Antimicrobial Resistance at the community level; Using Participatory Video methods to explore behaviours that drive AMR.

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Submitted in accordance with the requirements for the degree of PhD

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December 2022

The candidate confirms that the work submitted is her own and that appropriate credit has been given where reference has been made to the work of others.

Publications

The candidate confirms that the work submitted is her own, except where work which has formed part of jointly authored publications has been included. The contribution of the candidate and the other authors to this work has been explicitly indicated below. The candidate confirms that appropriate credit has been given within the thesis where reference has been made to the work of others.

Information on AMR from chapter 1 appeared in publication as follows:

Cooke, P., Shrestha, A., Arjyal, A., Giri, R., Jones, N., King, R., Mitchell, J., Tait, C., Donlan, I.S. and Baral, S. 2020**. What is 'antimicrobial resistance' and why should anyone make films about it? Using 'participatory video' to advocate for community-led change in public health**. *New Cinemas: journal of contemporary film.* **17**(1), pp.85-107.

I was responsible for contributing core AMR related knowledge to the introductory passages of this paper, editing and reviewing drafts of the manuscript.

Work from chapters 1 (why is gender important to AMR),3 (building an analysis framework) and 5 (findings from the CARAN study when applying a gendered framework) appear in a publication as follows:

Jones, N., Mitchell, J., Cooke, P., Baral, S., Arjyal, A., Shrestha, A. and King, R. 2022. **Gender and Antimicrobial Resistance: What Can We Learn From Applying a Gendered Lens to Data Analysis Using a Participatory Arts Case Study?** *Frontiers in Global Women's Health.* **3**.

I was responsible for conceptualisation, data curation, formal analysis, methodology, writing – original draft, writing – editing and review.

Acknowledgements

It would be difficult to summarise just how much I've appreciated the help and support I've received from my supervisors. This thesis would have been impossible without their guidance, particularly through uncertainty during the COVID-19 pandemic. As my lead supervisor, Rebecca has provided careful, fair, and always kind feedback. I'm deeply grateful for her optimism, compassion, and attention to detail. Paul always made sure to support my artistic and creative development alongside academic. I know that I would not be as confident to explore the unknown without his support. Without these supervisors, I know this project and thesis would not have been nearly as exciting, fulfilling or grammatically correct as it currently is.

I'd also like to thank the HERD International team; their support and enthusiasm has been instrumental in this thesis. Without their collaboration, this project would not have been possible.

Doing a PhD can be a lonely experience, but I've been lucky enough to make some wonderful friends from colleagues throughout my time as a PhD candidate. I'll always be grateful for the insights, coffee breaks and jokes we've shared. The 'Changing The Story' teams welcoming and supportive environment gave me a friendly space to work at a time when I needed it most. They gave me encouragement and helped my confidence grow. I also want to thank colleague and friend Jess, who's unerring guidance and patience has seen me though some difficult times. Always there with some advice, a knowing nod, and a glass of well-deserved wine – Jess has shown me how to be a young woman in academia. I'm excited to see what the future holds for us both.

Support from my family has been the cornerstone of my PhD experience. My family has been with me though challenges and celebrations, always ready to cheer me on. I'm incredibly proud to come from a long line of powerful, kind, and funny women – without whom I'd be truly lost. My mother has always told me I can do anything I set my mind to, her support over these years has been instrumental in my success.

Finally I really must give honourable mention to Angus the dog – the best companion and all-around good boy.

Abstract

Antimicrobial resistance (AMR) is one of the current leading causes of death globally (Murray et al., 2022). In 2019 AMR was associated with 4.95 million deaths, of which 1.27 million were directly attributable to AMR (Murray et al., 2022). While AMR is a global concern, its impacts are most acute across lower-middle income countries (Murray et al., 2022; Singer et al., 2016) where lower levels of health resources impact levels of sanitation, access to healthcare and clean water (Alvarez-Uria et al., 2016; Holmes et al., 2016). Although AMR is a naturally occurring process (WHO, 2018a) it has accelerated in recent years largely due to misuse and overuse of antimicrobial substances such as antibiotics (WHO, 2015b; WHO, 2018e). This overuse is considered a behavioural driver of AMR.

In order to address these behavioural drivers of AMR, we must first understand their origin and causes. This thesis will contribute to the literature on AMR by utilising community engagement (CE) methods is AMR research. This thesis looks at gendered and One Health perspectives of AMR drivers through CE methods and advances our thinking of participatory video methodology in health research through a review and development of an interdisciplinary evaluation framework. Analysis chapters develop evaluation tools for PV in health research as well as identify intersectional drivers of AMR at the community level. This thesis also highlights a need for integrated evaluations that equally value outcomes from arts and health perspectives.

This thesis will explore the use of Participatory Video (PV) in AMR research and collate a set of recommendations and tools for future research projects. This work advances our thinking on the use of PV in health research and highlights the need for and potential value of interdisciplinary evaluation of PV in health projects.

Abbreviations

ACRONYM/ABBREVIATION	DEFINITION
AMR	Antimicrobial Resistance
ABR	Antibiotic Resistance
LMIC	Low-Middle Income Country
WHO	World Health Organisation
OIE	World Organisation for Animal Health
FAO	Food and Agriculture Organization of the United Nations
GAP	Global Action Plan
SDG	Sustainable Development Goals
HERD	Health Research and Development Forum (Nepal)
CARAN	Community Arts Against Antibiotic Resistance Nepal
FCHV	Female Community Health Volunteer
PV	Participatory Video
CE	Community Engagement

Table of Contents

Table of Figures

Chapter 1: Introduction

Antimicrobial resistance (AMR) is one of the current leading causes of death globally (Murray et al., 2022). In 2019 AMR was associated with 4.95 million deaths, of which 1.27 million were directly attributable to AMR (Murray et al., 2022). While AMR is a global concern, its impacts are most acute across lower-middle income countries (Murray et al., 2022; Singer et al., 2016) where lower levels of health resources impact levels of sanitation, access to healthcare and clean water (Alvarez-Uria et al., 2016; Holmes et al., 2016). Although AMR is a naturally occurring process (WHO, 2018a) it has accelerated in recent years largely due to misuse and overuse of antimicrobial substances such as antibiotics (WHO, 2015b; WHO, 2018e). This overuse is considered a behavioural driver of AMR.

In order to address these behavioural drivers of AMR, we must first understand their origin and causes. One approach to understanding these drivers involves community engagement (CE), an approach currently under-utilised in addressing AMR. This thesis will contribute to the literature on AMR by utilising CE methods is AMR research. This thesis looks at gendered and One Health perspectives of AMR drivers through CE methods and advances our thinking of participatory video methodology in health research through a review and development of an interdisciplinary evaluation framework. This thesis will focus on the behavioural drivers of antimicrobial resistance (AMR) from multiple perspectives. Using community engagement (CE) methods to generate community-led solutions to complex issues is a growing approach in public health. This thesis will explore the use of one method of CE; Participatory Video (PV) in AMR research and collate a set of recommendations and tools for future research projects. This work advances our thinking on the use of PV in health research and highlights the need for and potential value of interdisciplinary evaluation of PV in health projects.

This thesis centres around a pilot study, conducted in Kathmandu Nepal in 2017-2019: the Community Arts Against Antibiotic Resistance Nepal (CARAN) project. The CARAN project used participatory video methods to engage two communities in AMR research. From this project, community members produced films on the topic of AMR, spoke directly with policymakers and organised community showcasing events to share their reflections on the drivers of AMR in their local setting Initially, this thesis was intended to take key lessons from the original CARAN project and apply them to new fieldwork. However, due to COVID-19 pandemic restrictions my work had to be reconfigured. Consequently, the data

analysis chapters of this thesis utilise the data gathered in the CARAN project to unpack specific issues related to community-level drivers of AMR, issues that were not the primary focus in the original project, but the importance of which can be found clearly within these data. A further description of the data collection methods employed during the CARAN project will be presented in the 'methodology' chapter, later in this thesis.

What is AMR

Antimicrobial resistance (AMR) is the ability of a microorganism – such as bacteria, viruses, parasites, and fungi – to stop an antimicrobial (antibiotics, antivirals, antimalarials and antifungals) from working fully, allowing for infections to continue and to spread to others. This can lead to the treatment courses for these infections eventually becoming ineffective and other, more complex, courses of treatment being required to stop the infection (WHO, 2018a). Although AMR is a naturally occurring process which emerges over time, resistance has increased at an alarming rate due to the overuse and misuse of antimicrobials worldwide (WHO, 2018a). A recent review found that, in 2019 alone, AMR was associated with 4.95 million deaths globally (Murray et al., 2022). The alarming findings highlighted the issue of AMR as a global health emergency and confirmed that we are currently on-track to reach the WHO prediction that approximately 10 million deaths per year will be attributable to AMR by 2050 (WHO, 2019c). AMR infection rates are directly affected by factors such as levels of sanitation, infection control and access to safe, clean water (Holmes et al., 2016). Research shows a significant relationship between resource-poor countries and a presence of antimicrobial resistant infections (Alvarez-Uria et al., 2016).

Citizens living in LMICs, in addition to experiencing higher rates of infections, are also more likely to struggle with treatment options for antimicrobial resistant infections. Common infections are becoming more difficult to treat, with increasingly expensive combinations of medications needed to effectively treat these illnesses (CDC, 2018). Globally, the burden of AMR will place strain on even well-established health systems (Le Doare et al., 2015) and pose a potentially disastrous threat to health systems that already struggle to meet the health needs of a population. Out of pocket expenses for patients in LMICs account for up to 42.3% of national health expenditure (World Health Organization, 2016). Where costs at the individual level are 'catastrophic', i.e. equal to or exceeding 40% of the household income (World Health Organization, 2016), poorer populations will be disproportionally affected by

increased treatment costs(Liu et al., 2021). Many households choose not to seek medical services out of fear of these ‘catastrophic’ costs (Xu et al., 2003; Galárraga et al., 2010; Okoroh et al., 2018), further exacerbating the spread of communicable diseases.

Antibiotic resistance (a type of antimicrobial resistance) has been found to be present in every country (WHO, 2018a), with patients suffering from resistant infections more at risk of worse clinical outcomes and death. Concerns about moving towards a post-antibiotic era, where the achievements of modern medicine are significantly undermined, have prompted the WHO and partners to focus on AMR as a priority in recent years (World Health Organization, 2014). A stark example of the effects of drug resistance is the rising number of multi-drug resistant tuberculosis (MRD-TB) cases. The WHO estimates that 240,000 people died of MDR-TB in 2016 alone (WHO, 2019b). Anti-TB medication has been used for decades, so resistance to such medication is widespread, with treatment for the disease becoming more complex and costly (WHO, 2017a). Infections such as pneumonia, gonorrhoea and salmonellosis are also becoming harder to treat as the antibiotics used to treat them become less effective (WHO, 2018a).

Furthermore, complex medical interventions such as surgeries and cancer treatments rely heavily on the use of antibiotics in the recovery process for patients. Treatment outcomes for such interventions would be negatively impacted without effective antibiotic courses (WHO, 2018a). In effect, the advances of modern medicine are being jeopardised by the advancement of antibiotic resistance (WHO, 2018a).

The World Bank is the world’s largest development institution and provides financial support to low income countries for development (World Bank, 2021). Comprising 189 member states, the World Bank is a partnership that works towards developing sustainable solutions to reduce poverty and promote prosperity in developing countries (World Bank, 2021). The World Bank generates reports and collects data on global issues such as poverty, health, climate change, education, and conflict. A 2017 World Bank report projects that AMR will cause global GDP to decrease by 1.1%-3.8% by 2050, ranging from a significant to a severe economic burden, depending on the actual rate of AMR (World Bank, 2017). While this economic loss will affect all countries, LMICs are likely to be caught in a cycle of poverty exacerbated by the effects of AMR. LMIC economies often rely heavily upon labour-intensive sectors such as farming and factory work, sectors that would suffer

great declines in output and growth in comparison to sectors that are more capital-intensive (World Bank, 2017). As productivity decreases due to an increasing burden of communicable diseases, GDP also decreases, with less money available at the individual, household, district, and national levels to fund social mobility and development. The World Bank predicts that, if left unchecked, AMR will cause a further 24 million people will be pushed into extreme poverty by 2030 (Jonas OB, 2017).

In addition to a decrease in national productivity, national healthcare costs are likely to rise for nations and individuals (WHO, 2018a). For individuals, the costs of effective medication are likely to rise due to increased resistance. More complex, less effective, treatment plans will also likely lead to longer hospital admissions(WHO, 2018a), excluding populations who can neither afford expensive treatment or long periods of time away from work. For nations, especially for LMICs, there is a delicate balance to be drawn between increasing access to vital antimicrobials and reducing misuse. Any efforts to monitor AMR, enforce policy changes or even incentivise a change in behaviours in relation to AMR at the national level often require resources that might not be available to some LMICs (Seale et al., 2017). Effective research and development for new drugs has slowed in recent years due to a lack of profits for private pharmaceutical companies; governmental agencies are needed to incentivise developments in key AMR research areas (Roope et al., 2019) which again requires resources that might not be available to some LMICs.

Although AMR is now recognised as one of the greatest threats to human health worldwide (Basnyat, B. et al., 2015), it has only recently been added into the United Nation's Sustainable Development Goals (SDGs). The SDGs act as a call to action for all member states to ensure peace and prosperity for all life on earth (UN) and recognise that progress cannot be made in one area alone; for example poverty (SDG 1) cannot be significantly reduced without considering health (SDG 3), education (SDG 4), infrastructure (SDG 9), equality (SDG 10) and economic growth (SDG 8)(World Health, 2020a). In response to the SDGs, the WHO laid out an infographic that views each goal from the perspective of SDG 3 – Good Health and Wellbeing:

Figure 1 - WHO's SDGs from a Heath Perspective(WHO, 2021a)

In this example, WHO demonstrates how, as health practitioners and researchers, we must consider issues beyond health to improve the quality of life globally. In the above image issues such as improved health education, empowering institutions for sustainable growth, preventing diseases through safe and reliable water and sanitation facilities are considered priorities for improved health globally. In much the same way, AMR should be viewed as an intersectional issue that impacts and is impacted by all SDGs. AMR was recently added into the SDGs, specifically as an indicator in SDG 3 – Good Health and Wellbeing – as an addendum to target 3.d which focuses on capacity building in low-income settings. The addition reads:

3.d.2: Percentage of bloodstream infections due to selected antimicrobial-resistant organisms

This addendum, though approved in 2019, only recently appeared in the official UN documentation. The inclusion of AMR indicators to an SDG shows progress. However, given the impact AMR has on factors such as food security, and how it is driven by factors such as poor sanitation (World Health, 2020a), it would be prudent to add AMR indicators into other SDGs. The overlap in AMR indicators and those already included among various SDGs would allow for monitoring and progress activities to be logged within existing SDGs. Even within SDG 3 there is opportunity to expand existing indicators; one example would be to include whether under 5's diagnosed with pneumonia (indicator 3.8.1) not only sought care but were offered antibiotics (IISD, 2019).

The One Health Approach

The concept of One Health emerged in the early 2000s as an official presentation of an idea that had been understood by experts across the human, animal and environmental fields for many years (OIE, 2020). The One Health approach was coined, in part, as an evolution from the 'One Medicine' concept that linked human and veterinary health practices (Van Helden et al., 2013) to fully integrate the relationships between human, animal and environmental health. Many of the microbes and pathogens in our eco-systems that affect animals also affect humans, and any response from one sector alone cannot fully address the wider issues (WHO, 2017b). Below is a diagram illustrating the interconnected fields in the One Health approach:

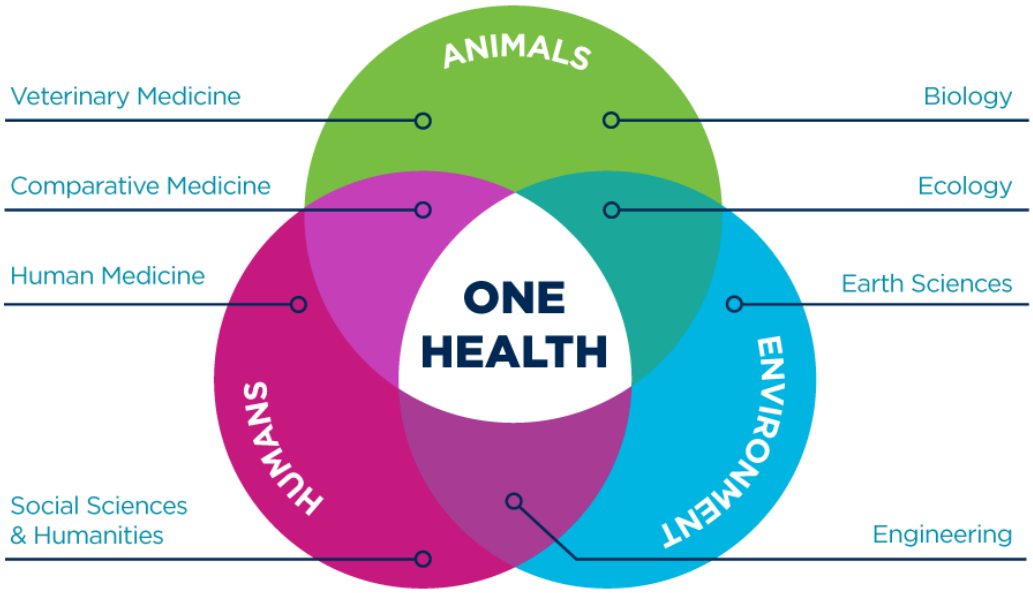


Figure 2: An illustration of the One Health approach; the intersectional nature of human, animal and environmental health sectors (UC DAVIS, 2020)

The One Health approach sets global standards of practice to better develop understanding as well as interventions to reduce AMR. One Health recognises that the goals set out are unlikely to succeed without the cooperation of all stakeholders, and places equal importance on all risk factors: human, animal, agricultural and environmental.

An example of the One Health concept in action could be made of the recent COVID-19 pandemic. Though the exact method of transmission from bats to humans is not yet known (Shereen et al., 2020), a 2021 WHO report suggested that the virus was likely to have passed to humans via an intermediary farmed animal and that further surveys should be conducted on the supply chain of farmed animals where intensive farming practices are common (WHO, 2021b). Global trade and tourism routes allowed the virus to travel internationally at extreme rates, infecting millions across the globe within months of its initial discovery (Ahmad and Hui, 2020). Farming and animal practices were, then, likely to be the origin of the virus but our collective behaviours exacerbated the spread to a global level. The One Health approach, here, is essential to understanding transmission routes and behaviours that led to this outbreak as well as potential prevention and mitigations for future zoonotic outbreaks of a similar nature (Bonilla-Aldana et al., 2020).

In relation to AMR specifically, the One Health approach allows us to holistically consider the drivers, as well as the solutions to AMR at the global level. As resistance

to treatment builds across multiple strains of harmful bacteria, our behaviours drive AMR at ever-increasing rates. Any interventions to slow the spread of AMR require multi-agency cooperation as well as prolonged concentrated efforts to educate the public on infection prevention, sustainable consumption and safe disposal of antimicrobials as well as strong regulations and policy (Moran, 2017). AMR is primarily driven by the inappropriate use of antimicrobials (across both human and animal/agricultural health sectors); a human behaviour that will take much effort to change (WHO, 2018f).

Why is CE useful when looking at AMR from a One Health perspective?

While global guidelines can inform regional and national governments on best practices, community generated solutions to local issues with antimicrobial and antibiotic misuse are essential to effect behaviour change (Chhorvoin Om, 2017; Anna K. Barker, 2017; Peng et al., 2018). Community engagement is not, though, directly addressed in the most recent IACG report delivered in early 2019. One recommendation briefly mentions the effective engagement of 'civil society' for more effective action against AMR (IACG, 2019). In the drivers of AMR, especially in human health, a lack of understanding on both how/when to take antibiotics effectively and the potential risk of AMR contribute to the continuation of AMR drivers. (McParland et al., 2018; Gualano et al., 2015). These problematic behaviours largely occur at the community level, especially in countries where antimicrobials and antibiotics are available without prescription. Public engagement, especially at the community level, is central to informing the public on the issue of AMR and how their behaviours can impact the issue (McParland et al., 2018). Additionally, in engaging with the public directly to reduce the demand for antimicrobials, community engagement interventions can have synergistic effects on other interventions designed to reduce the supply of antimicrobials (for example interventions aimed at reducing prescriptions of antibiotics from healthcare professionals) (Elouafkaoui et al., 2016; Treweek et al., 2016). It is imperative that we use community engagement, linking our AMR response directly to those living in the 'civil society' referred to in the IACG report, to first understand then address the community-level barriers to improved antimicrobial behaviours.

While the One Health approach has received increasing support in recent years, there are few examples of it being put into practice at the community level (Cunningham et al., 2017).One Health has been applied to macro-level policy through guidance such as the Global Action Plan (WHO, 2015b) but engagement from community members is essential to both inform and enact any One Health policy (Henley et al., 2021).

Chapter 3 will present literature on the One Health drivers of AMR and develop an analysis framework using the CARAN data as a case study. This chapter will firstly discuss the macro-level drivers of AMR from human, animal and environmental sectors highlighting the overlap between them. From there, this chapter will present a need for focus on community level research and interventions. Currently, the available literature on the One Health approach illustrates the connections between human, animal, and environmental health (not just in relation to AMR, but more generally) on a macro/global scale, rather than at the community level. There is a gap in our understanding of how the connections between human, animal and environmental health behaviours and drivers play out in the daily lives of high-risk communities. The need for community-level interventions to co-produce sustainable solutions to the drivers of AMR will be further discussed in Chapter 3. Using the community-level data gathered during the CARAN project, this first analysis chapter will present evidence of AMR drivers at the community level and develop a framework to better analyse future community-based projects in the field of AMR.

Why is gender important in relation to AMR?

In early readings of the CARAN data, it became clear that gender played a role in the behaviours that drive AMR in those communities. Chapter 5 therefore, will seek to unpack the relationship between gender and AMR in both the wider literature and in the CARAN data. There is a dearth of literature that links gender to the behaviours that impact AMR, despite gender being a widely accepted factor that impacts all aspects of a person's health experiences (health seeking behaviours, access to facilities, social norms and traditions(Verbrugge, 1985; Doyal, 2001; Matthews, 2015; Graham, 2009)). This chapter will illustrate the need to focus on gender within AMR research and analyse the data produced by the CARAN project via a specifically gender-focussed analysis framework to a set of community engagement data (CARAN). In doing so, this chapter illustrates the value in seeking gender-based information from communities and highlights the opportunity to revisit qualitative data sets to explore the issue of gender more thoroughly.

Biological sex can influence trends in antibiotic usage and prescription. For example, common urinary infections can differ by sex (den Heijer et al., 2013). There is some evidence to suggest that sex-based trends in AMR-related topics occur, though these studies often conclude that further research is needed to better understand the behavioural mechanisms that cause these trends. Sex and gender are of course linked, both sex and gender influence the needs of a body. However, especially when

considering AMR, current research there is a need for integration of both sex and gender considerations on all stages of research projects (Day et al., 2016).

Differences in AMR- related practices and need for antimicrobials can differ due to gendered factors. Data across surveillance networks in Germany, for example, show that men are approximately twice as likely to have an AMR infection than women (Brandl et al., 2021). The gender of a patient can impact patterns in prescribing behaviours, for example in Estonia, one study found that women were more likely to be prescribed antibiotics unnecessarily (Tisler-Sala et al., 2018). Interestingly, this differs by study population; a 2007 study in Tanzania found that men were more likely to be prescribed antibiotics unnecessarily (Leonard, 2007). Gender inequalities can influence the level of access to various health facilities. Where patriarchal values are prominent, boys and men are often prioritised for treatment over female family members (Barasa, 2019). Though predetermined by biological sex, these trends are based in behaviours. Gender norms shape health needs and use of medications through access to and utilisation of health services, decision-making power, access to and control over resources (including paid employment) as well as risk behaviours in relation to the seeking and use of antibiotics and antimicrobials (ReAct, 2020).

Why is CE useful when looking at gender?

Gender inequality, in relation to AMR, intersects with One Health topics. Gender inequality is present in farming and agriculture; only 13% of landowners are women (UNDP, 2021). However, women typically do more livestock care than men and make up around two thirds of all poor livestock farmers (ILRI, 2021). As a consequence of completing the majority of the care for animals, women are more likely to be exposed to AMR residues and pathogens (and other harmful pathogens) than men. A study of farmers in the Philippines, for example, found that female farmers had high prevalence of respiratory infections due to exposure to harmful chemicals from activities such as manuring, ploughing and plant protection (Lu, 2007). In contrast, the male farmers in the same study were most likely to experience back pain, reflecting the nature of gendered roles within farm work (Lu, 2007; ILRI, 2021). Though women farmers are typically more involved with daily care for animals, men are more likely to be landowners and therefore are prioritised by animal health services and receive higher access to medications and information on animal care (ILRI, 2021). Female farm work is often unacknowledged (Shortall, 2006; Whatmore, 2016). This information provides

some initial insights into some of the gendered aspects of AMR drivers in agriculture. However, there is much still to uncover.

Patterns in infectious disease spread, including antimicrobial resistant infections, are deeply influenced by the social and political dynamics of a community (WHO, 2015b). The intersections between gender and other social elements such as poverty, work division, roles in a community need to be better understood in the fight against antimicrobial resistant infections (White and Hughes, 2019). Health systems research, with a gendered lens, can identify the areas in which different genders experience health systems differently. A 2018 WHO bulletin identified multiple areas where SDGs 3 (health) and 5 (gender) intersect, including social determinants, health behaviours and health systems. Under health systems issues, women can experience barriers in health education, employment opportunities (limited income), governance issues, gender roles etc (Manandhar et al., 2018). Health systems research must take gender (and sex) into account when looking at all areas of health behaviours and outcomes in a community (Johnson et al., 2009). Gender inequality can also negatively impact men's health, in particular men have lower life expectancies and are more likely to engage in unhealthy behaviours as a result of various social norms (Sen and Östlin, 2008). Research suggests that gender can influence every part of an individual's health experiences (Östlin et al., 2006), prompting the exploration of the relationship between gender and AMR within this thesis.

PV

Co-production

Co-production of knowledge in health research is a process of collaboration between researchers, community members and other relevant stakeholders to generate and share different types of knowledge to improve health services (Vindrola-Padros et al., 2019). Co-production of knowledge between community members and researchers has the potential to generate new insights into research practices and values, such as justice and equity, that transcend economic value alone (Filipe et al., 2017). Genuine collaborating between stakeholders, though, can present challenges. Developing sustained relationships between multiple parties across a project requires large amounts of time and effort and can be negatively impacted by any factors from each stakeholder group (e.g. personnel changes within the research team, or a shift in political priorities from policy-makers) (Rycroft-Malone et al., 2016). If achieved, genuine co-production moves away from the traditional, and often constraining,

methods sometimes associated with health research and towards a ‘third space’ between researchers and the lay-person (Rose and Kalathil, 2019). The term ‘third space’, here, referring to a space that acknowledges the expert knowledges from both researchers and participants to enable equal and meaningful negotiations between the two(Rose and Kalathil, 2019; Sackett).

What is PV

Participatory Video (PV) is an arts-based methodology that co-produces videos with a group or community in order to engage participants in exploring issues that affect them, voicing concerns or expressing group creativity (Lunch and Lunch, 2006). PV interventions are generally viewed as a positive means for co-production of knowledge and prompts for positive social change (Milne et al., 2012). The design of PV aims to diminish traditional hierarchies between researchers and participants and, if used correctly, can create spaces of learning and transformation for participants and researchers (Kindon, 2003). PV can play a significant role in supporting and amplifying the voices of marginalised communities (Jiang and Kobylinska, 2020).

Chapter 2 will present a scoping review of the available literature on PV in health. The review highlighted a key need for an evaluation framework that reflects the complex and interdisciplinary nature of PV in health studies. Following from this, Chapter 6 will present the process of developing an interdisciplinary evaluation framework that can be applied to future PV in health projects as a means to evaluate both the process of intervention and the health outcomes from that intervention.

CARAN

One project that looked to combine AMR and PV was the CARAN project (Community Arts Against Antibiotic Resistance in Nepal)(HERD, 2017). The CARAN project ran between 2018-2019 across two communities in Kathmandu: in one urban (Madhyapur Thimi) and one peri-urban (Chandragiri Municipality) location. Each iteration of the project included a one-week series of workshops that introduced the key issues in AMR (antibiotic resistance) as set out in the WHO guidelines, through various arts-based interactive exercises. Each exercise was designed to allow community members to reflect on the issues of AMR from their own, local, perspective. Alongside these exercises, participants were trained in filmmaking. Each workshop group produced three videos, making a combined total of six films that engaged with issues related to AMR from the community perspective. The films can be viewed here: https://www.youtube.com/watch?v=GBZCunEPD3U and https://www.youtube.com/watch?v=W-R205-kudQ.

These films were showcased at local events where community members and multiple policymakers were in attendance. Showcasing events were designed to highlight the project outcomes and start community dialogues on how this project might be taken forwards in the future.

The CARAN project set out to look at human health behaviours in relation to AMR at the community level. The objectives of the CARAN project were:

- To identify critical barriers to preventing and controlling ABR at the individual, household, and community levels
- To enable communities to identify solutions to overcoming these barriers
- To present the identified issues and solutions in the form of documentary films to community, district, and national level stakeholders for maximum impact.

(HERD, 2017)

The CE process highlighted the OH elements present within the communities; within all interactions with participants and community members, elements of one health approaches came through. Workshop participants discussed their farming activities (something common amongst participants, some of whom rear animals at home) and participants decided to highlight various animal and environmental elements within their films (Cooke et al., 2020a). This echoes the gaps already highlighted in this introduction; there is a need to use community engagement methods to unpack the complex social dynamics of a community and how these dynamics lead to AMR-driving behaviours. The films also echo a need to look closely at the gendered power dynamics that affect the behaviours driving AMR at the community level and to co-produce genuine and effective solutions to these behaviours.

The original plan for this PhD programme was to use the CARAN project as a trigger point for further research into specific areas of interest (one health and gender). However, due to COVID-19 travel restrictions coming into effect at the beginning stages of fieldwork, it was not possible to gather new data for this PhD. This did, though, present the opportunity to revisit the CARAN data in more detail, reanalysing the data gathered and developing new frameworks to guide future research projects in this area. A full description of the data collection and analysis methods are presented in the Chapter 3 in this thesis.

Researcher positionality in relation to the research

During my undergraduate studies, based in a contemporary performing arts degree, I became increasingly interested in the use of arts in other fields. One of my third-year projects focussed on developing assisted technologies to improve access to musical performance for adults with physical and learning disabilities. This project was inspired by my time as a carer for adults with learning disabilities, and one woman in particular who wanted so much to play in a band but was physically not able to play a traditional instrument. In the years following my undergraduate studies, I continued to work as a carer and travelled to multiple countries.

When I returned to studying, after multiple years working in health and social care in the UK, I already had an interest in engaging often underrepresented communities. Working closely with people who are often subject to policy change without consultation, I was particularly interested in the ways in which health research shapes the lived experiences of underrepresented/under researched communities. During a Master's programme at the University of Leeds (International Health) I developed an interest in communicable diseases. In my personal life, as well as in my studies, I became increasingly interested in gender disparities and how these impact on health.

During my studies as a masters student, the opportunity to apply for this PhD programme arose and seemed to combine my personal interests and experience as a performing arts and health student. From the initial brief, the focus of this PhD has been informed by my passion to explore gender disparities in health and to better understand the perspectives of communities whose lives are impacted by the research we do in the 'global north' and the policies that are enacted/adapted from this research.

Study timeframe

I was enrolled onto this PhD programme in October of 2018. The first phase of research (PV literature review and fieldwork planning) was completed during 2018-2019. Planned fieldwork activities were to commence in Spring of 2020. These were initially postponed then cancelled due to COVID-19 travel restrictions. During 2020 I reworked the plan of the thesis and decided to use the CARAN data to develop my frameworks, having been granted access to the original raw data by the original HERD and Leeds teams.

Structure of thesis

Research aim

This thesis seeks to unpack the complex behavioural drivers of AMR at the community level in an LMIC setting (Nepal) and develop a toolkit from this learning that will guide future research in CE methods in AMR research.

Research objectives

1. An exploration of the use of participatory video in health research
    a. To map the existing literature on PV in health and present the potential value in utilising PV in AMR research specifically.
    b. To identify key gaps in our understanding when applying PV in a health setting.
    c. To develop an evaluation framework as a means to standardise the place of PV in health-reporting methods.

2. To develop a framework for analysing a qualitative data set for One Health AMR driving behaviours at the community level.
    a. To identify the overlapping One Health behaviours that drive AMR in a specific LMIC setting (Nepal).
    b. To develop a framework that can be used to analyse qualitative data for one health behaviours at the community level.
    c. To present the findings from applying this framework to the CARAN data.

3. To unpack the relationship between gender and AMR driving behaviours in a community setting.
    a. To identify the literature linking gender and AMR at any level
    b. To identify gender-based AMR-driving behaviours in the CARAN data
    c. To provide recommendations for future research

The learning from these sections of the thesis has been synthesised into a guidance manual that has been presented as a final output.

4. To incorporate findings from this thesis into a toolkit for PV in AMR researchers in the form of a revised facilitators manual

a. To review an existing manual, developed during the CARAN project and identify areas that need to be amended.

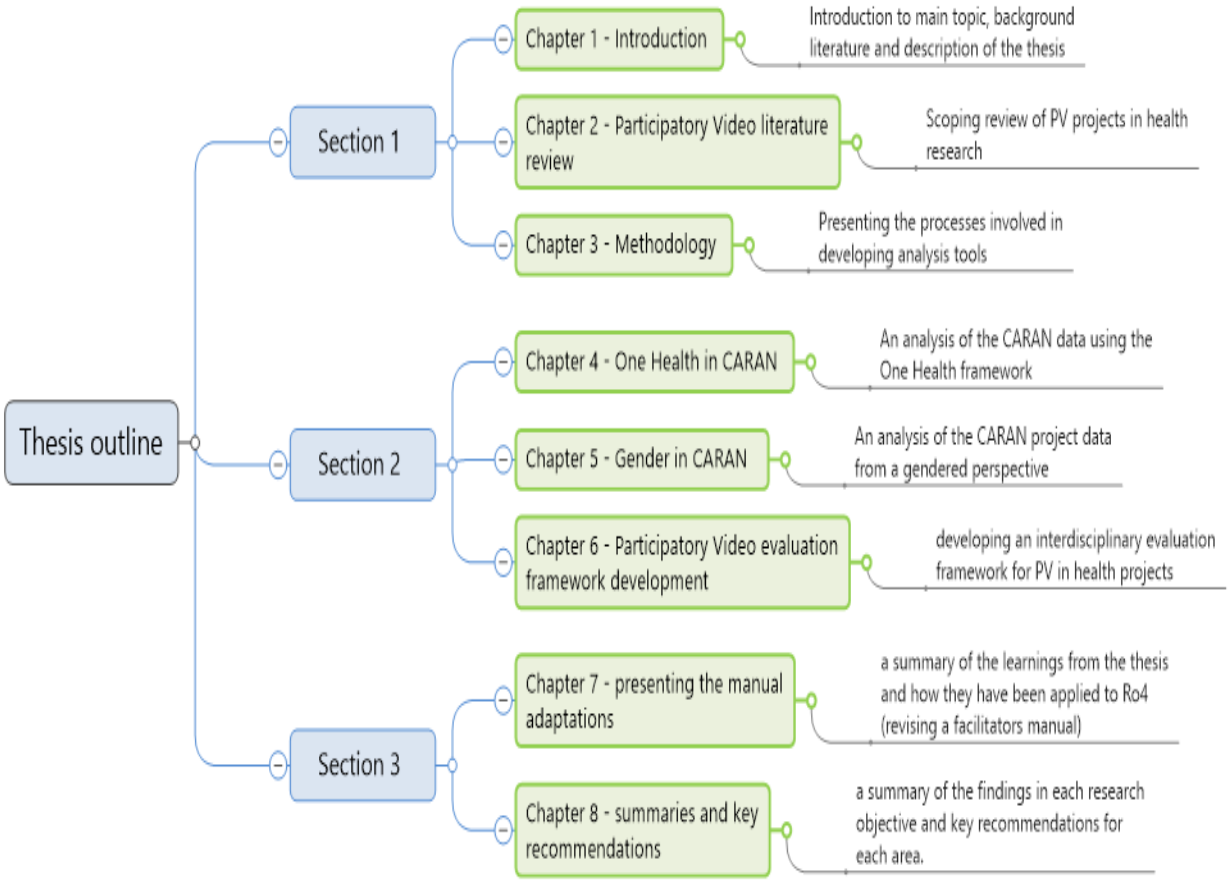
The findings of this research will be applied in multiple ways. The key outputs are:

1. A scoping literature review presenting the use of PV in all health studies
2. An evaluation framework that can be applied to all PV in health studies in any context
3. A One Health analysis framework that can be applied to any other Community Engagement, qualitative study on AMR drivers at the community level

Although the manual is developed from learning from Nepal specifically, all additions and amendments were presented to multidisciplinary teams from multiple countries for feedback. A discussion on the use of the revised manual in a training programme will be presented in Chapter 3 later in this thesis.

The final manual, presented in the concluding section of this thesis, is designed to be accessible and easily understood by researchers across One Health sectors to encourage interdisciplinary collaboration (this can be extended to policymakers and other stakeholders where appropriate). This thesis provides guidance for researchers who are interested in improving interdisciplinary collaboration in AMR research, especially in LMIC settings.

Thesis outline



Chapter 2: Participatory Video scoping review

Introduction

This chapter maps the existing literature on PV in health research to both highlight the value of using PV interventions to unpack complex health issues and to identify key gaps in our understanding when applying PV to health research.

AMR, as explored in the introductory chapter of this thesis, is a complex One Health issue influenced by multiple factors played out across different sectors of human, animal d environmental health. Complex socially driven issues, such as AMR, require innovative and nuanced ways of co-producing knowledge and identifying realistic solutions. Co-production of knowledge between community members and researchers, though challenging, has the potential to generate new insights into research practices and values, such as justice and equity, that transcend economic value alone (Filipe et al., 2017). Generating sustained relationships between multiple parties across a project requires large amounts of time and effort, especially during the early stages of development. These relationships can be negatively impacted by any factors from each stakeholder group (e.g. personnel changes within the research team, or a shift in political priorities from policy-makers) (Rycroft-Malone et al., 2016). If achieved, genuine co-production moves away from the traditional, and often constraining, methods often associated with health research.

Within AMR research, community engagement (CE) projects are a growing area of interest. The term community engagement has been used to describe a wide range of practices that aim to generate interactive relationships with groups of people (communities) who share specific demographics (MacQueen et al., 2015). While terms like ‘community’ can be considered vague, implying a sometimes misleading sense of cohesion among grouped individuals (Head, 2007) this thesis will continue to adopt the phrase community engagement/CE given the current language in the wider literature and case study discussed in later chapters.

As discussed in previous chapters, AMR research needs to reflect the complex and diverse nature of the issue at multiple levels. Community engagement (CE) as a means to co-produce knowledge is growing in popularity, though there is still very little known regarding the success in using CE to address AMR (Mitchell et al., 2019). Much of the available evidence available in this area relies on knowledge, attitudes, and practices (KAP) data to show success and more research is needed into the value of specific methods of community engagement in AMR research, and health research more

broadly. This chapter will present a scoping review on an arts-based methodology that aims to co-produce knowledge and resources with participants and other stakeholders.

Participatory Arts Research

Participatory research, as a methodology, encourages active participation with individual and/or community engagement in an intervention in order to find viable solutions to a problem (Higginbottom and Liamputtong, 2015). It uses local culture, knowledge and perspectives as a basis for research, ultimately aiming to redress power imbalances between researchers and participants (Cornwall and Jewkes, 1995). Potentially transformative in nature for the communities involved, participatory research aims to involve communities in effective knowledge exchange, amplifying the voice of often underserved or marginalised participants and therefore increasing the likelihood of an effective and acceptable intervention (Wallerstein, N. and Duran, 2010). Both the arts and research share the objective of understanding and exploring human experience (Eisner, 2006). The use of arts in research brings an opportunity to not only enhance approaches to academic research, but also to present knowledge in new ways (Boydell et al., 2012). Arts-based participatory research aims to bridge the gap between scientific research and the arts (Leavy, 2015) exploring the potential to gain insight beyond spoken or written data, using sometimes experimental means to create a more complex understanding of a person or situation (Barone and Eisner, 2011). Using arts-based approaches in health research can supply the researcher with a wider range of investigative and communicative tools than traditional research methodologies (Leavy, 2015).

Effective interdisciplinary research equips researchers and policy makers with nuanced solutions to complex, multifaceted health problems, such as AMR, through approaches that promote impartiality in research approaches (Bindler et al., 2012; Gavens et al., 2018). There is a growing body of evidence to suggest that participatory arts methods are beneficial in various health topics. A review found that participatory arts methods were beneficial to patients with dementia (Houston et al., 2017), and further studies based in mental health have found positive outcomes for participants related to improved creativity, self-confidence and ability to manage challenging behaviours (Margrove et al., 2013; Bone, 2018; Jensen and Bonde, 2018; Torrissen and Stickley, 2018; Sexton and Sen, 2018). When arts-based methods were used in engaging nurses with the issue of AMR, researchers found that they were able to produce

insights into the thinking and practice of nurses and ultimately identify opportunities to maximise nurse involvement with reducing AMR (MacDuff et al., 2020).

Participatory video

Participatory Video (PV) is an arts-based methodology that co-produces videos with a group or community in order to engage participants in exploring issues that affect them, voicing concerns or expressing group creativity (Lunch and Lunch, 2006). Originating from a method of filmmaking labelled the 'Fogo Process' – so named because of a Canadian film festival project – PV aims to involve populations in the filmmaking process that are most often the subject of top-down directed documentary. The Fogo Process was coined to reflect a more complex way of making films than a more traditional documentary style, and was as much about the process of filmmaking for participants and communities than the films they produced (Crocker, 2003). Traditionally, documentary film subjects have little or no control over how they are portrayed and represented whereas participants in a PV project are encouraged to control their own narrative (Lunch and Lunch, 2006). Participants can, with support from facilitators, curate their own end-product from the framing of each shot to the messages being delivered in the final edit of the video itself. Participants are limited only by their own imagination – or sometimes the amount of available resources – and are given the power to deliver their message in whichever way they choose, be that drama, interviews or documentaries. Participants are given a set of skills through the process of PV: filming, editing, story-boarding etc. Participants in PV projects have the potential, therefore, to be fully in control of what they create, and can advocate for change themselves rather than through intermediaries/facilitators (Willis et al., 2014).

PV methodologies are generally viewed as a positive means for co-production of knowledge and prompts for positive social change (Milne et al., 2012). The design of PV aims to diminish traditional hierarchies between researchers and participants and, if used correctly, can create spaces of learning and transformation for participants and researchers (Kindon, 2003). PV can paly a significant role in supporting and amplifying the voices of marginalised communities (Jiang and Kobylinska, 2020). While the aims of PV are laudable, it is important that researchers are mindful of their often liberal assumptions of the power dynamics of the study population; often individual or grass-roots 'empowerment' projects do not reflect the political environment of the study (Walsh, 2016). Furthermore, terms such as 'empowerment' and 'giving voice' could be considered patronising to participant communities and do not reflect the co-produced nature of the method (Cooke et al., 2018). Critical analysis of any PV in health study

should consider these complex issues, alongside the inherent conflict between target-driven health research and exploratory research methods.

As an emerging methodology in health research, there is little critical engagement with the literature on PV in health l to assess its value or how it address the above mentioned challenges. The available body of literature on PV in health is growing, but there is currently no review that presents the collective evidence from this body of work. Though this thesis is concerned primarily with research in AMR specifically, this thesis has focussed on mapping the PV in health literature more broadly for multiple reasons. Firstly, at the time of this review, no paper mapped the available literature on PV in health research projects. Additionally, at the time of the review, no publications discussing PV in AMR research were published. This chapter, then, aims to map the PV in health literature to highlight it's potential value across complex health topics broadly and identify gaps in our existing knowledge in this area. More work is needed to determine the effects, results, limitations, and challenges of PV methodologies being used in health research to better inform future projects.

Aim/objective

The objective of this review is to map and examine the use of participatory video (PV) methodologies to explore health-related topics globally in order to provide an overview of the existing literature. This scoping review aims to answer the questions: what is currently reported on PV in health research, what can PV methodologies bring to health research and what are the main gaps in knowledge to be addressed in future research.

Methods

Search strategy

This scoping review aims to synthesise the current literature, mapping the available knowledge and identifying main concepts, theories, and knowledge gaps (Tricco et, al 2018) on PV in health research. As PV is an emerging methodology in healthcare research, a scoping review format was selected due to its suitability to characterise the broad and thus far unchartered scope of the topic (Arksey and O'Malley, 2005).

To identify potentially relevant documents, the following databases were searched from inception to 16th July 2018: CINAHL via Ebsco, Embase, Global Health**,** Medline, Medline in Process and PsycInfo via Ovid, and the Web of Science Core collection using a combination of text words and subject headings. The EBSCO databases British Education Index, Business Source Premier, Child Development and Adolescent Studies, Communication and Mass Media Complete, Education Abstracts (H.W.

Wilson), Education Resources Information Center (ERIC), and SportDiscus were searched simultaneously using text words. The search results were exported into EndNote, and duplicates were removed by researcher (NK). For a full search strategy please see Abstract 1 – Search Strategy.

The database searches identified 1010 records, once duplicates were removed 636 records remained. After screening, 30 articles were included for review with four additional articles added that were not found in the database search. These four studies were found during informal searches and included terms other than PV but describe a participatory video-making process.

Below is a PRISMA (Tricco et, al 2018) flow diagram to show the article selection process, undertaken by researchers, which was then cross-checked by other members of the research team at key stages in the process.

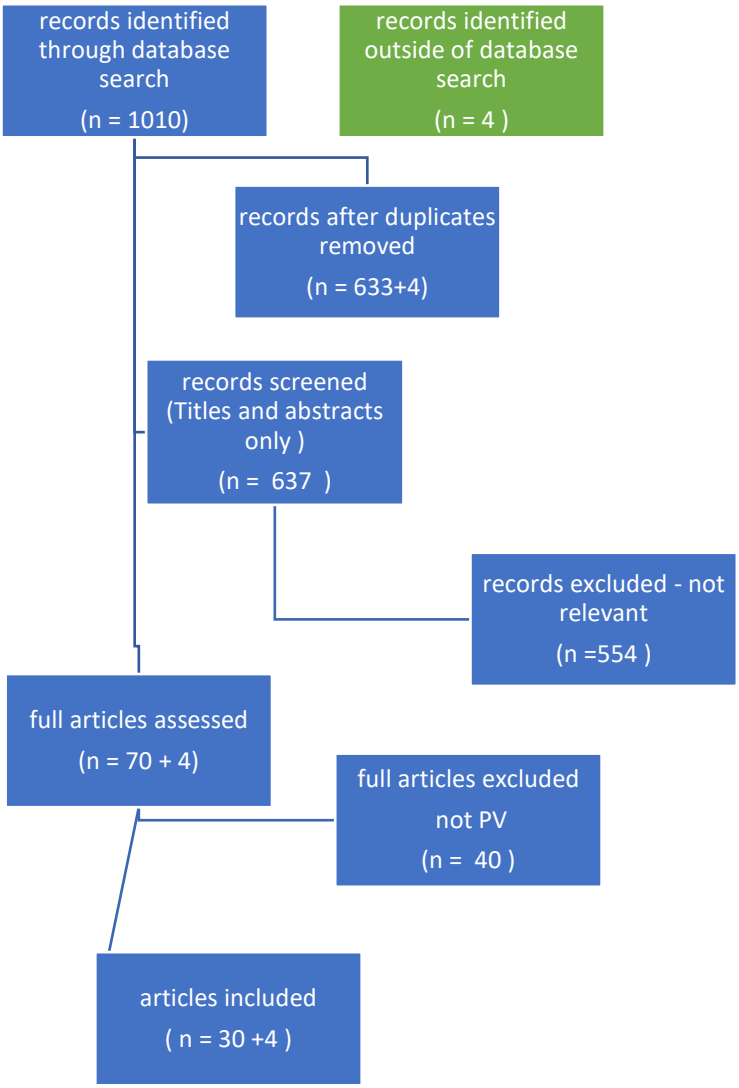


Figure 3 - PRISMA flow diagram of literature selection process

Data Selection and Extraction

As the parameters of PV can be unclear (Milne et al., 2012) the following decisions were made regarding the inclusion criteria. Studies containing a process through which participants take an active role in at least one stage in the production of a video were considered a participatory video methodology regardless of context, participants, study size or duration. The studies needed to use participatory video methodologies to address a health topic. There were no restrictions based on publication date, language, or study location. Studies automatically excluded were those not relating to health issues or those not describing the process of PV. We also excluded studies that did not include participants actively taking part in a video-making process, even if they addressed a health topic. This includes studies where participants were asked to provide advice or feedback for researchers creating videos.

With the above parameters in place, articles were screened. Titles and abstracts of each article were reviewed (a total of 637 once duplicates were removed). If the article did not meet the above criteria (e.g. the title referred to a non-health topic or the abstract presented a non-PV research process) then they were removed, if this was unclear then the article was retained for a full review. The remaining papers were reviewed in full for eligibility (a total of 74 full articles) where a further 40 articles were removed. The remaining 34 papers met the above inclusion criteria so were included in the review. On occasions where it was not clear if an article met the criteria these papers were referred to supervisors for input.

Once papers were included in the review, a process of thematic analysis was conducted on each manuscript. Initial themes around participant experience and use of videos, developed during the initial screening process, were used to group, and guide the thematic analysis stages. After a period of iterative analysis, sub-themes were identified and grouped. A table of themes was produced, where extracted text from each manuscript was grouped according to themes and sub-themes. This table can be found in Appendix 2: Excerpt from themes in PV articles table.

Results

Of the included articles, 19 interventions focussed on adults with the remaining 15 focusing on youth and child participants. A broad range of countries have been used as the location for PV, with several studies each in the USA, Canada, UK, South Africa, Niger and India as well as individual studies from various other countries in Africa and Southeast Asia. Specific health topics tend to cluster around geographical locations. For example, all articles about lung health were based in the USA, while all articles focusing on food and nutrition were based in India and Niger. That said, given the relatively small number of articles involved, one must be careful not to infer too much from these trends.

Chart 1 shows the number of articles about each health topic:

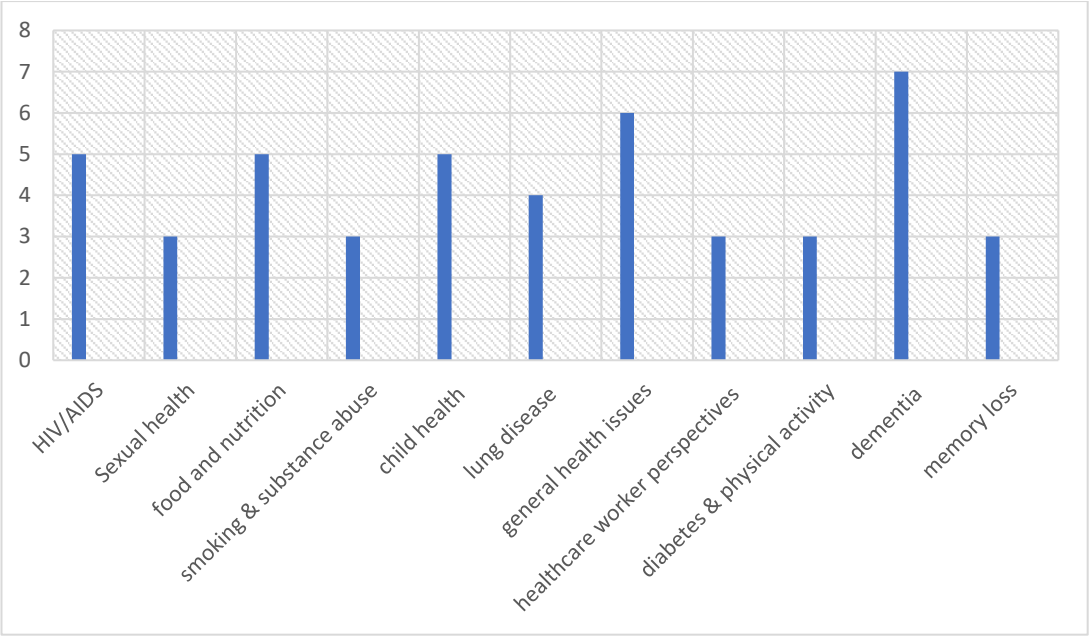


Figure 4 - Chart of health topics in review articles

Chart 1: Studies identified by health topic

The following health topics had one article each: health related to climate change, mental health, gender, worker wellbeing, Ebola, refugee, breastfeeding, cancer, hypertension, violence, stroke, maternal health, community recycling and impacts on public health.

From a table of themes created to assess the content of each article, it was possible to categorise the articles into three themes: participant experiences, outcomes, and methodology. Each of these areas, detailed below, explains what the current literature can tell us regarding the potential uses of PV in health research.

Participant experiences

This category summarises sub-themes from the literature regarding the experiences of the participants. Feedback, either taken directly from participants via interviews and focus groups, or observations from researchers or the wider community have been classified into the following sub-themes;

Enjoyment

One study states that the mothers included in the study (Ntuulo-Mutanda, 2016) enjoyed the videos and found them informative. Feelings of being heard/seen (Bader et al., 2007; Willis et al., 2014; Samara, 2010; Sharma et al., 2011; Sitter, 2015),

empowerment (Bader et al., 2007; Warren CM, 2016; Clabots and Dolphin, 1992) and improved understanding and communication (Warren, K., Holl, Gupta, , 2014; Granger, 2017; Dougherty, 2017; Acosta et al., 2014) were reported in the feedback from participants and people who were shown the co-produced videos. Of all the participant feedback given, there were no negative comments or experiences reported.

Skills building

A sub-theme mentioned across 12 studies is the development of participant skills

(Willis et al., 2014; Chávez et al., 2004; Warren, C.M. et al., 2014; Koniz-Booher. P, 2013; Park et al., 2017; Peters et al., 2016; Harou. A, 2017; Warren CM, 2016; Murphy et al., 2007; Samara, 2010; Stewart et al., 2008). Given that PV entails teaching a community group to make videos, there is an inherent aspect of learning, and thus skills building involved in these projects. Many studies make mention of participants having gained skills in the taught practices such as videography and editing. While some studies make broad mention of the building of video production skills, some specifically give examples of participants stating that they felt more confident in their skills than before the intervention (Peters et al., 2016; Warren, K., Holl, Gupta, , 2014; Stewart et al., 2008; Willis et al., 2014; Park et al., 2017) These studies reference feedback given directly from participants, as well as anecdotal evidence of some participants continuing in videography (or similar fields) after the intervention.

Ability to control the story

Participatory video, and indeed participatory research in general, is designed to allow participants to take control of outputs and tell their own stories. Multiple studies state that participants were enabled to make creative decisions during the process of video production, and valued the opportunity to control the message within the videos they produced (Willis et al., 2014; Waite and Conn, 2011a; Green, B., McKenzie, Lord, & Rich,, 2015; Peters et al., 2016; Warren CM, 2016; Gupta, R. et al., 2012; Clabots and Dolphin, 1992; Warren, K., Holl, Gupta, , 2014; Sano et al., 2016; Poureslami et al., 2016b).

PV as means of expression

While similar to the previous theme of storytelling, PV as a means of expression should be considered thematically separate due to the focus placed on the processes through which participants are able to express themselves (Willis et al., 2014; Waite and Conn, 2011a; Warren, K., Holl, Gupta, , 2014; Park et al., 2017; Peters et al., 2016; Acosta et al., 2014; Li and Ho, 2019; Sitter, 2015; Sharma et al., 2011; Samara, 2010). One

study (Acosta et al., 2014) discusses the importance of a forum after a video has been shown for community members to be able to reflect creatively upon the video and discuss its contents. Importance, in some studies, is placed in sharing the co-produced videos with the wider community (Waite and Conn, 2011a; Warren, K., Holl, Gupta, , 2014; Peters et al., 2016; Stewart et al., 2008). Two studies reflected on how PV can help participants to discuss topics that are usually considered taboo such as sexual health and leprosy (Moletsane et al., 2009; Willis et al., 2014). Drama-based PV projects, reported in four of the studies (Waite and Conn, 2011a; Park et al., 2017; Bader et al., 2007; Murphy et al., 2007), discussed how participants felt more able to discuss taboo or difficult topics such as leprosy more freely than they might have been able to otherwise, in particular highlighting the value of taking on different characters in the story development process (Waite and Conn, 2011a; Moletsane et al., 2009). A Ugandan study on womens' experiences (Waite and Conn, 2011a) found that using drama rather than documentary was a valuable means of expression. Participants did not have to speak out in public as themselves but instead took on a character, interacting with other characters as 'active' agents in the narrative, allowing them to more freely express potentially taboo topics.

Empowerment

Bader et al. (2007) refer to researcher observations that show participants were empowered to discuss taboo topics, express themselves creatively and/or to tell their own stories through the use of PV. Warren (2016) reports that participants, as a result of the intervention, felt empowered to take positive action within their community through dissemination of educational videos made during the intervention. Clabots and Dolphin (1992) also described how community members were given the opportunity to take active roles in healthcare delivery for their community through creating and distributing educational videos aimed at improving access to minority communities.

Empowerment is a difficult concept to define and evidence in the results of a study. While the above studies suggest that the empowerment of participants is a key outcome of projects, the word is never explicitly used in the participant feedback referenced by authors. Instead empowerment is inferred by researchers through evidence of participants experiencing heightened confidence, for example.

Power dynamics and evidence of participant led projects

Only three studies directly address the issue of power dynamics within the research process (Waite and Conn, 2011a; Sitter, 2015; Sharma et al., 2011). Each of these studies deals with participants from minority communities: women, disabled adults, and aboriginal youth respectively. Waite and Conn's 2011 study discusses the power (im)balance between researchers and participants, describing how the hierarchy of researcher/participant was reduced by a joint learning experience with the camera equipment; as neither party was confident with the equipment at the outset, the experience of learning together created a moment of bonding. Sitter et al (2015) describes the importance of participants feeling able to express themselves fully, and reflects on the author's position as an able-bodied researcher. Similarly to Sitter, Sharma et al (2011) reflect on the position of authors/researchers as outsiders and the need to accurately and respectfully approach aboriginal research.

Peters et al. (2016) describes how facilitators and participants jointly agreed on an aim for the video being made, namely to adress misconceptions and reduce stigma around leprosy. Two studies (Murphy et al., 2007; Green, B., McKenzie, Lord, & Rich,, 2015) describe a process through which participants were able to give feedback and make adjustments to edits of the video, allowing participants a final say on what was included and how messages were delivered. Other studies emphasise a need for collaboration between researchers and local stakeholders/community members to ensure that video content is appropriate and relevant (Harou. A, 2017; Ntuulo-Mutanda, 2016; Acosta et al., 2014; Green, B., McKenzie, Lord, & Rich,, 2015; Warren, K., Holl, Gupta, , 2014).

Outcomes

This area includes themes regarding the identified outcomes of research. Here, outcomes were identified by the original researchers as the direct consequences of their video-based intervention.

Use of videos post project

Twenty-two articles described the use of the created videos after the project (Catalani et al., 2013; Waite and Conn, 2011b; Waite and Conn, 2011a; Chávez et al., 2004; Warren, C.M. et al., 2014; Koniz-Booher et al., 2013; Park et al., 2017; Green, B., McKenzie, Lord, & Rich,, 2015; Peters et al., 2016; Ntuulo-Mutanda, 2016; Harou. A, 2017; Warren CM, 2016; Gupta, R. et al., 2012; Murphy et al., 2007; Clabots and Dolphin, 1992; Moletsane et al., 2009; Willis et al., 2014; Tang and Jardine, 2016; Sitter, 2015; Sharma et al., 2011; Stewart et al., 2008; Sano et al., 2016).The

interventions described invariably began with the aim of creating a video product with participants, often as an educational tool (Chávez et al., 2004; Park et al., 2017; Green, B., McKenzie, Lord, & Rich,, 2015; Ntuulo-Mutanda, 2016; Harou. A, 2017; Blumenstock et al., 2015; Clabots and Dolphin, 1992) or as a prompt for behaviour change (Koniz-Booher et al., 2013; Green, B., McKenzie, Lord, & Rich,, 2015; Acosta et al., 2014; Gupta, R.S. et al., 2013; Poureslami et al., 2016a; Stewart et al., 2008; Poureslami et al., 2016b; Sharma et al., 2011). Researchers describe the potential for both learning through the intervention community and through creating educational videos to be shown after the intervention. While the impact of such campaigns may be difficult to measure, Harou (2017) describes how the educational campaign the team created emphasised the need for monitoring where and how often the videos are shown. Other studies highlight the value of online dissemination and how this could be measured to gauge the impact of a given intervention (Chávez et al., 2004; Warren, K., Holl, Gupta, , 2014), although it is fair to say that this tends to be presented as a future possible development for the work, rather than as a feature of the current intervention.

Knowledge and practice is used as an indicator of behaviour change in Acosta et al. (2014) study. Male respondents in these studies gave feedback that they had become more aware of parenting and spousal behaviours as a result of the intervention. In the same study, a number of female participants gave feedback indicating that their husbands had begun to alter their behaviour in accordance with the messages of the videos they had watched/produced (Acosta et al., 2014) Behaviour change, in a study about improving nutrition, is measured by the intentions of respondents; data is collected from participants that records how they intend to amend their behaviour according to the messages of the video (Koniz-Booher. P, 2013).

Impact and long-term benefits

The potential for long-term benefits is discussed in fourteen studies (Willis et al., 2014; Chávez et al., 2004; Warren, K., Holl, Gupta, , 2014; Granger, 2017; Dougherty, 2017; Koniz-Booher. P, 2013; P Koniz-Booher 2013; Park et al., 2017; Ntuulo-Mutanda, 2016; Warren CM, 2016; Murphy et al., 2007; Clabots and Dolphin, 1992; Stewart et al., 2008; Tang and Jardine, 2016), suggesting how the intervention can bring improvements to the participants, the wider community or both. One study (Clabots and Dolphin, 1992) states that participants continued to work together on numerous task forces after the intervention had finished, although it would, of course, be necessary for follow-up data to be collected at a much later date to further assess the longevity of such an impact.

Methodology

This category summarises themes to emerge in the literature regarding methodological practices.

Reporting

From the few articles included in this review that thoroughly detail their methodology (Willis et al., 2014; Warren, C.M. et al., 2014; Park et al., 2017; Peters et al., 2016; Warren CM, 2016; Gupta, R.S. et al., 2013) no set framework or format for reporting method emerged.

Discussion of ethics

The aim of reducing potential harm to participants is described in one study regarding the potential stigma within the community that might emerge from discussing taboo topics, when participants have no ability to remain anonymous after appearing on film (Moletsane et al., 2009). The same study goes on to discuss ways of doing most good for the participants by allowing them to identify issues in their community and how to address them. Participants with leprosy, faced a range of issues around concealment (participants not wanting to reveal their medical condition publicly); again with the researcher describing the possibility of stigma should the participants be identified from the videos and the ways to mitigate this eventuality. However, it was noted that stigmatisation due to participation in the project did not occur (Peters et al., 2016). Stigmatisation was also discussed in a dementia-focussed study (Li and Ho, 2019), where family members of participants expressed concerns over community opinions. In this case researchers decided to keep the identities of participants confidential.

Sensitivity around certain topics is discussed in two studies; one around the cultural considerations of portraying diabetes care and one around the distressing images of people suffering from drug overdoses. The first, a Canadian study aiming to reduce diabetes amongst indigenous populations discusses the need to address the topic in a sensitive, culturally appropriate way (Sharma et al., 2011). The second, an incarceration specific study describes the decision-making process around what to include in the final videos produced; footage of people experiencing a drugs overdose, for example, was deemed too distressing for viewers so alterations were made (Green, B., McKenzie, Lord, & Rich,, 2015).

Discussion of challenges

The study limitations were defined by the authors of the included articles. The most common challenge discussed is the equipment required to conduct a video project (Willis et al., 2014; Warren, K., Holl, Gupta, , 2014; Harou. A, 2017; Blumenstock et al., 2015; Warren CM, 2016; Clabots and Dolphin, 1992). The cost of equipment, the time needed to teach participants to use the equipment, and the need for reliable power sources are limiting/challenging factors, particularly in countries where such equipment is not always readily available. Additionally, Peters et al. (2016) describes the challenges of using the equipment for participants with leprosy-induced physical impairments and internalised stigma, describing how more time and teaching sessions were required to allow participants to fully engage in the PV process.

An inability to conduct follow-up research on the comments made by participants is discussed by Peters et al. , reducing the ability to evaluate the long-term effects of the intervention(Peters et al., 2016). A sampling bias was noted in two studies (Warren, K., Holl, Gupta, , 2014; Park et al., 2017), stating that convenience sampling, though necessary, impacted the generalisability of the results. One study (Hanse and Forsman, 2001) described noticing that participants were likely to ‘act differently’ while being recorded, and as such their behaviour on film was influenced.

Evidence of evaluation

Multiple studies evaluated their interventions (Warren, K., Holl, Gupta, , 2014; Dougherty, 2017; Pinsker, 2017; Peters et al., 2016; Acosta et al., 2014; Ntuulo-Mutanda, 2016; Harou. A, 2017; Blumenstock et al., 2015; Warren CM, 2016; Murphy et al., 2007; Clabots and Dolphin, 1992; Willis et al., 2014). Most commonly researchers conducted surveys to gauge pre-and-post-intervention knowledge levels, attitudes, and behaviours. One study looking at childcare in India, for example, noted an increase in nurturing behaviours after the video intervention (Granger et, al 2017). Dougherty et al. (2017) found an improvement in male involvement in childcare after the intervention. A study aiming to improve asthma care recorded improved inhaler practices after the intervention (Pourlesami et al. 2016).

Discussion

When considering what the current literature can tell us about the potential value of using PV methodologies in health research, the most prominent theme was that of a positive participant experience. Health researchers, by using an intervention widely

considered to be enjoyable, such as PV, increase the potential for meaningful and lasting research that engages key stakeholders in health topics. Studies also suggest how PV can shift the power dynamic between researchers and their participants, highlighting how this can lead to the generation of community-led solutions to health problems. PV, often used as a tool for co-creating positive social change, has the potential to positively impact the lives of participants, building skills, developing dialogues within communities and between communities and policymakers. Further research is needed to better understand the potential long-term impact of such a participant-led approach to generating health solutions.

There is a need for more robust reporting in order to assess the rigour of PV studies in health and to compare outcomes across projects. While participants report positive experiences, it is unclear as to the extent to which we can attribute any positive health outcomes solely to the PV intervention. A framework to standardise reporting and evaluate PV interventions in health research would enable a more robust means of evaluating their long-and-short-term effects.

The reported outcomes of the studies show another lesson learned in acknowledging and reporting on power dynamics. The wider literature around PV discusses the importance of shifting power towards participants. Lunch & Lunch (2006) describe a best-practice approach to a PV project that engages stakeholders in all stages of the research including selecting the topics to be explored. All of the articles included in this review appeared to have an explicit health topic as a starting point for research and many had a predetermined aim of producing educational videos as an outcome. Researchers do not critically reflect on the inherent power imbalance created in this dynamic, or how it might impact the process of their research. The unanswered – and unasked – question of how predetermined outputs affected the process leaves a gap in the research. Specifically, more work is needed to properly understand the process of PV from the perspective of the participants, and how these power dynamics might affect health outcomes. Furthermore, regarding outcomes, only direct outputs of the intervention were mentioned, such as educational videos intended to improve local knowledge, practice, and behaviour. No mention is given to the potential influence that these video outputs could have on policy at any level. It may be useful for researchers, when planning projects with participants, to consider the health needs of the community and how to best engage policymakers as key stakeholders during the implementation process. Further research is needed to understand the possible impacts of PV interventions on policy at all levels.

Although every effort has been made to include all relevant literature on this topic, it is possible that studies have been published too recently to have been included. This review aims to discuss all themes identified in the literature. Although it is impossible to discuss in detail all aspects of each study included, as much detail as possible has been included to give the best representation of available knowledge in this area. Finally, as a scoping review, there is no grading of the quality or level of evidence provided in each study included. As such, all recommendations for practice and research cannot be graded.

Conclusions

From this review, there is evidence that PV methodologies provide nuanced and tailored approaches to socially complex health issues. As previously discussed, any comprehensive community-level approach to AMR requires innovative and culturally appropriate knowledge-building and problem-solving activities.

The literature creates a strong case for future use of PV methodologies in health research as both an enjoyable and informative experience and a means to potentially generate community-led solutions to health problems. The articles describe positive experiences through which participants were able to discuss sometimes challenging health topics in a safe and creative environment. Several articles indicate a positive health outcome, such as improved awareness around a specific topic or better health behaviours. However, none of the studies put forward measurable improvements in any health outcome for their study communities.

Future research should consider using clear reporting and evaluation frameworks to enhance the rigour of their reported outcomes. Additionally, future research should consider the potential for long-term impacts on community health and its potential to effect policy. Researchers should detail the challenges, opportunities and solutions that occurred during the production process to further enrich our understanding of participatory video making – much is known of the potential uses of PV, but little is documented on the actual process of using PV in health topics. There is a need for standardised reporting across PV interventions in health research. As an emerging methodology in health research, it is important for researchers to reflect critically on the process of implementation, including assessing fidelity in order to understand the extent to which we can attribute the outcomes of each study to its methodology.

Either as a sole methodology or in conjunction with another, participatory video has the potential to elicit data on a multitude of health topics. While many health topics have been addressed, this study shows many gaps in the literature remain. PV can be applied in a wider range of contexts, and it has been shown to have positive effects on behaviour and health. Future research should widen the pool of knowledge and focus on detailed reporting of methodology.

The learning of this review informed the direction and focus of key sections of this thesis. In conducting this review, I was able to more clearly understand how the data from the CARAN project might begin to fill some of our gaps in understanding the application of the PV method to AMR. This review presents a growing area of research, where the PV method could be used to understand and even begin to provide solutions to complex health issues. As discussed in the previous chapter, AMR is largely driven by complex behaviours across human animal and environmental health. Each of these behaviours impacts upon and is impacted by intersectional issues (age, gender, socio-economic status, education etc) that may be difficult to discuss in traditional research designs. The PV method, as described in this review, has the potential to begin dialogues with community members and move towards understanding the complex behavioural divers of AMR at community level. PV, in enabling sometimes uncomfortable conversations around systemic issues, could provide insight into a community-level understanding and use of antimicrobials and begin to produce community-led solutions.

Chapter 3: Methodology Chapter

The previous chapter presented the key values and uses of participatory video methods in complex and intersectional health issues. The growing evidence to support participatory video methods in public health research, though, does not yet touch upon its potential in the field of AMR research (with the exception of one paper, also based on the CARAN project(Cooke et al., 2020a)). This chapter will present the methods used in the CARAN project, a study that piloted the use of participatory video methods in AMR research in Nepal. The data collection was primarily conducted by the HERDi team; a Nepali public health organization based in Kathmandu. HERDi are a well-established team that work closely with the Nepali Ministry of Health and Population to guide national responses to various health issues. The original plan for this PhD, as mentioned in the Introduction, was to conduct fieldwork using lessons learned from the original CARAN project. However, due to COVID-19 travel restrictions, it was impossible to conduct fieldwork during the planned timeframe (Spring of 2020). As a result, this PhD will apply new analyses to the CARAN data.

This chapter will present the methodological processes of developing key evaluation and analysis frameworks. This chapter addresses research objectives 2b:

To develop an analysis framework that analyses qualitative data for one health behaviours at the community level

This chapter will firstly present the CARAN research project, it's context, data collection methods and evaluation methods. This chapter will then present two analytical frameworks developed during this PhD programme to identify gendered and One Health themes emerging from the CARAN data. Finally, this chapter will present the process of modifying a toolkit; making amendments and additions to a manual first developed during the CARAN project. One of the primary outputs from this PhD is a revised manual that incorporates the learning from these analyses as well as the newest developments in responses to AMR.

Context of CARAN project

This section of the chapter will provide insights into the context of the CARAN project. The Southeast Asian region, as defined by WHO, contains multiple low income countries and is home to around one quarter of the world's population. South East Asia is prone to natural disasters exacerbated by climate change, communicable disease outbreaks and poverty (WHO, **2020a**). As already discussed earlier in this chapter, AMR infections are driven by poor conditions, brought about by poverty. Where low

income countries are less prepared to limit the spread of AMR infections poverty will increase, effectively securing a cycle of poverty and poor health (Ahmed, S.A. et al., 2018). Recent research has shown that South East Asia is at high risk of AMR spread in humans, and that a comprehensive One Health approach is needed to contain AMR in the region (Chereau et al., 2017).

Nepal, a country in the South East Asian region, is classed as a low income country (WHO, 2018d) with a population of approximately 29.9million (IHME, 2019a). Though much progress has been made to reduce morbidity and mortality nationally, communicable diseases such as diarrheal disease, lower respiratory infections and TB are still within the top twelve causes of death in Nepal (IHME, 2019a). Public health campaigns have focused on behaviour change to reduce the effects of communicable diseases. The ODF (Open Defecation Free) campaign saw huge improvements in sanitation practises across the country, and identified motivators for behaviour change such as media campaigns and witnessing reductions in illnesses due to improved sanitation (Bikas Shrot Kendra, 2017). Campaigns such as this show the possible opportunities for other public health campaigns, with focuses on issues that feed into AMR reduction such as vaccinations, improved WASH facilities and practices etc.

AMR is a particular concern in Nepal, primarily caused by misuse and both overuse (using antibiotics when not needed) or underuse (not using antibiotics when needed or for the full duration of a course) of antibiotics (Dahal and Chaudhary, 2018). Though much progress has been made to reduce morbidity and mortality, illnesses such as TB and diarrheal diseases remain top causes of death nationally (IHME, 2019b). A 2015 national report found issues such as irrational use and over-the-counter availability of antimicrobials, poor laboratory facilities and lack of appropriate surveillance systems to be among contributing factors to the rise of AMR in Nepal (Basnyat, B et al., 2015). A different 2015 report, conducted by The World Bank, found that many health facilities were lacking in basic hygiene facilities; around half provided access to both soap and running water, half of facilities have regular electricity and that only around 2/3 conduct regular staff training (Nepal New ERA, 2017). Nepal is prone to natural disaster, most notably suffering a huge earthquake in 2015 which killed over 8,000 people, displaced around 2 million and devastated the country's infrastructure (Hall et al., 2017). In the wake of the earthquake, Nepal governmental structures were criticised for a lack of transparency in their response (Basnyat and Tamang, 2020). Rapid urbanisation has also driven higher rates of AMR in Nepal – research shows that urban areas of Kathmandu have expanded by 412% over the last three decades (Ishtiaque et al., 2017). With increased populations occupying a small geographical area, various socio-

economic factors will impact upon health outcomes (Raphael, 2016). Rapid urbanisation often leads to overcrowded living environments, a factor connected to the spread of resistant strains of bacteria in one Indonesian study (Lestari et al., 2010). A recent review also found a positive association between AMR and housing status, as well as other factors around socio-economic status and education levels (Alividza et al., 2018). Animal health also plays a large role in Nepal's AMR drivers; farming practises in poultry, beef and dairy production often include use of antimicrobials for prophylaxis and growth promotion (Acharya, K.P. and Wilson, 2019).

Nepal National policy/response

In response to the issue of AMR, the Government of Nepal, in partnership with WHO, developed the *National Antimicrobial Resistance Containment Action Plan* which outlines The Governments' role in reducing AMR. These include but are not limited to: education, disease prevention and control, surveillance and food production (Department of Health Services, 2016). Nepal also has a 2018-2022 country cooperation strategy which identifies activities aimed at reducing AMR infections nationally including: engaging with stakeholders, building lab capacity and incorporating social media to improve public awareness (WHO Nepal, 2018). The cooperation strategy states:

Combating antimicrobial resistance (AMR) WHO will:

(1) Engage with stakeholders across sectors to promote rational use of medicines and reduce over-the-counter sale of antibiotics and advocacy for AMR prevention and containment programme in line with the national action plan.

(2) Build capacity for laboratory-based surveillance.

(3) Use traditional and social media to educate the public and health professionals on the risk of AMR.

(WHO Nepal, 2018)

The 2016 *National Antimicrobial Resistance Containment Action Plan* outlines the problem of AMR globally, then lists the strategic areas of focus for Nepal specifically and delegates roles and responsibilities of all agencies involved. Below is a breakdown of the key elements of the plan in Nepal.

Research in Kathmandu shows that public awareness of both the use of and resistance to antibiotics is poor (Satish Kumar Deo, 2018). Additionally, research around community pharmacies in Nepal found that dispensing antibiotics without a prescription was common practise (Mukhtar Ansari, 2017). A video produced by RINGS detailed

the research being conducted in Pokhara, Nepal. The video describes how the urban poor of the area are distrustful of government-run health facilities and instead visit pharmacies for drugs without seeing a doctor (RINGS, 2019).

CARAN

As stated in the opening passage of this chapter, this thesis will use the data gathered in the CARAN project (Community Arts Against Antibiotic Resistance Nepal). The CARAN project was first conceptualized between two researchers at the University of Leeds. Dr Rebecca King, a member of the Nuffield Centre for International Health and Development in the School of Medicine met Professor Paul Cooke, a member of the Faculty for Arts, Humanities and Cultures in 2018. The two discussed their research areas and began to see potential for combining Dr King's public health research topics with Professor Cooke's arts-based research practices. Upon further reading into interdisciplinary research using participatory methods, it became apparent that there was a gap in the literature around the use of these methods in AMR research

Community Engagement

Community based participatory research (CBPR) in public health employs methods of active engagement and involvement of community members who experience social, structural, physical and/or environmental health inequities (Israel et al., 2001). The CBPR paradigm centers around developing relationships between researchers and community members to integrate education and social action into addressing health disparities (Wallerstein, N.B. and Duran, 2006). The term community engagement (CE) has been used in health research to describe a wide range of activities focusing on outreach, education, public engagement and awareness raising (Mitchell et al., 2019). The process of developing and evaluating the CARAN project led to a definition of CE which the original CARAN team feel better represents community engagement as an activity separate to other research areas (such as outreach, education etc):

'A participatory process through which equitable partnerships are developed with community stakeholders, who are enabled to identify, develop and implement community-led sustainable solutions using existing or available resources to issues that are of concern to them and to the wider global community.'

(Mitchell et al., 2019)

Community engagement approaches, as discussed in the Introduction to this thesis, are essential to understanding the perspective of community members who live in AMR hotspots; where infectious diseases and rates of AMR are particularly concerning (Nhung et al., 2016). Community engagement, in developing collaborative relationships with community members, has the potential to promote sustainable behaviour change in a cost-effective manner (Farnsworth et al., 2014). The CARAN project underpinned

all research activities with community engagement as a focus; aiming to co-produce solutions to the issue of local AMR-driving behaviours with participants.

Interdisciplinarity

The CARAN project was created through collaboration between public health professionals, and creative arts practitioners (including participatory filmmakers). The experienced research team had a wide range of research backgrounds in medicine, anthropology, and the humanities. Interdisciplinarity in health research has been increasingly encouraged in recent years (M Giacomini, 2004; Choi and Pak, 2007; Nair et al., 2008; Clarke et al., 2012) to more accurately reflect the complex nature of health issues that span socio-cultural aspects of daily life (Newell et al., 2001). Though interdisciplinarity in health research is necessary to developing an understanding of and generating nuanced solutions to complex health issues (Bindler et al., 2012; Gavens et al., 2018) there are still potential challenges to genuine interdisciplinary research. Within research teams, there is a potential for friction concerning practical issues such as authorship of disseminated materials (Smith, E. and Master, 2017). Additionally, challenges around conceptualisation of and response to research questions can differ widely between and even within disciplines (Clarke et al., 2012). These challenges also present opportunities for growth that can ultimately benefit the research team and project outputs (Clarke et al., 2012), this is especially true when projects are strategically planned to best utilise the expertise from each team member (Nair et al., 2008).

Using these key concepts from interdisciplinary health research literature, the CARAN team pragmatically designed the project to generate socially useful knowledge (Feilzer, 2009) using expertise from a University of Leeds based team in combination with a health-focussed NGO based in Kathmandu, Nepal: HERD International (HERDi). The HERDi team were asked to join the CARAN project as facilitators to connect policy-level decision making processes with the lived reality of community members in affected areas.

HERDi

Dr King had an established relationship to HERDi staff from previous public health research, so acted as a point of contact in initial discussions and planning activities for the CARAN project. HERDi is a research and development agency, based in Kathmandu Nepal, that promotes evidence-based policy and practice for sustainable development and improved quality of life for Nepali people (HERD, 2021). Facilitators from the HERDi team have a wide range of experience in public health research,

connecting with national level policymakers in various sectors of the Nepali government and includes filmmaking experts.

The HERDi team led fieldwork activities (contacting and recruiting gatekeepers, running workshops, and connecting with policymakers). HERDi facilitators were all fluent in Nepali (the primary language of both study sites) and spoke with participants in Nepali throughout workshops. All CARAN team members were, where appropriate, trained in participatory video methods and given up-to-date AMR information to ensure that all facilitators were equally aware of both the topic of the research and the research methods.

Process of CARAN development

The CARAN project focussed on antibiotic resistance (ABR) initially, aiming to explore how participatory arts approaches can help ABR-related policy to better inform and be informed by the people whom it seeks to affect (CARAN, 2019).

The main objectives of the project were to:

- Identify critical barriers to preventing and controlling ABR at the individual, household, and community levels
- Enable communities to identify solutions to overcoming these barriers
- Present the identified issues and solutions in the form of documentary films to community, district, and national level stakeholders for maximum impact.

The applied qualitative research design of the CARAN project aimed to apply the finding of the research to addressing particular issues related to community-level drivers of ABR.

Ethics

The original CARAN project was funded by UK's Arts and Humanities and Medical Research Councils (grant number AH/R005869/1). The study received ethical approval from Nepal Health Research Council (Reg. no 211/2018) in Nepal and ethical review board of University of Leeds.

CARAN implementation

Setup

HERDi team members first selected two appropriate municipalities, considering socio-cultural diversity and range of rural and urban settings. Initial co-ordination meetings were held with stakeholders from each municipality to sensitise them to the study and seek permission to conduct the study. Once municipalities were confirmed, specific study sites were chosen - one peri urban site in Chandragiri municipality and one in urban settlement in Bhaktapur, Lokanthali. The sites were selected considering the urban rural mix and socio-cultural diversity.

Sampling Strategy

Gatekeepers were those who were familiar with the community and had a major role in identification, coordination and liaising with the community participants. Possible gatekeepers were first listed with the help of stakeholders through sensitization talks between HERDi facilitators and local level policy makers. Two gatekeepers from each site were selected, each gave signed consent and were able to communicate the study aims and designs to local community members.

A total of 20 participants- 10 participants in each site - were selected for the workshops. Within these sites, with the help of gate keepers, workshop participants were purposively selected from diverse groups to account for variation in responses based on their personal experiences and exposure to AMR. Gatekeepers made initial contact with community members, explaining the study briefly and collecting information on potential workshop participants. The study objectives, methods, procedures, engagement, risk, benefits, and ethical aspects were explained to community members, and those providing written voluntary consent were selected for the study. The participants represented different social demographics such as age, occupation, education level and gender. The initial inclusion criteria were: 18yrs and older, able to give consent and must be living in the site selected for study. These characteristics were selected to allow for a wide range of experiences in relation to the use and misuse of antibiotics locally

At the showcasing stages of the CARAN project, where films were to be shared with local community members and policy makers, recruitment for audience embers was directed by workshop participants. Workshop participants were encouraged to invite friends, family and community members and share the showcasing information widely to invite as many community members as possible to each event. Facilitators from the HERDi team supported interactions with policy makers to ensure that participants were

contacting appropriate members of local and national governmental agencies at appropriate points (CARAN, 2019).

Workshop process

The project began with a series of workshops where facilitators and participants explored issues relating to AMR, as well as learning the basic principles of filmmaking. Practicing filmmaking and exploring AMR took place together, the one being used as a tool to document and reflect upon the lessons learnt about the other. This was facilitated through the regular screening of footage shot by participants to participants in order to generate a strong feedback loop that allowed participants both to reflect upon and improve their practice as filmmakers and to ensure the whole group understood the issues surrounding AMR as well as the specific challenges community participants face in using antibiotics specifically, and antimicrobials generally, appropriately. After a period of training, participants were then supported by the project facilitators to plan, shoot and edit their own films, engaging members of their wider community in the process (CARAN, 2019).

Each participant group took part in a series of five workshops, the following descriptions are summaries of activities described fully in the CARAN manual, available here: https://ce4amr.leeds.ac.uk/wp-content/uploads/sites/84/2019/11/CARAN-manual-version-1.1-1-min.pdf

Workshop 1: Introducing the Project

The primary focus of workshop 1 was to introduce the study, topic of AMR and some basic filmmaking principles. Additionally, the workshop was designed to provide participants and facilitators with opportunities to become familiar with each other. After time spent on introductions, facilitators took time to present the concepts of the project using Microsoft PowerPoint presentations This introduction was followed by introducing participants to filmmaking equipment; cameras, tripods, microphones. Participants were encouraged to learn about fitting equipment together, explore the use of each piece of equipment and begin to film each other. Once participants were familiar with the equipment, facilitators introduced basic principles of interviewing techniques and prompted participants to interview each other. The groups were given time to collectively decide on a set of questions to ask each other and took turns interviewing and being interviewed.

Workshop 2: Unpacking the Issues

The second workshop focused on the issue of AMR; introducing the topic more thoroughly and providing activities to explore local level AMR-related issues/drivers. The first activity; 'where do I stand' encouraged participants to consider their own opinions of statements provided by facilitators. Facilitators asked participants to stand in a circle, once the facilitator had made each statement participants were asked to either move forwards or backwards, depending on if they agreed or disagreed with the statement (and how strongly). This activity was designed to allow participants to share their opinions on topics and understand the opinions of others, it also provided insights for facilitators on areas to probe further in later activities and workshops. Example statements included:

- People are getting sick more often
- Some medicines are stronger than other medicines
- People prefer to visit the traditional healer when they are unwell

After each statement was read aloud and participants had moved according to their opinions, facilitators took the opportunity to ask participants for their rationale. These probing questions led to open discussions between participants and facilitators, with facilitators moderating conversations to ensure all participants felt comfortable to share their perspectives, experiences, and opinions.

Following from this activity, participants took part in 'And So…': a storytelling activity where participants were given a prompt from facilitators and asked to each continue the story using one sentence only. This activity was designed to provide facilitators with insights into typical behaviours for community members faced with health issues. An example prompt for this activity:

- One of your animals is sick
- Your daughter has a sore throat

This activity also provided insights for participants into the potential differences in approaches depending on the individual facing the situation; this activity led to discussions in the groups about different ways of reacting to each situation.

Workshop 2 then moved into activities designed to prompt participants to identify potential stakeholders and their role/influence on AMR at the local level. Participants were asked to 'map out' stakeholders from the community, local and national levels of human animal and environmental health sectors. Once this was complete, participants

took part in ‘hot seating’ activities where participants took turns in acting out one of the key stakeholders for others to ask questions. The acting participant would sit in the centre of a circle, taking on the role of their chosen stakeholder and the group would take turns asking them questions relating to their role in local-level AMR drivers. This activity aimed to prompt participants to explore the perspectives of people outside of their own social group (e.g. pharmacists, doctors, government officials).

Finally, workshop 2 concluded with a review of the footage shot by participants during workshop 1. This activity developed participants understanding of basic filmmaking principles (such as framing, sound quality, focus).

Workshop 3: Introduction to drugs and ABR and learning of interview techniques

The third workshop aimed to further explore the issues of ABR locally, identify and unpack participants understanding of ABR and different antimicrobials and to develop participants skills in filming interviews. The first activity ‘playing corners’ asked participants to stand in a corner of the room based on their response to multiple-choice questions (taken from WHO’s AMR quiz – now unavailable on their website) on the issues of AMR and ABR. This aimed to gauge participants current knowledge levels and understanding of ABR and provided an opportunity for facilitators to provide current information to participants based on their answers. This activity had regular points of conversation between facilitators and participants, allowing facilitators to impart correct information on AMR, correct any misconceptions that participants might have about antibiotic use and for facilitators to identify any areas for further probing.

Workshop 3 then moved into filmmaking activities, shooting B-roll, 5-shot sequences and conducting interviews. Facilitators gave participants information and prompted discussions on the topics of these filmmaking principles and asked participants to consider the types of images they might want to include in films that discuss their local area and topics related to antibiotic use/misuse. Finally, participants were asked to reflect on what they had learned so far in workshops and consider topics they might want to make films on.

Workshop 4: Consolidating key content and identifying the key local stakeholders

The focus of workshop four was to consolidate the learning and progress made during workshops 1-3 and identify the key stakeholders at the local and national levels. Participants were asked to create mind maps that included all stakeholders, facilitators

prompted participants in this process wherever needed. Participants took turns writing stakeholders onto a large piece of paper and reflected on each stakeholders role in the issue of ABR. This activity then fed into the next; a critical reflection of the WHO guidance on appropriate antibiotic use and the local-level enablers and barriers to reducing ABR. In this activity, facilitators read guidance from WHO, e.g.: “Only use antibiotics when prescribed by a certified health professional” and asked participants to reflect on each in turn. Facilitators first ensured all participants understood the statements, then asked probing questions, such as:

- What do people actually do?
- Who does what (e.g. is there a difference between adults and children?)
- What might help this to happen more?

These prompts were designed to encourage participants to critically reflect on the WHO guidance, how it applies to them and how the guidance might need adapting to fit their circumstances.

Finally, workshop 4 ended with an activity in reviewing interview footage shot during workshop 3. Participants were asked to view and provide feedback on the interviews shot in the previous session. Participants were encouraged to focus on technical aspects of the films as well as the content of each interview and consider the footage in terms of quality.

Workshop 5: Developing your film ideas

The final workshop for participants focussed on technical elements to filmmaking as well as developing story/content for their films. Participants were given information via PowerPoint on scriptwriting then were asked to split into smaller groups to discuss film topics. Each participant presented their topic ideas from workshop 3, discussed their learning since then and as a group decided the topics for their films. At the end of this process, participants were asked to present a 20-second description of the film they wanted to make. From there, participants took part in storyboarding activities and listed each shot for their films to guide their filming activities.

Making the films:

After the workshops, participants were given four days to shoot their planned scenes. Participants were given cameras and tripods to take into their filming locations and recruited local community members to appear in films either as actors or as

interviewees. At key points, participants returned to their workshop space to reflect on their footage so far and discuss any challenges, changes made or plans for the following day(s). Once all footage had been shot and returned to facilitators, the process of editing footage began. Due to resource limitations, it was decided that facilitators would carry out most editing activities and consult with participants at key stages. Participants gave facilitators their story boards and all footage, then were asked for feedback once a rough edit had been created. Based on this feedback, facilitators further edited footage into short videos – each small group produced a video that was around 3 minutes in length. Participants had a final review of each film before it was finalised.

Public screenings:

Once participants were happy with their films, facilitators began to support them in planning local screening events. Workshop participants first selected locations and timings for showcasing events that would best suit the needs of their communities. Participants took responsibility for sharing the screening information with as many local people as possible. HERDi facilitators supported participants to communicate the showcasing events with local and national level policy makers. These policy makers were aware of the project from its planning stages (sensitisation talks during planning stages) and were keen to attend the events.

Data Collection

During the intervention, data was gathered in the form of workshop recordings (video files later transcribed to written documents for analysis), filming footage of participants, reflective notes from facilitators and the final films made by workshop participants. Evaluation data was also gathered after the intervention in the form of focus groups with workshop participants and audience members from public screenings of films.

In total, the CARAN project produced ten transcripts; 6 detailing activities across 10 workshops and 4 focus group discussions attended by 23 community members in total. The CARAN project produced a total of six short films made by workshop participants. In addition, the CARAN project produced reflective notes from facilitators, gathered after each workshop across both sites. Films made by participants were captured using video-cameras and edited using Adobe editing software. Focus groups were audio recorded, and later transcribed into word documents for analysis. Field notes were taken by facilitators, written in notebooks during workshops and later discussed and typed into word documents to be shared with the wider research team. These forms of data were gathered to maximise the range of information available at the analysis and evaluation stages.

Fieldwork activities ran in 2017, with workshops running over a period of 2-3 weeks each. All data was collected at the study sites in Nepal. Aside from workshop participants and facilitators, the only other people present were filming subjects (during filming activities only). The workshops, focus groups, filming activities and showcasing events were all run in Nepali. Transcripts from each were translated into English, then transcribed in English to facilitate the data analysis stages. Facilitators also made reflective notes throughout the fieldwork process.

Data collection instruments

Data collection instruments were developed iteratively from readings of the wider AMR and PV literature. The intervention and data collection tools were piloted prior to CARAN activities taking place. Facilitators conducted key workshop activities with a pilot community and adjusted before commencing the project. The topic guides for FGD's were finalised by CARAN project facilitators at HERDi and Leeds before being used in the CARAN evaluation data collection activities. All data collection tools were, therefore, developed prior to the commencement of this PhD project. Full topic guides can be found in Appendices 3 & 4: FGD guides to give further context to the data gathered for analysis in this thesis.

Ethical issues pertaining to human participants

The topic and methods of the CARAN project were not considered to be sensitive. However, researchers were sensitive to the importance of facilitating the process adequately to ensure that the films produced by participants were factually accurate in terms of AMR messaging. Researchers were careful to ensure that workshop participants understood the key messages of AMR (transmission, scale, drivers etc) through interactive activities during workshops. Facilitators ensured that all messages within the films were accurate and would not result in the spread of misinformation before films were screened at public events.

Consent

Study sites were determined in collaboration with district authorities, community leaders were asked for permission for the intervention to be conducted, and to introduce the researchers to residents. All participants were first approached via a

gatekeeper, who explained the study and asked if they would like to join. Workshop participants were given information, verbally and as a written information sheet (written in Nepali), on the content of the study as well as key contact information and their role as participants. Participants returned signed consent forms to take part in the study, or where appropriate (for those with lower literacy levels) participants gave verbal witnessed verbal consent. It was explained to participants that they could leave at any time and were not obliged to take part in any activities they did not wish to. Time was given to participants, once they had received information on the study, to withdraw before workshops began. Furthermore, participants were asked to give permission (verbally) to be filmed during workshops.

Participants were able to withdraw their data from the qualitative components of the study (FGD transcripts) up to an agreed upon point in the process, until coding of the data had been completed. It was, though, explained to participants that all responses would be anonymised.

Confidentiality

Due to the nature of PV outputs, it was not possible to keep full confidentiality to participants who chose to appear on film. Participants were made aware of this prior to commencing the study and were asked for permission at all points prior to filming. Workshop participants, as part of the process of filming local areas and individuals, were instructed to get (on film) consent from filming subjects. Those filmed as part of the videos that were made all gave permission to appear in the final films verbally. This was recorded on camera. Workshop participants also had input into final edits of each film, ensuring that they were happy for their films to be disseminated before showcasing events took place.

Transcript data from workshop participants and film screening participants were fully anonymised. Participants were given a unique ID number and any identifying remarks made in the transcripts were removed during readings of the data. Consent forms and ID links were stored separately from anonymised data and were only made available to the core research team. Any available qualitative data from the CARAN project was made fully anonymous. Published quotations from the transcripts contain no identifying information and only link to ID numbers.

Data security

All data was stored according to the University of Leeds guidelines, in accordance with UK data protection laws. All data was stored on encrypted devices and shared via secure OneDrive folders (accessed only by the research team via passwords) on the University of Leeds cloud storage platform.

Analysis methods: framework development

All data from the CARAN project was collected prior to my PhD programme, meaning that I did not take part in any data collection activities. As a result, analysis stages in this thesis emerged organically from initial readings of the data. These initial readings led me to consider the CARAN data from through a gendered lens and a focus on One Health approaches. Initial readings of the data provided 'tigger points' for further reading into both gender and one health literature and two separate analysis frameworks were developed as a result.

This section has presented the methodological content of the CARAN project, the next section will present two analytical frameworks developed and applied to the data generated during the CARAN project. The first, a One Health framework, aims to identify the community-level drivers of AMR through a One Health lens. The second framework, adapted from an existing health systems research framework, aims to unpack the gendered power dynamics at the community level in relation to the behaviours that drive AMR.

One Health analysis framework development

This section of the chapter focuses on the development of an analysis framework seeking to identify and unpack the One Health dimensions of the CARAN data. This analysis uses the data gathered during workshops and focus groups as well as films made by participants during the workshop period, as described above. Each transcript documents the conversations and activities that took place over the course of workshops as well as documenting the feedback gathered from participants and audience members in post-showcasing focus groups (FGDs). The films, made by participants, relay AMR information that is specific to their own context. Though the initial aims of the CARAN project were not defined using the One Health approach, some crossover between human and animal health was brought into focus through prompts and questions from facilitators. These links became clearer, especially within the films, where participants relayed their experiences in rearing animals and growing crops in their daily lives. Through this initial analysis, it became clear that by applying a One Health lens to the data, it would be possible to draw insights into the ways in

which AMR was being driven at the community level across all One Health areas. Data from a community-led study should be collected and analysed from a One Health perspective to better capture the nature of daily life for many (i.e. those who rear animals or grow crops at a homestead or smallholding). In order to do this, a more robust analysis was needed to unpack the data more thoroughly through a One Health lens.

All transcripts and films were analysed using thematic analysis. Given that there is currently no One Health framework that applies to the analysis of qualitative data in AMR studies, the first stage of this process was to generate a framework that could guide and sort themes emerging in the data. The framework method (Gale et al., 2013), a method through which a researcher develops a framework through readings of data, was employed here to create a systematic method of data analysis. The first step in this process was to become familiar with transcripts and films, making initial notes and observations. These initial notes shaped an early set of codes which developed iteratively through further readings. It became clear that most One Health related responses fell within the categories of knowledge, attitudes, and practices (KAP). These initial codes were separated into human, animal, or environmental topics to create a manageable and clear dataset. Further transcripts were read for responses within these codes and numerous responses were found. The process of generating themes and codes, iterative in nature (Saldaña, 2015), continued to inductively generate themes within the codes of KAP (Pope et al., 2000; Boyatzis, 1998). This is to say that themes emerging from the data were recorded and grouped accordingly (Gale et al., 2013). At this stage a preliminary framework was designed to represent the layers of analysis, as shown below.

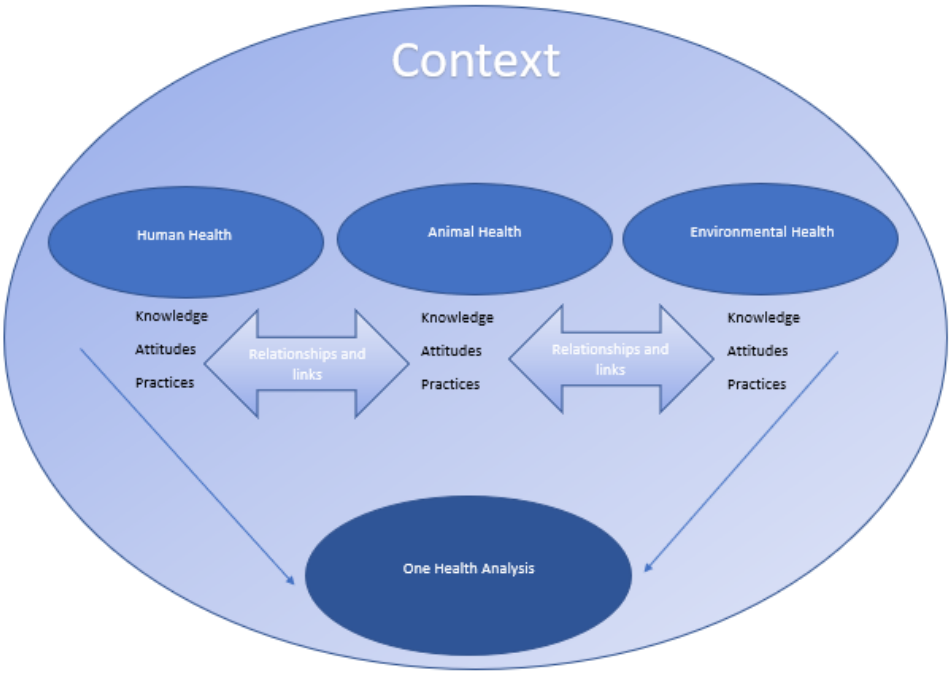
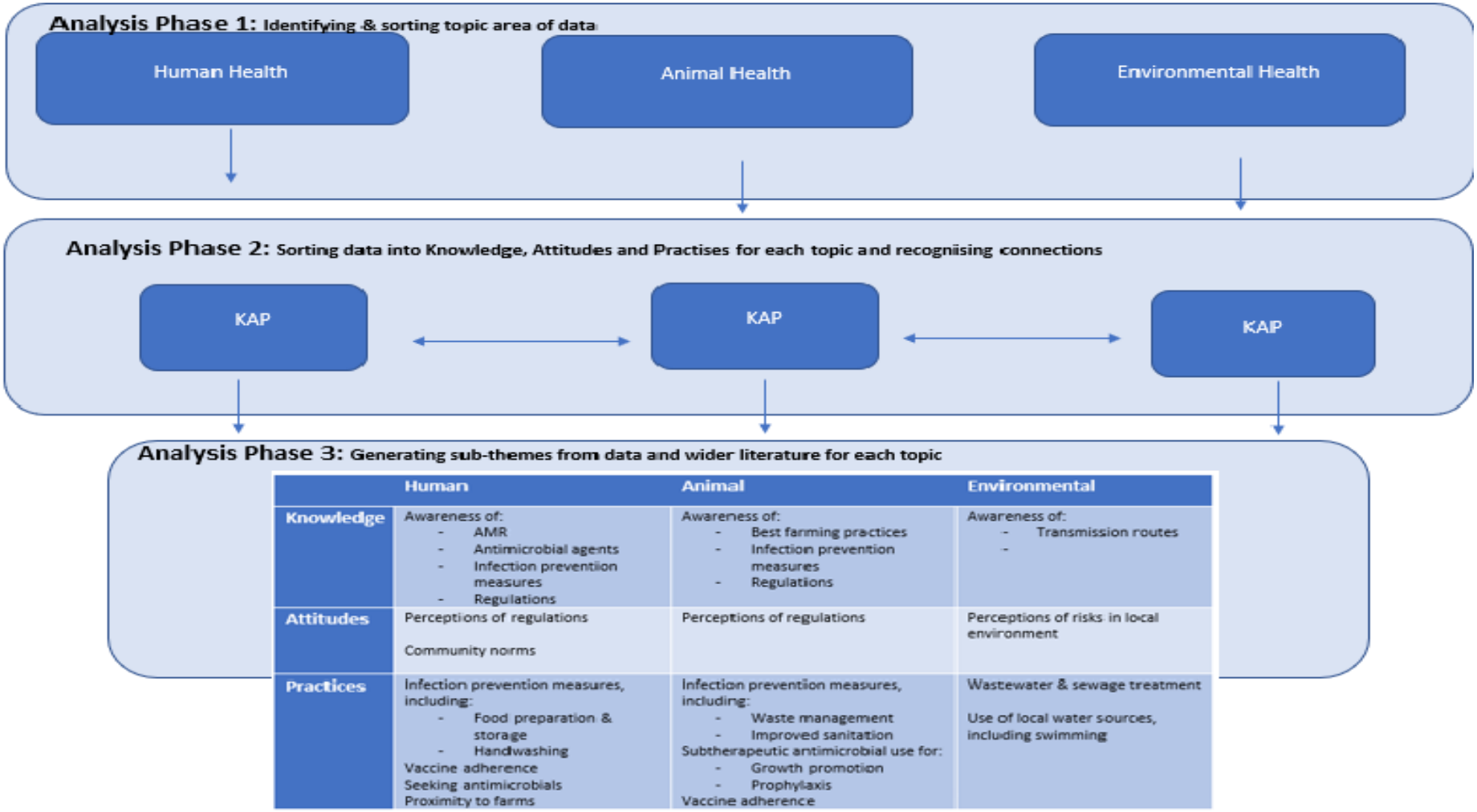


Figure 5 - One Health analysis framework: A first iteration limited to the themes inductively generated through readings of CARAN data

This framework highlights interconnections between the separate themes, often relating to and influencing other themes. In defining the terms for KAP; knowledge, in this case, relates to participants understandings of topics relating to AMR and antibiotic use. This was not limited to scientific knowledge of particular chemicals and included topics such as animal rearing knowledge and behaviours that relate to use of antibiotics in farming as well as knowledge on infection spread via environmental factors. Attitudes were defined as the emotions or feelings relayed by participants, either as individuals or in description of community responses to AMR related topics within the categories of animal and environmental health. Practices were defined as any responses that described the acts undertaken in either agricultural or environmental settings that related to AMR. These responses could describe personal experiences or observations made of practises that relate to the spread of AMR in animal or environmental health.

It became clear, though, upon review that coding would need to be added deductively from the wider One Health literature in order to create a comprehensive framework. Coding responses to KAP alone were too broad, more specific themes were needed within each of these categorises. Themes within One Health range widely across topics relating to animal, human and environmental health. However, not all of these themes were present in the CARAN data alone. From the wider One Health literature, as

discussed in the introduction section of this chapter, there are many intersectional issues across the three health areas. The CARAN data, as it was not initially intended to gather One Health data explicitly, does not include information from each of the three sectors. There is a focus primarily on human health, secondary focus on animal health (agricultural animals) then little to no mention of environmental health. Inductive generation of themes from the CARAN data alone would therefore produce an imbalanced framework with a focus mostly placed on human health. Sub-themes absent in the CARAN data, but appropriate for the wider One Health discussion, added to the framework were identified through close readings of WHO's Global Action Plan (GAP)(WHO, 2015c) and a 2018 Wellcome Trust report (Aga et al., 2018). The GAP provides information to stakeholders (such as governmental agencies) on common transmission routs of AMR infections from a One Health perspective and provides guidance on key interventions. Below is the final One Health analysis framework, it outlines the phases of data analysis to guide researchers seeking to identify One Health themes within qualitative datasets.



	Human	Animal	Environmental
Knowledge	Awareness of: - AMR - Antimicrobial agents - Infection prevention measures - Regulations	Awareness of: - Best farming practices - Infection prevention measures - Regulations	Awareness of: - Transmission routes -
Attitudes	Perceptions of regulations Community norms	Perceptions of regulations	Perceptions of risks in local environment
Practices	Infection prevention measures, including: - Food preparation & storage - Handwashing Vaccine adherence Seeking antimicrobials Proximity to farms	Infection prevention measures, including: - Waste management - Improved sanitation Subtherapeutic antimicrobial use for: - Growth promotion - Prophylaxis Vaccine adherence	Wastewater & sewage treatment Use of local water sources, including swimming

Figure 6 - One Health analysis framework: Showing each phase of analysis involved in generating a One Health analysis of qualitative data sources

Gender Analysis framework

This section of the chapter focuses on the development of an analysis framework seeking to identify and unpack the gendered dimensions of the CARAN data. This section addresses research objective 3: To unpack the relationship between gender and AMR driving behaviours in a community setting.

This analysis uses transcript data gathered in focus group discussions (FGDs) with workshop participants and showcasing participants, transcripts from recorded workshop sessions, feedback from facilitators in the form of reflective notes and the videos produced by participants. Iteratively generated through multiple readings of text and screening of videos, this analysis was produced to reflect on the main themes in gendered elements of AMR related behaviours. Data from transcripts and videos were separately analysed to unpack enforcing and contradicting information between the two data sources. The transcript data was analysed using thematic analysis, using a modified health systems research (HSR) framework as a stimulus, as described below. Once this analysis was completed, the next stage was to assess the films generated by participants. The films were analysed using a coding framework (below) that was created through a process of transcript analysis. Transcripts from films were analysed thematically, as above. Visual elements of the films were also analysed, guided by themes generated from the analysis framework.

Health systems research, or HSR, is designed to take environmental factors impacting on health (culture, socio-economic, geography, demographics, political, historic) into account when conducting research (Varkevisser et al., 2003). Good health can only be experienced by all when health systems consider the context in which it operates. When considering the impacts gender can have on AMR drivers, HSR is a useful tool to unpack issues such as gender norms and behaviours, access to treatments and cultural/religious attitudes. One such HSR framework, created in 2016 by Morgan et.al, looks to specifically address gender in health systems at all levels and provides a basis for the analysis later in this chapter. While this framework is useful as a starting point for analysis, it is important to note here that this thesis is not concerned with a full evaluation of all aspects of Nepali health systems, therefore HSR was utilised as a means to initiate an analysis method. This is concerned with the impact gender has on AMR drivers at the individual, family, and community levels. This analysis therefore took a well-established HSR framework and used it as a starting point for thematic analysis: as

a means to provide an over-arching set of questions in order to group emerging themes. From these over-arching themes, sub-themes were described and unpacked – as is detailed in the 'results' section of this chapter.

Where many of the previously discussed resources linking gender and AMR begin the conversation about a potential relationship between the two, we must move beyond simply desegregating health data by gender in order to better understand the drivers of AMR and how they are shaped and/or influenced by gender. Sex and gender influence health outcomes in many ways; access to resources, health-seeking behaviours, attitudes and perceptions, resource utilization (Heidari et al., 2016). This chapter aims to evaluate the data gathered in the CARAN project through a gendered lens; unpacking what this PV project can tell us about the gendered elements of AMR drivers in relation to local health systems.

The Morgan et.al framework is employed to provide an initial set of questions to be applied to the CARAN data, acting as a directional tool to group themes in the text and films. The data gathered during the CARAN project, though not explicitly aiming to generate gender information, surfaced some fundamental differences in how men and women experience and perceive different elements of the local health system in relation to AMR. The Morgan et.al framework argues that more must be done than only disaggregating data by sex. To understand the drivers of any health issue, firstly we must see if the data exist (disaggregating by sex) but then move beyond that to develop a more detailed picture of how social dynamics (based on gender roles) create barriers and opportunities within health systems. The framework contains four basic categories that relate to the differences in power experienced by gender; who has what, who does what, how values are defined and who decides. Below is a breakdown of these four categories, with the given examples from the original text.

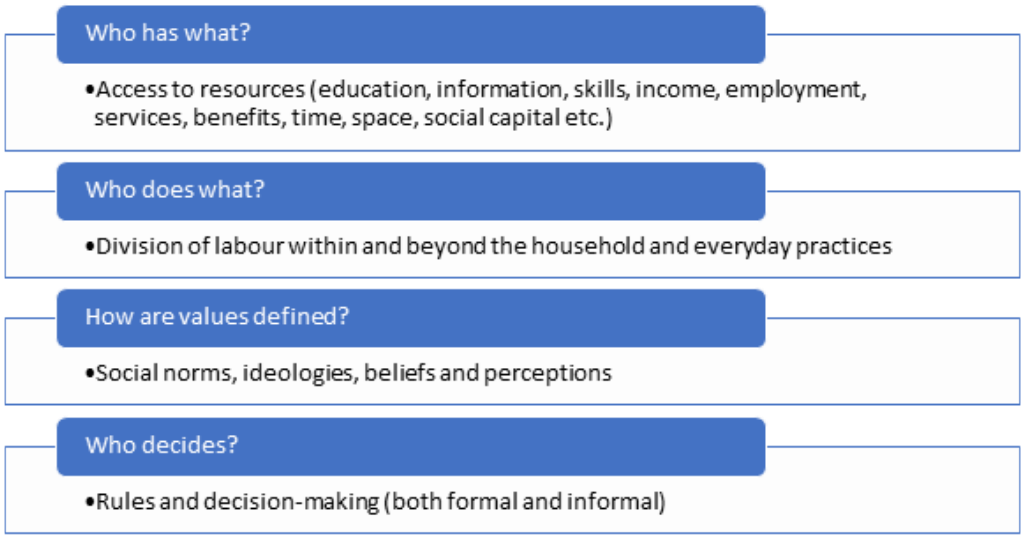


Figure 7 - Morgan et al. 2016

The final framework was generated through iterative readings of the data and development of themes, through a process of thematic analysis. This framework was developed through analysis of FGD transcripts, then applied to the films generated by participants during the project. Thematic analysis was selected as an appropriate tool, as laid out in Braun & Clarke's 2006 paper, to systematically analyse transcripts in a rigorous and clear way (Braun, C., 2006). This analysis moves through the six phases of analysis, as laid out by Braun& Clarke: Familiarisation, generating initial codes, searching for themes, reviewing themes, defining, and naming themes and writing a report. In order to ensure reliability of findings, it was important to catalogue each stage of the analytical process in a precise and consistent manner (Nowell et al., 2017). Below, each stage of the FGD transcript analysis process is described.

In the first stage of data analysis, focus was placed on familiarisation with the transcripts. Each transcript was read and initial notes and observations were made. Additionally, in order to ensure all gender-related conversations were logged, a key terms search was completed on Microsoft Word. A number of key terms were used that related to gender, for example; male, female, mother, father etc. Each result was read through and, if connected to AMR topics, notes made in an initial table. In relation to the HSR framework, this phase in analysis served as a means to test the data for relevant information. The Morgan et.al. framework describes a need for initial evidence of gendered trends to act as a 'trigger point' for further analysis

(Morgan et al., 2016). This first stage, where transcripts were read and initial notes taken, served as a means to establish that a further and more thorough gender-based analysis would be useful.

The second phase of analysis consisted of generating initial codes; noting particularly interesting responses from transcripts. This phase of analysis was guided by the over-arching four categories posed by the HSR framework. Initial codes were generated manually though highlighting interesting sections in the text that related to gendered aspects of AMR-related behaviours. Once highlighting of each text was completed, a table was generated that grouped all relevant responses into one of the four categories laid out by the guiding HSR framework. This table took direct quotations from transcripts as evidence in one of the four categories: *who has what, who does what, how values are defined and who decides.*

In phase three of analysis, where themes were searched for, the coded table (mentioned above) provided a means to unpack potential themes within each of the four categories. Each category was analysed separately, taking each of the quoted sections of transcripts and assessing them for potential connections and relationships. Quotations from each category was transferred to word documents, read through and each potential theme assigned a highlighted colour. Upon multiple readings, initial themes were generated through the use of highlighting and linking direct quotations from transcripts. This process was iterative; though some themes were searched for initially, some emerged through readings of the data. At this point, where a new potential theme emerged, key readings of the text were performed again to search for any relevant data that could have been missed in phases one and two. This process was repeated for data in each of the four categories, at each stage of this process, Wherever necessary, repeated readings of key texts were undertaken to ensure no relevant information was omitted. At the end of this phase of analysis four separate Word documents catalogued responses in terms of potential themes and sub-themes (divided by gender). At this point it was useful to create maps of the emerging themes, in order to visualise the themes and begin the next phase of analysis (Braun, C., 2006). Below is an example of these maps, outlining initial themes and sub-themes from the category *who has what:*

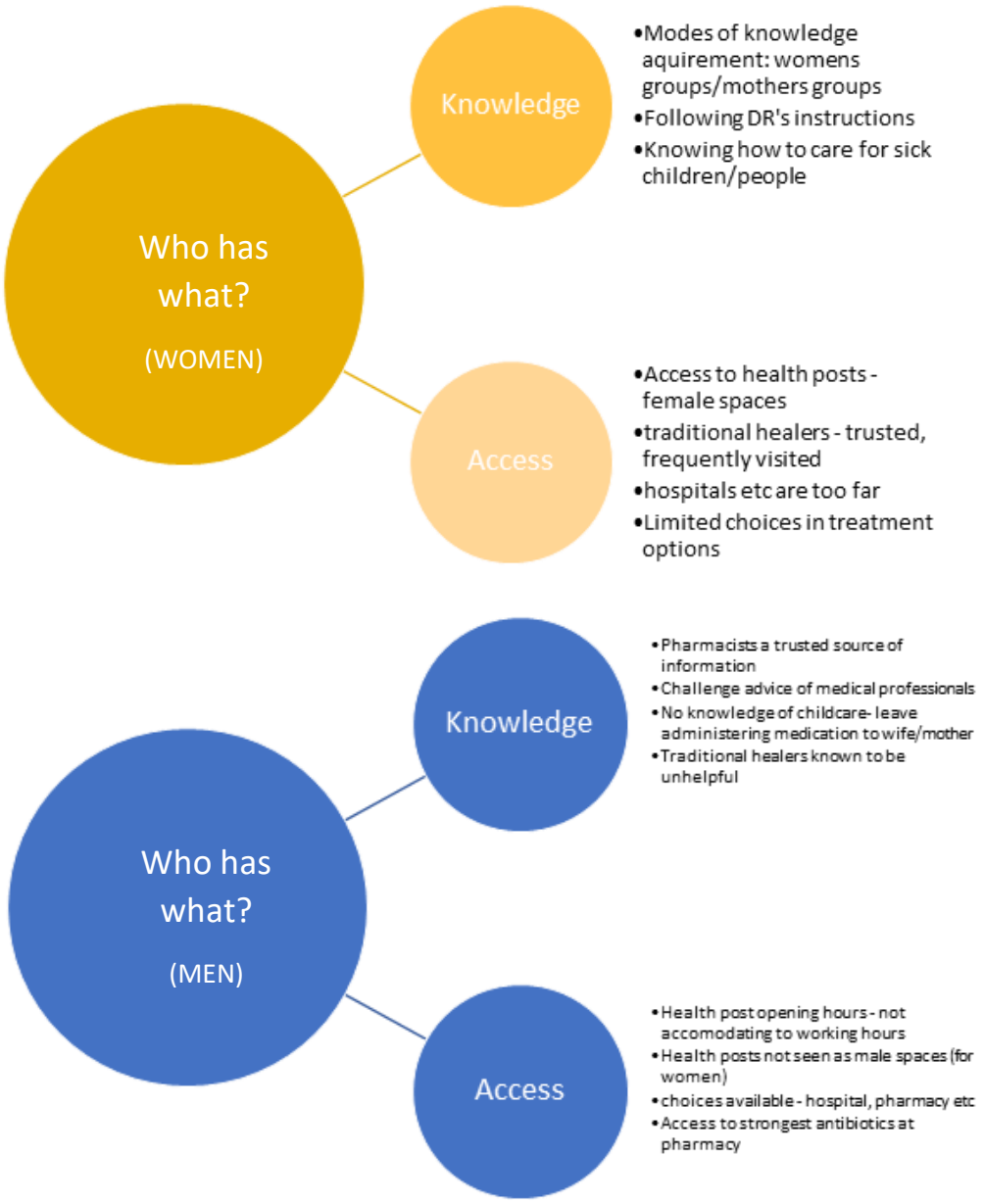


Figure 8 - initial themes & Sub-themes mind-map

The over-arching theme of *who has what* yielded two main themes; knowledge and access. Within each of these themes a number of sub-themes were identified, as shown above.

Phase four consisted of reviewing each potential theme and sub-theme. Each category was mapped, ensuring that the data was showing a coherent pattern in responses. Some of the sub-themes were merged due to the amount of data available for each. To illustrate this process, below is a diagram showing the final map of themes and sub-themes within the category *who has what:*

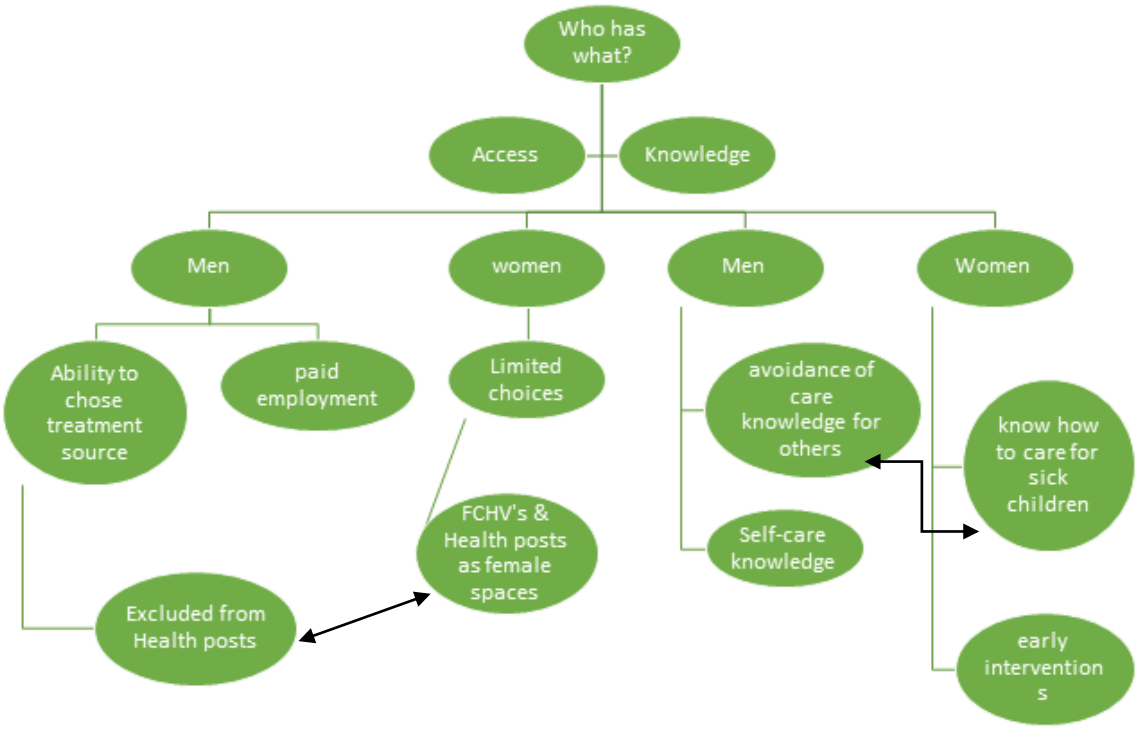


Figure 9 - phase 4 of analysis (theme naming) who has what

Upon refining themes and sub-themes it became clear that some sub-themes were strongly connected; one good example of this is in a male sub-theme of avoiding caretaking behaviours for children, and a strong sub-theme of caregiving behaviours from women. Male participants, when asked, often relay that they leave knowing how to medicate a sick child to their wives, a theme connected to that of women knowing how to care for sick children through home remedies and doctors instructions. This will be further unpacked in the 'results' section of this chapter.

This process of reviewing themes and sub-themes was repeated for the remaining three categories and resulted in four maps. At this point in this phase of analysis, a thematic map (Braun, C., 2006) was designed that mapped all major themes and sub-themes from all four categories. Key sections of transcripts were re-read with the intention of ensuring that themes fitted the data, as well as identifying any data missed in earlier stages of coding. The coding frame, after a few minor refinements, was completed at this stage.

The final stage of analysis, in which themes and sub-themes were named, generated a modified version of the initial HSR framework stimulus. Each of the four categories were revised to better fit the questions asked in this analysis. Each of these over-arching categories, as shown below, has a concise explanatory passage below it defining what information is sought through each category.

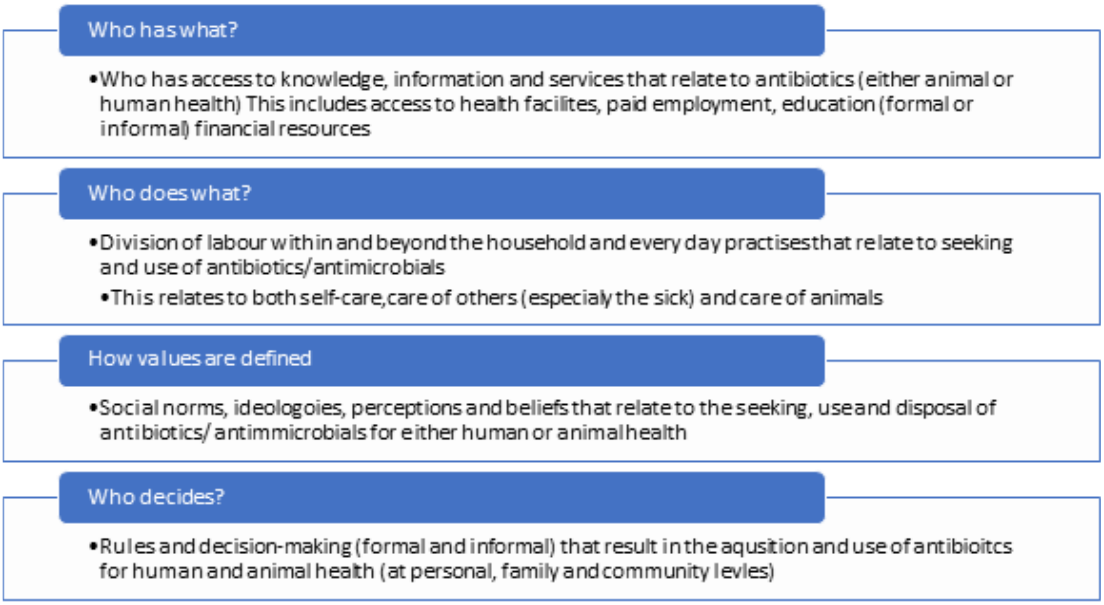


Figure 10 - Final Framework

This section has presented the two frameworks to be applied to the CARAN data in chapters 5 and 6. In section 2, this thesis will present the outcomes from applying the above frameworks to the CARAN data. In applying these frameworks to the CARAN data, this thesis will produce recommendations for future PV in AMR projects. This framework can also be applied to visual data within films; seeking evidence of each theme within framing, movement and choices of setting. Visual elements of the films will be included in the full analysis presented later in this thesis. Recommendations, along with reflections on the execution of the CARAN project and recent literature will guide a process of reviewing and revising a current manual. The next section of this chapter will describe the process of applying the learning of this thesis to the development of a reworked user's manual.

Manual review

The final output of this thesis comes in the form of a user's manual for researchers conducting PV projects in AMR. The first iteration of the manual was developed during the CARAN project and was published online in 2019 via the CE4AMR

network – a network initiated and run by the University of Leeds. Initial plans for fieldwork activities, as described above, were refined during the CARAN fieldwork period, and written into a user's manual to be made available online here:

https://ce4amr.leeds.ac.uk/wp-content/uploads/sites/84/2019/11/CARAN-manual-version-1.1-1-min.pdf

The original manual was designed as a working document, intended to be reviewed periodically as evidence grew in the area of PV in AMR research. The research outcomes from this thesis, therefore, were identified as useful additions to be made to the next iteration of the manual. One of the primary outputs of this thesis is a modified user's manual that incorporates updates to AMR information, guidance around One Health approaches and the findings of the analyses conducted on the CARAN data in this thesis. The review process was approached pragmatically; guided by a desire to generate useful knowledge using iterative cycles of abductive reasoning (Feilzer, 2009). Pragmatism, in this review and revision process allowed for a clear focus on the needs and perspectives of those the next iteration of the manual was designed to guide (stakeholders) and aimed to integrate research with practice (Glasgow, 2013).

Process

Initial readings of the manual were completed with a focus on how and where it might be useful to incorporate research findings from this thesis. Readings of the manual were completed, and a series of notes and suggestions made to be discussed with the original CARAN team members for feedback. I undertook a process of conducting structured discussions and feedback sessions to capture the learning from and since the CARAN pilot study and endeavoured to collect this learning into useful messages to be incorporated into the next iteration of the manual. A series of workshops with CARAN team-members and team members from an ongoing project (COSTAR) where these materials are to be used, alongside targeted interviews with researchers who have used either the full manual or specific exercises from within the manual. From the conversations and feedback from these professionals, I began to identify key areas of the manual that would benefit from adaptations and additions.

This process included regular feedback sessions with my PhD supervisors, who were both integral members of the CARAN project. As iterations were developed, versions were shared with key team members at appropriate points and alterations were made accordingly. Alongside revisions based on team-members feedback,

lessons from the analysis chapters of this thesis were incorporated. The key messages related to the topic of AMR to be incorporated into the revised manual were the need for:

- A focus on AMR broadly, to replace the ABR language included in the original iteration of the manual
- A focus on One Health drivers of AMR at the community level, including information on how common practices in each sector drive AMR and guidance on identifying stakeholders across each sector.
- A focus on the role of gender in community-level drivers of AMR, with considerations of other demographics (such as age)
- An interdisciplinary evaluation framework, developed in Chapter 6 of this thesis which can guide researchers in planning and executing PV in AMR research.

Each of these additions was agreed upon with CARAN team members and other relevant experts in the fields of human health, animal health, environmental health, participatory arts, and community engagement. The process of developing One Health additions to the manual were as follows:

Reflections and feedback from key CARAN team members highlighted the variety of antimicrobial medicines used in agriculture and livestock production outside of antibiotics. In order to ensure that the next iterations of projects in this field are engaging to as many communities as possible, it was decided that the manual should discuss AMR broadly and introduce the transmission and treatment routes across human, animal and environmental sectors. It was identified that One Health information would be useful for an interdisciplinary team, given that some core members of a facilitation team may not have a comprehensive understanding of AMR drivers (at all levels). I attended workshops where experts from the fields of human, animal and environmental health presented key information from their field on AMR. From these presentations, I developed summary pages (one for each sector) that presented key One Health information on AMR from each perspective; human, animal and environmental health. These pages were circulated with the experts who delivered the various presentations at the workshops. Each expert was prompted to provide feedback to ensure the accuracy and delivery of the messages. Feedback from each expert was collected and incorporated into the revisions made to these drafts. Once each expert approved these pages, they were added to the revised manual. Full drafts of the manual were later shared with the

wider CARAN team and other relevant stakeholders for general feedback on messaging, ordering of content and visual elements.

A similarly iterative process was undertaken to incorporate gendered information into the manual. Research outcomes from chapter 5 in this thesis shaped a number of additional passages and pages to be incorporated into the manual. Pages prompting researchers and facilitators to reflect specifically on the gendered dynamics of their study population, gender dynamic of their participant groups and examples of prompts to facilitate group conversations around gender roles were all incorporated into the manual at appropriate points. All additional passages and pages were shared with the CARAN team for feedback before being added to the final draft of the manual for wider circulation.

Similar processes were undertaken to incorporate new information in other areas of the manual, described more thoroughly in section 3 of this thesis. A full draft of the revised manual is presented in section 3 of this thesis, in Chapter 7, with full details on how each area of this thesis informed the specific additions made to the manual.

Limitations

As stated previously, the original CARAN project did not focus on gender or One Health explicitly. As a result, the dataset used in this thesis is limited by the original aims of the project; to look widely at community level drivers of AMR. The CARAN project researchers intended to keep aims and prompts broad to gather as much information on community level drivers of AMR as possible. Therefore, they did not focus on specific demographics when shaping topic guides etc. As discussed, through early readings of the data, it became apparent that there was evidence of both One Health themes and gendered themes within the data, though these were not always fully explored/probed by researchers. This thesis, and the analyses presented within it, use the CARAN data as an illustration that these foci are essential to both identifying key drivers of AMR and potential solutions to those drivers. Due to these limitations, this thesis aims to use the CARAN data to identify emergent themes and areas for future research focus rather than to present a complete picture.

Conclusion

This chapter has presented the data collection methods from the CARAN project, providing the context for the analysis chapters in section 2 of this thesis. This chapter has also presented the process of developing two key analytical frameworks that will be applied to the CARAN data in section 2 of this thesis, namely the modified health systems research framework designed to unpack gendered power dynamics and a newly designed One Health analysis framework to identify intersectional community level drivers of AMR. Finally, this chapter has described the iterative process of reviewing a manual for conducting PV in AMR research.

This is the concluding chapter of section 1. This section has presented the issue of AMR and illuminated two key gaps in current research, namely in community level One Health approaches and a lack of gender-specific focus in AMR research at all levels. A scoping review of the participatory video literature has identified a need for a robust evaluation framework that reflects the interdisciplinary nature of this area of research. Finally, in presenting the CARAN project methods and analysis frameworks, this section has provided key context in which to situate the analysis chapters to come in section 2 of this thesis. The next section of this thesis will consist of a chapter presenting the outcomes of applying the previously described One Health analysis framework, a chapter presenting the outcomes of applying the previously described gender-focused analysis framework and finally a chapter presenting the development of an interdisciplinary evaluation framework designed to be applied to participatory video-based health projects.

Section 2

This section will explore each of the points developed in section 1: a need for community focus when considering One Health drivers of AMR, a need for a gendered lens when considering community-level drivers of AMR and a need for an evaluation framework that combines key elements of PV and public health evaluation methods. The first section presented a justification for the topic of AMR and the methodological approaches explored in this thesis. It provided essential background information on the context of the data set and the development of analysis tools. This section will, firstly apply a One Health analysis framework, developed in the ‘Methodology Chapter’ of Section 1, to the CARAN data and present findings. The following chapter will present a gendered analysis of the CARAN data, again developed in the ‘Methodology Chapter’ of Section 1, presenting findings and recommendations. Finally, this section will present the development of an evaluation framework that combines key elements of PV evaluation and public health evaluation to address the need for standardisation in evaluating and reporting on PV in health studies, as identified in Chapter 2.

Chapter 4: An exploration of One Health drivers of AMR at the community level; CARAN data analysis

Introduction

Following from the information presented in ‘Chapter 1: Introduction’, this chapter will further unpack the One Health drivers of AMR and address key elements of research objective 2: To develop a framework for analysing a qualitative data set for One Health AMR driving behaviours at the community level.

The intersections between animal, human and environmental health both impact and are impacted by communities. This chapter seeks to present the value of exploring the community-level perspectives of local One Health issues in identifying potential solutions to the drivers of AMR. An analysis framework, developed in ‘Chapter 3: Methodology’ will be applied to the CARAN data, identifying key areas for potential focus and interventions in future research. Due to previous analyses, conducted by CARAN researchers, into the human behaviours that drive AMR at the community level, the framework will be applied to the CARAN data with the aim of primarily exploring animal and environmental health themes. To give context, a brief summary of human-health findings from the CARAN project will be presented later in this chapter.

The One Health Approach explored

As defined in Chapter 1, the One Health approach combines human, animal, and environmental health sectors. In relation to AMR specifically, the One Health approach allows us to holistically consider the drivers, as well as solutions to AMR at global, regional, national and community levels(WHO, 2017b). As resistance to treatments builds across multiple strains of harmful bacteria, our behaviours across human, animal, and environmental sectors drive AMR at ever-increasing rates. Any interventions to slow the spread of AMR require multi-agency cooperation as well as prolonged concentrated efforts to educate the public on infection prevention, sustainable consumption and safe disposal of antimicrobials as well as strong regulation and policy (Moran, 2017). Each of these issues occurs across both human and animal health, impacting on local environments through contamination (e.g., water runoff from farms seeping into local environments). The next part of this chapter will use the One Health approach to unpack issues relating to human, animal, and environmental drivers of AMR.

Human misuse

Antibiotic misuse in humans has occurred for many years; where people access antibiotics unnecessarily and without a prescription (Auta et al., 2018). Between 2000 and 2010 antibiotic use increased globally by 35% in humans (Van Boeckel et al., 2014). Antibiotics are often used in error, and are commonly believed to be suited for the treatment of more illnesses than is actually the case; a WHO survey from 2018, for example, shows that antibiotic knowledge is low in China, with 61% of responses misidentifying antibiotics as an effective treatment for viruses such as cold/flu and 35% believing them to be effective against headaches(WHO, 2018c). Surveys in the USA show that around 25% of patients expect to receive antibiotics for a cold(Nisbet, 2017).

A WHO 12 country survey in 2012 gave a comprehensive view of how antibiotics are understood and used in those countries(WHO, 2015a). The survey found that, at the time of the survey, 65% of the respondents had taken antibiotics within the past six months, 35% within the past month. The survey highlighted several trends in the use of antibiotics across the twelve countries included in the survey. A higher usage of antibiotics was reported in lower income countries, with 42% of LMIC respondents having recently taken antibiotics compared with 29% of HICs. The survey also showed that, in the countries surveyed, young people were more likely to have used antibiotics within the previous month; 37% of 16-24 years compared to 24% of 65+ years. Across the countries included in the survey, 81% of respondents said that they were prescribed or provided by a doctor or nurse, and 93% say they obtained the drugs from a pharmacy or medical store. However, the survey does not account for whether these prescriptions were necessary. Growing research suggests that antibiotics can be mis-prescribed by doctors due to pressures from patients to receive treatments which they perceive as necessary or more effective(Suda et al., 2019; Ranji et al., 2008; King et al., 2020). Doctors may also see a benefit in giving the patient in front of them antibiotics, believing the benefit of a contented patient to out-weigh the eventual risk of contributing to antimicrobial resistance (Broom, 2017)

The WHO survey showed mixed knowledge levels around antibiotics between respondents. Worrying data showed that 25% of respondents thought that using antibiotics that were given to a friend or family member was acceptable if treating the same illness/symptoms. Additionally, 43% of respondents stated that they would buy antibiotics if they displayed the same symptoms as an illness, they had previously taken antibiotics for. While antibiotics should be taken for the full

prescribed dose, 32% of respondents stated that they should stop the course once they begin to feel better, this was particularly evident in Sudan, Egypt, and China with this response as 62%, 55% and 53% respectively. Misconceptions around what illnesses can be treated by antibiotics can lead to people buying antibiotics unnecessarily. The WHO survey showed that 64% of respondents incorrectly stated that a cold/flu can be treated with antibiotics. Research in America around attitudes to antibiotics suggests that patients often expect to be given antibiotics at their doctor's visit, with around one in four surveyed expecting antibiotics to be prescribed for a cold (Francois Watkins et al., 2015).

The issue of antibiotic resistance and how to address it is a topic that has mixed levels of understanding across the 12 countries surveyed. When asked, 72% of respondents understood that many infections are becoming resistant to antibiotics. However, 76% of respondents incorrectly understand the term 'antibiotic resistance' to refer to a body becoming resistant to the effects of antibiotics. Furthermore, 44% of respondents believed that antibiotic resistance was a problem only for those who take antibiotics. Many respondents (91%) identified that simple actions such as hand washing can prevent the need for medications such as antibiotics and 87% agreed that antibiotics should only be used when prescribed. However, the understanding of an individual's possible impact can have on antibiotic resistance is low, with 57% of respondents stating that they didn't believe they could do anything to stop the spread of antibiotic resistance.

Animal/Agricultural misuse

Resistant strains of bacteria, found in the bodies of livestock, are passed to humans via the food chain and direct contact (Levy et al., 1976; WHO, 2020d). Livestock production often incorporates mass antibiotic administration in healthy animals as a preventative measure to maximise production, known as prophylaxis (WHO, 2015c). These sub-therapeutic doses are designed to prevent illnesses, rather than treat an illness once it has occurred. Livestock are also given antimicrobials as growth promoters, increasing yield and profit margins by shortening the amount of time an animal takes to grow to a profitable weight(Cogliani et al., 2011). Concerningly, in some areas of the world, antimicrobials are more commonly used in animal production than in human health (Moran, 2017; Van Boeckel et al., 2019).

Increases in demand for animals to consume, because of population and economic growth across many regions (Fiala, 2008), as well as poor or non-existent regulations (Van Boeckel et al., 2015; Cogliani et al., 2011) have led to an increase

in unsustainable farming practices globally. Subtherapeutic use of antimicrobials in farming act as a short-term solution to issues around food supply, creating increased yield through prophylaxis and shorter turn-around time for production through growth promotion (Brown et al., 2017). These practices also expose bacteria to antimicrobials unnecessarily and therefore promote resistance at alarming rates (Wongsuvan et al., 2018; Aarestrup et al., 1998). These issues are not limited to LMICs. A recent report found that countries such as Italy, the USA, Canada and Spain are using antibiotics at alarimg rates compared to the European average (Nunan, 2020). Some restrictions have been put in place to ban the subtherapeutic use of antimicrobials across areas such as Europe and Scandinavia. This has led to an overall reduction in resistant strains of bacteria present (Bengtsson and Wierup, 2006; Cogliani et al., 2011). However, evidence to suggests that eliminating sub-therapeutic use of antimicrobials alone is not effective in reducing AMR in certain strains of bacteria (Davies and Wales, 2019). Where the use of sub-therapeutic antimicrobials are banned, the cost of meat production can increase (Xiong et al., 2018) due to the requirement for improved infection control measures, meaning that future farming practices must focus on the challenge of meeting demand sustainably.

Some antimicrobials are used in crop production, although they are an expensive and often ineffective way to prevent infections in plants given that plants most commonly suffer with fungi and viruses (Vidaver, 2002). While the use of antimicrobials is relatively under-researched compared to animal usage(Aga et al., 2018), the impact that overusing and misusing these pesticides should not be ignored. The FAO (Food and Agricultural Organisation of the United Nations) works closely with farmers to help reduce reliance on pesticides, teaching alternative practices for pest management that do not use pesticides as well as advocating for strict regulations on the use of pesticides and antimicrobials (FAO, 2018).

Environmental transmission

Antimicrobials can be highly effective for human health. However, given that they are substances that can harm a microbial population, antimicrobials should also be considered as potential pollutants in the wider environment. Residues from both human and agricultural environments can enter the local natural environment and helps to accelerate the selection of resistant strains of bacteria. Wildlife, especially those living in close proximity to farmed animals, often test positive for the presence of resistant strains of E. coli (Furness et al., 2017; Swift et al., 2019). The environment, and environmental transmission is an increasingly recognised

element in the spread of AMR (WHO, 2017b). Environmental transmission is an element in AMR that is not yet fully understood. More research is needed to fully understand the impact of this on the global challenge of AMR (Huijbers et al., 2015; Afema et al., 2016). Below is a diagram that displays the role of the environment in antibiotic resistance:

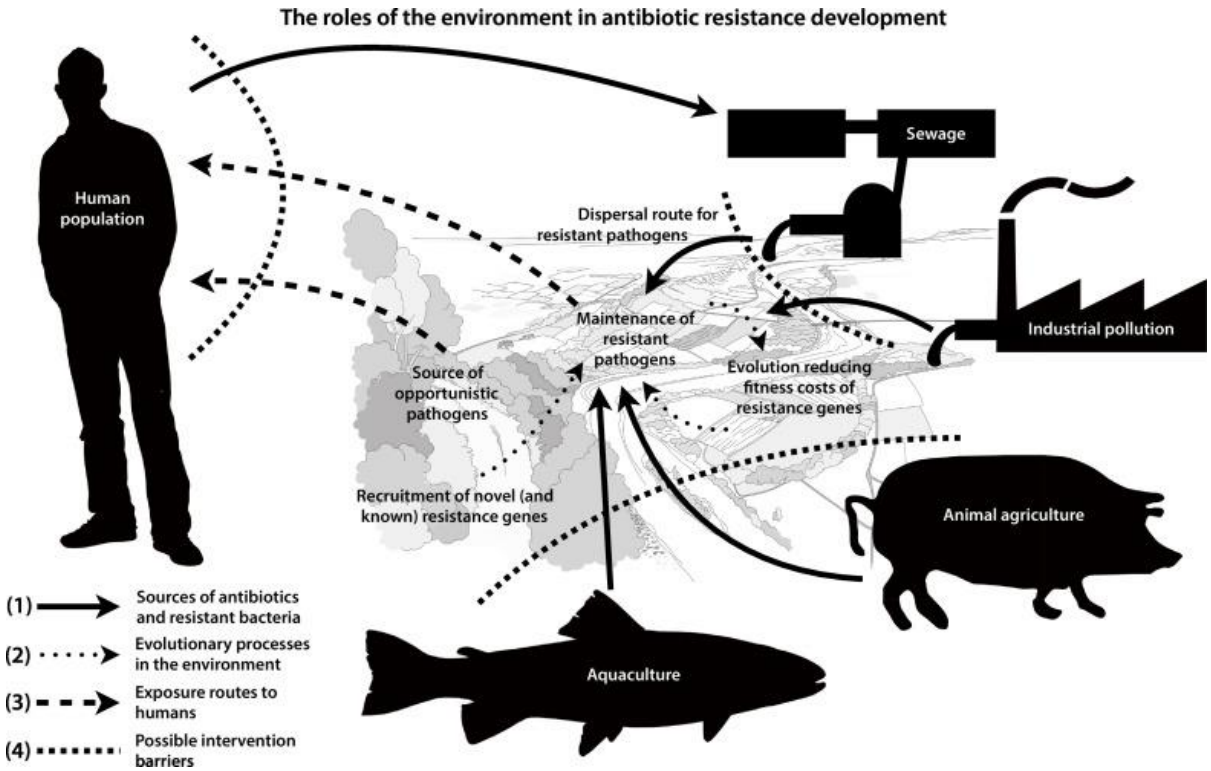


Figure 11 - Environmental transmission routes (Larsson et al., 2018)

As the diagram shows, environmental transmission of AMR can occur via multiple routes depending on the location. One key element is in WASH (water, sanitation, and hygiene). Research across multiple LMICs show AMR elements are present in drinking water and wastewater, even after treatment (Morse et al., 2019; Hiller et al., 2019; Chagas et al., 2011). Poor water quality for drinking and washing accounted for approximately 2 million preventable deaths in 2016 alone, and 13% of under 5yrs mortality in the same year (World Health, 2019). Research has found that waste water, especially from hospitals and health facilities, can be high in antimicrobial resistant microbes (Aga et al., 2018). Infection prevention, through improved access to WASH facilities, would lessen AMR by reducing exposure to all pathogens, including resistant strains of bacteria (Macintyre et al., 2017). Additionally, a 2014 study found that large-scale drug manufacturing plants discharge antimicrobials into their local environments at alarmingly high rates in

comparison to human excretion in communities (Larsson, 2014). Local transmission, though, may not be the only route for AMR spread; travel and trade routes are so internationally connected that transmission of antimicrobial resistant strains of bacteria might well be happening on a global scale (Hernando-Amado et al., 2019; Aga et al., 2018).

Global Environment

There is a growing body of literature connecting the increasing rates of AMR to warming global temperatures. While more must be understood before any strong conclusions can be drawn, there is evidence that warming global temperatures increasingly drive resistant strains of bacteria to populate (MacFadden et al., 2018). In addition, the warming climate means that vectors such as mosquitos are more able to populate and spread diseases such as malaria (Austin et al., 2017); an illness that is becoming increasingly resistant to treatments (Bloland and World Health, 2001; Menard and Dondorp, 2017).

One Health and AMR (global responses)

There are a range of global agencies involved in the One Health agenda, this section will outline each of them to give the wider context of One Health guidance and response at the macro/global level.

The Global Action Plan (GAP) was developed by WHO in 2015 in response to the worrying predictions made by the World Bank on human and economic costs of AMR globally, as previously described. The plan details the scope of AMR, the challenges faced and the possible way forward in AMR reduction through five main objectives:

- To improve awareness and understanding of antimicrobial resistance through effective communication, education, and training.
- To strengthen the knowledge and evidence base through surveillance and research.
- To reduce the incidence of infection through effective sanitation, hygiene, and infection prevention measures.
- To optimize the use of antimicrobial medicines in human and animal health.
- To develop the economic case for sustainable investment that takes account of the needs of all countries and to increase investment in new medicines, diagnostic tools, vaccines, and other interventions.

(WHO, 2015d)

Various global agencies and initiative have been set in train through these recommendations. Below is a summary of three agencies that aim to meet some of these recommendations:

The Global Antimicrobial Resistance Surveillance System (GLASS)

Launched in 2015, GLASS is a WHO-supported system that supports a standardized approach to the collection, analysis and sharing of data regarding AMR globally. It is designed to inform decision-making and to drive local, national and regional action (Seale et al., 2017). GLASS works at all levels of WHO; headquarter, regional and country offices to support standardised monitoring of AMR within each enrolled country (WHO, 2018b). Early progress reports suggest that there is an increasing awareness of the importance of AMR surveillance, with a 64% increase in participating countries (WHO, 2018b).

Global Antibiotic Research and Development Partnership (GARDP)

In the fight against AMR, the development for new treatment options is essential. Initiated by the WHO in 2016, GARDP is a not-for-profit organisation focusing on the development of new and effective antibiotic treatments (Piddock, 2019). GARDP works across academia, the private sector, civil society and governments to generate innovative solutions to the issue of AMR globally (GARDP, 2019). GARDP has set itself an ambitious target to develop five new antimicrobial treatments by 2025, focusing on sepsis in new-borns, sexually transmitted infections and infections in hospitalised patients (Balasegaram and Piddock, 2020). As part of its aims to connect private and public sectors, GARDP has developed the REVIVE training programme; a series of webinars, online sessions, conferences and platforms for current and retired experts across fields to connect (Pentz-Murr and Piddock, 2019). The REVIVE programme aims to bridge gaps between often fragmented research fields (Zuegg et al., 2020).

Interagency Coordination Group on Antimicrobial Resistance (IACG)

Established in 2016 by the UN Secretary-General, the IACG aims to improve coordination between international organisations, ensuring effective global action against the threat of AMR.

> *The IACG's mandate is to provide practical guidance for approaches needed to ensure sustained effective global action to address antimicrobial resistance; and to report back to the UN Secretary-General in 2019 (WHO, 2019d).*

A 2016 summit identified specific areas across human and animal health that require urgent action, as well as areas for further research, including optimising antibiotic use, improved awareness, and better alternatives to antimicrobials in agriculture. It was also agreed that cross-sectoral advocacy groups must be created in all settings, with partnerships between public and private organisations. The report states a need for generating local data to inform policy and establish local and national priorities.

In early 2019, the IACG released an updated report with recommendations to address AMR globally. The report lists the following as key objectives:

A. *Accelerate progress in countries*
B. *Innovate to secure the future*
C. *Collaborate for more effective action*
D. *Invest for a sustainable response*
E. *Strengthen accountability and global governance*

(IACG, 2019)

Actions such as ensuring appropriate use of agricultural antibiotics, as well as investing in antibiotic development research and engaging with civil society organisations for One Health approaches all feature in the recommended actions for member states. The IACG encourages innovation and collaboration, placing One Health at its centre.

Figure 12 - IACG 'No Time to Wait' One Health recommendations linking to the Sustainable Development Goals

Above is a figure developed by the IACG as part of their 'No Time to Wait' report on the increased incidence of AMR infections globally. The figure outlines the One Health areas of AMR, their ties to different SDGs and the necessity for interagency and interdisciplinary response.

It is worth mentioning, here, that global data on antimicrobial usage is limited. While high-income countries across Europe often relay complete data sets to global surveillance systems, many LMICs face challenges in monitoring that include lack of funding, resources and trained staff (WHO, 2018f; WHO, 2018b). Any reporting on global AMR trends is therefore incomplete, especially when considering that AMR is also driven by a lack of access to appropriate antimicrobials; a common issue across many LMICs (WHO, 2018f). At all levels, stronger monitoring and interventions are needed to better address the rising issue of AMR. AMR is driven by human behaviours across multiple areas, as discussed earlier in this chapter, and therefore must be solved by fundamentally changing our behaviours around antimicrobials.

Linking community engagement (CE) to the One Health approach

While global guidelines can inform regional and national governments on best practice, community generated solutions to local issues regarding antibiotic misuse are essential in order to effect behaviour change (Chhorvoin Om, 2017; Anna K. Barker, 2017; Peng et al., 2018). Community engagement is not directly addressed in the most recent IACG report delivered in early 2019. One recommendation in this report briefly mentions the effective engagement of 'civil society' for more effective action against AMR (IACG, 2019). As discussed in Chapter 2, community engagement can have positive effects on health outcomes. Where communities are empowered to 'speak truth to power' they are empowered to act on issues at the local level. Community engagement offers an opportunity to develop an applied understanding of One Health principles as experienced within communities on a daily basis: through running smallholdings, seeking subtherapeutic antibiotics and more.

The CARAN project found that participants were able to understand the issues surrounding AMR, as well as identifying local-level barriers and opportunities in addressing the rise in AMR. One analysis of the films (and filmmaking process) generated through the CARAN project reflected on the co-production of knowledge and the genuine knowledge exchange between community members and policymakers that it enabled (Cooke et al., 2020a). This will be discussed further in the following sections of this chapter.

Human health behaviours in the CARAN data

To provide context to the findings, presented in the below sections of this chapter, this section will summarise findings from the CARAN study related to human health behaviours and AMR.

CARAN Participants agreed that inappropriate use of medicines including antibiotics has been common practice in the community irrespective of age and gender. Self-medication and poor compliance to medicines including antibiotics was an important factor for irrational use of antibiotics.

In seeking antibiotics for self-medication, the CARAN participants described common local practises in obtaining antimicrobials (in particular antibiotics) from private pharmacies. These pharmacies are not regulated strictly, therefore are able to sell antibiotics without repercussions from governmental agencies. Most

commonly, participants described attending a pharmacy and either asking directly for a specific medication or describing symptoms and asking for an appropriate treatment. Participants also described a common method of getting antibiotics from a private pharmacy by asking family to attend on their behalf, often children within the family are asked to run this errand for parents/other family members. CARAN participants described seeking an alternative pharmacy, should the first they attend be reluctant to sell them antibiotics (or reluctant to sell stronger antibiotics) without a prescription from a medical professional. This practice is common, as pharmacies are run privately and for-profit, participants stated that it would be likely to find a willing seller. The CARAN study found that more men than women were likely to engage in the above behaviours due to various social pressures (explored more thoroughly in Chapter 5 of this thesis). CARAN participants also suggested that self-medicating with antibiotics (obtained over the counter from a private pharmacy without a prescription) was preferable to seeking sometimes high-cost medical treatment. This attitude from local community members is common, even though free-to-use health posts are available. These health posts are not always trusted by local communities to provide reliable and timely healthcare. Furthermore, as the medicines provided there are not branded, they are seen as weaker or of lower quality than those available through private pharmacies. These ideas are explored further in Chapter 5.

The CARAN project also found that compliance to recommended dosages and durations of medication were often not followed locally. CARAN participants described that, locally, people thought that taking medication after symptoms passed would make them ‘weaker’. This closely linked to the concern that, if a person takes medications for long periods, they may be too affected by side-effects to return to work.

CARAN participants did suggest that it would be possible to improve attitudes and practices related to antimicrobials/antibiotic use locally but that it would take time. Participants suggested that education could focus on alternatives to antibiotics for human health and identified women’s groups and schools as potential delivery mechanisms for messages related to improved antimicrobial usage.

Data Analysis

This section of the chapter will present the application of a One Health analysis framework (developed in Chapter 3) to the CARAN data, as described in Chapter 3.

The analysis framework aims to present an approach to applying a One Health lens to qualitative data analysis. As stated previously in this chapter, the CARAN project was primarily concerned with human-health behaviours that drive AMR at the community level. As such, analysis of the CARAN data from this perspective has already been completed by the original research team and will not be repeated here. The gendered analysis, described in the next chapter, aims to unpack some nuance within the human-centric behavioural drivers of AMR at the community level. This chapter will use the One Health framework developed in Chapter 3 to specifically identify AMR-driving behaviours that occur in the intersections between human behaviour and animal/environmental health. This analysis, then, should be considered as complementary to other analyses performed on the CARAN data; a means to explore the behaviours that directly influence or are influenced by interactions between humans, their animals, and their local environments.

Data analysis was approached thematically, using the above framework as a guide to shape themes and sub-themes in a clear and rigorous manner (Braun, V. and Clarke, 2006). Analysis followed the six stages of thematic analysis: familiarisation, generating initial codes, searching for themes, reviewing themes, defining, and naming themes and writing a report. Given that these stages were fully outlined in the previous gender analysis, this chapter will not catalogue each stage of analysis and will instead move into presenting findings.

Results

Animal health themes:

Knowledge:

There is a scene within the film '*Doctors Advice'* where a female patient receives information relating to AMR in humans, then enquires about animals as she keeps chickens at home. The patient describes how she had not known about AMR and would change her behaviours accordingly now that she knew giving her chickens sub-therapeutic antibiotics drives AMR. However, participants do discuss specific antimicrobials in relation to treating animals' multiple times across all transcripts. Participants with experience of rearing animals reference a need to administer and store antibiotics correctly in order for them to work:

F: We should not keep them [antibiotics] in an open place and if we do so, it will not be effective.

I1: You mean the medicines should be used properly?

F: Yes.

This level of awareness is reflected in two of the participant films: '*Agriculture'* and '*Antibiotics in Agriculture'*. In the film '*Agriculture*' we see a man who keeps cows. When one becomes unwell, he seeks veterinary help. The farmer, though, decides to administer the antibiotics purchased from the vet without supervision as he has previously experienced doing this for other cows and feels that he does not need guidance. After a period of time, he feels the cow is not getting better and seeks veterinary advice again, when the vet comes to his homestead he advises the farmer that he has been administering the antibiotics incorrectly. The vet advises the farmer and demonstrates the correct dosage and method of delivery before giving the farmer some information on AMR. In the film '*Antibiotics in Agriculture'* we see a chicken farmer give antibiotics to a large number of chickens via injection, a process which he describes as a regular occurrence.

There was also some awareness amongst some participants of specific mg dosages of antibiotics given to farm animals- this was due to their professions being closely linked to agriculture. Participants discussed the potential issues arising in knowing when to give animals medicine; comparing animals to humans, participants reflect that it can be more difficult to diagnose an illness in an animal as they cannot describe symptoms as humans can. For this reason, participants postulate that antibiotics can often be given to farm animals from vets that are not fully sure of their illness, thus potentially misusing antimicrobials.:

P10: We can only try with the birds and animals. We cannot be 100% sure. That is because they do not speak like the people. If people tell me that their chicken looks tired all the time, then I hand them the antibiotics. We are not Gods that can make them well immediately. We can provide people medication for their nausea when they tell us how they are feeling. But the chicken cannot speak. So, we assume what has happened to them and give them the medicines. They could either get better or they could die.

Participants expressed a consensus on a need for improving awareness relating to AMR in animal farming. Participants stated training for farmers on best practice relating to antimicrobials:

M: Farmers should also be trained accordingly, similarly, those selling pesticides and insecticides, pharmacists and community people should be educated about these accordingly. In general, everyone should be educated as per their need.

…

P10: We need to raise the most awareness amongst the people involved in agriculture.

[P1 agrees]

P10: Farmers and veterinary [doctors].

…

P9: They need to be given proper training…

P2: The farmers…

P10: [Interrupting] The government must provide the farmer…

P2: They need to provide them with training.

P10: Yes, that is the reason.

In relation to the transmission of AMR, and passing of antimicrobials to humans via different routes, participants expressed surprise in learning of certain issues. One particular scenario that participants mentioned multiple times is the transmission of antibiotics via cows' milk. These discussions are prompted by a scene in the film '*Agriculture'* where a farmer is told by a vet that he should not sell milk from his cow while it is receiving antibiotics, as antibiotics residues can be passed to humans through the contaminated milk. Participants taking part in a focus group discussion about the CARAN films after a showcasing event described their having learned about this:

P6: To tell you exactly, there was the one with the cow. After the cow is given the antibiotics, we also consume it through their milk. I did not exactly know that. I did not know that there could be transmission through the milk. I learnt that. It was not new for me watching about TB because we regularly work with that. And I did know about the one with the chicken which I was in. But I did not know about the cow. That is something that I got good information about.

…

P4: Everyone felt that the one regarding the cow's milk was new to us all… If I am a breastfeeding mother, then the antibiotics that I have is consumed by my child also. We had only information at that level. But most of them did not know that we were consuming antibiotics from the cow's milk.

M: Okay. What was their response like? Did they show astonishment about this, or did they say that they knew about it?

P4: They did not know that we were directly consuming it from the cow's milk. After that, they learned about it. We only knew that it could be transmitted from the mother to their babies. We would have never thought that we were consuming it from the cow's milk.

Attitudes:

Subthemes within the theme of attitudes appeared during transcript analysis. Participants expressed opinions on farming practices, mostly negative. Participants describe farmers as 'money-minded' and motivated to use antibiotics in meat production to maximise profits by promoting growth. Participants, especially in reference to poultry, described how modern farming has dramatically reduced production time:

F: They have to give it to the chicken in 45 days. It takes a year to raise the Nepali chicken.

F: We need six months for them (referring to Nepali chicken).

F: While the other chicken is raised within 45 days.

[All the participants agree]

…

P7: There are certain antibiotics that are given to the small chickens.

P1: The chickens are given antibiotics. And they even sell the chickens that have died after they were given those antibiotics...

P6: The thing is that after the chicken farming business boomed, people learned that the chicken could be eaten after 30 to 35 days only. When we used to raise chicken back in the village, the ones that were about a year or a year and a half would only be this big. [Gesturing]

P2: The chickens used to be smaller before.

P6: It used to be only 2 kilos at most.

Participants describe a feeling that farmers need better training in order to reduce inappropriate use of antimicrobials, or the selling of animals for meats that have too recently been treated with antimicrobials. Participants, here, describe a need for the government to 'raise awareness…amongst farmers and veterinary doctors. Participants also describe a responsibility of the government to enforce regulations on meat production and selling. Participants express concerns that the government

does not do enough to ensure the quality of meats that are sold to the public via markets:

P10: The government is the weakest here. The cows and cattle that are imported from outside are not paid any attention.

….

P10: The government is supposed to control it.

….

Participants even go so far as to suggest that farmers are wilfully dishonest about their practices due to the lack of monitoring provided by the government, as summarised in this comment from one participant:

P10: Yes, they [farmers] have become business minded. That is because the government has not managed it. That is the reason why we have to face these issues. They need to tell the farmers that they are not supposed to sell it in the market…

Another strong theme to emerge within attitudes is the reaction to meat products once participants have learned of certain farming practices. Though not limited to chicken, most examples relate to poultry meats. Participants describe being 'disgusted' by chicken reared in recent years, as well as a feeling that all meats are 'contaminated' by diseases. On two separate occasions participants raise concerns that the chemicals used in meat production cause cancer'.

Practices:

In the film '*Agriculture*' we are shown a scene where the vet, having checked a sick cow, goes to wash his hands using a jug of water poured by the farmer. There was one mention of regular vaccination of chickens in transcripts. However, this was conflated with discussion of regular antibiotic use and so is not clear if the participant meant vaccine or antibiotic. The film '*Antibiotics in Agriculture'* shows a chicken farmer describing the process of medicating and vaccinating his chickens regularly to help them grown and stay healthy. There is also no mention of common practices around waste management or proximity of living quarters to farm animals in transcripts. However, there is one scenario shown in the film '*Antibiotics in Agriculture'*. A farmer in the film describes how he uses the manure from his pigs to fertilise his tomato plants, claiming that his plants have become much healthier since he began this practice.

The strongest themes in transcripts, here, appeared in the acquisition and use of antimicrobials for farm animals. Participants who regularly tend to animals that took part in workshops described a reliance on the opinions of trained veterinarians to treat their livestock:

F: We go to the medical and we take the medicines for them. We go there and tell them about the problems that are seen with the chicken. We tell them things like their excrement is white in colour or green in colour. We do not ask them about the medicines that they give us. We are only concerned with how many times we are supposed to give them the medicines. We simply give it to them and that is all.

…

P6: [Clearing his throat] They [cows] fall ill. Then we call the doctors and then they give them the medicines. We do not know which medicines that they give.

…

F: Even when we talk about our livestock, we give them medicines only if the doctor's say that it is required. I do not insist on using the medicines against the advice.

Access to trained veterinarians, though, was described as limited. Participants reflect that there are 'very few' veterinary doctors locally and that there are no veterinary hospitals known by participants in all of Kathmandu. In relation to this, participants describe common practice for vets is to consult on an animal quickly, sometimes without examination, then provide antibiotics as a first response to any illness:

M: For those who pay them [vets] less they are asked to come to the road nearby with their ill animals giving a reason they are in hurry. Or they also ask the owners to try feeding a certain medicine to their animals without examining them until he gets time to visit and check them. This is also the reason for antibiotics misuse.

This practice is reflected in the film '*Agriculture'* when the farmer consults with a vet about his sick cow. The vet prescribes antibiotics via injection upon hearing symptoms. Furthermore, the vet describes himself as 'very busy' and accepts that the farmer is able to administer the antibiotics without demonstration so that he can keep his appointments.

Within the subtheme relating to adherence to regulations, participants again speak in negative terms about farming practices. Participants state that it is 'the farmers responsibility' to only sell meats which have not been treated with antibiotics too close to sale. Furthermore, participants describe corruption in the selling process:

P10: When the chickens are brought in through Thankot, they are not supposed to let them pass without the doctors' certificate. But if they bribe the doctor with about five hundred to six hundred rupees, then they will sign that the chickens are all right and then send them through…We have seen a number of cases with our own eyes…. The channel is created by their money. The system here is not like the ones that they have abroad.

The sub-theme of proximity to farm animals is not discussed by participants in transcripts but is displayed in the film '*Agriculture'* where a farmer and his family keep cows and goats close to his family home.

Environmental health themes:

Knowledge:

With regards to awareness of transmission routes, participants regularly mentioned both air and water quality as an influencing factor on health locally. Participants discuss issues with 'dirty water' and explain:

P3: There are a lot of bacteria in the water. When we drink the same water, we will contract it.

Participants also discuss farming practices. Participants describe the use of 'chemicals' and 'pesticides' in crop production, though only one participant displays explicit knowledge of types of insecticides/pesticides.

Attitudes:

One of the strongest themes here appeared in the concept of personal responsibility. Participants describe a need to 'maintain personal cleanliness as well as the cleanliness of the environment' and keep high standards of 'personal hygiene' in reducing infections and AMR. Participants also describe a level or personal responsibility in making appropriate purchasing choices relating to foods:

P2: Many people have realized that they should have organic foods that are free from insecticides or other chemicals.

P7: Yes.

P2: You can see that almost every house has adopted vegetable farming on their terraces.

Participants, in this discussion, identify that people 'do not wash their vegetables' adequately before cooking, or indeed purchase vegetables according to their appearance when they should purchase according to the farming methods employed.

As above, participants also had strong feelings related to personal responsibility and their local environment; one participant summarises that:

P4: We are the ones that pollute the water also. We are the reasons behind all this dirt and smoke. How can we blame the bacteria for this? That is what I personally think.

[Some participants agreeing]

Similarly, to the 'animal' results, participants identify a need for stronger governance and 'monitoring' to improve antimicrobial misuse in crop farming. Participants, as in the animal discussions, describe a process whereby a farmer would be able to sell fruits and vegetables that have been treated with 'chemicals' to either boost growth or improve appearances. Here, participants state that 'the government is weak in this' and ask, 'where is the monitoring there?'. Additionally, participants state that 'Farmers should also be trained accordingly' as well as 'those who sell pesticides and insecticides' in order to improve general chemical use, '…. then they will not have to use antibiotics'.

Practices:

Here participants give very few examples of environmental issues relating to AMR locally. However, there is one mention of sewage routes in close proximity to water pipes:

P3: If you were to go to Ason [place name] … I have seen that the sewage and the water supply pipes are extremely close to each other. I have seen it many times when I was there when they dig up the roads there... Both those pipes are touching each other. There are a number of places where the sewage pipes might have burst. And then the water supply is contaminated by this.

P2: Oh! That is why we do not get to consume anything pure no matter what.

P3: No, we do not get to consume anything pure.

P2: I say that I drink boiled water. But let us take a look at the vegetables that I wash.

P3: You should use boiled water for that too.

Participants, in the above extract, discuss a feeling that water is 'impure' and must be boiled for use, even in washing. In the film '*Kusum, a Tragedy'* one scene shows a group of women gather to discuss a sick child in the village. These women are collecting water from a communal tap using buckets; nearby there is a cow freely roaming. The water, here, is not the main plot discussion point and as such it is not clear what this water is used for or how it will be treated by these women. It does

show a typical behaviour in the area, namely that water is collected from a local source and used by different households. While this is not necessarily an AMR-driving issue, it provides useful insights into water-sourcing behaviours in the local context.

The practices described by participants in crop production reflect the attitudes towards general farming practices. Participants describe a process whereby farmers are able to buy ‘pesticides’, ‘chemicals’ and ‘other medicines that enhance growths of fruits for greater yield’ without having to tell a seller what the crop issues are. Although this is not explicitly mentioned in any of the films, there is footage of a crop farmer first putting chemicals into a portable spraying machine, then spraying large tomato crops with these chemicals indiscriminately.

Discussion

This analysis has employed the One Health framework generated earlier in the chapter to draw out data relating to animal and environmental health and AMR at the community level. The framework highlighted areas of information, as well as gaps in responses that could be considered in future research projects.

Knowledge levels relating to AMR in animal and environmental health is generally low. While participants in workshops are often able to describe the process of acquiring and administering antimicrobials (especially to animals) there is little to no reflection on the consequences of sub-therapeutic use of antimicrobials. Participants do view modern farming practices in a negative manner; often describing farmers as motivated by larger profits and ignoring quality of produce as a result. Here there is an opportunity to build knowledge among communities on the long-term impacts of antimicrobial misuse as well as those who farm animals and crops.

Knowledge of transmission routes of antimicrobials among participants is low. Participants, in various sections of transcripts, describe how ‘unclean’ water can spread illnesses. Additionally, many film screening audience members were surprised to learn that antimicrobials can be passed via cow’s milk.

Responsibility is a recurring theme, in particular participants view the government as responsible for enforcing strong regulations and in training farmers to improve

antimicrobial use across animal and crop farming. Participants also express the concept of a personal responsibility, both from farmers to produce and sell products responsibly and to consumers for making better decisions regarding buying food products. This extends to pollution, where participants reflect that water and air pollution is caused by human behaviours and should be addressed. Interestingly the role of the government is not mentioned in creating clean water sources. Though the participant groups were small and therefore not generalisable to the wider population, these topics could prompt policy makers and researchers to direct future projects towards unpacking these topics into the future in the wider population.

Participants repeatedly, in transcripts and films, describe poor antimicrobial practices among the agricultural sector – in particular in rearing animals. Participants identify a need for strong monitoring and governance in order to improve antimicrobial use in farming generally. Participants also identify a need for more available veterinary care for animals, often describing vets as scarcely available and unwilling to visit sick animals; instead ‘guessing’ at an animal’s illness according to farmers descriptions.

Conclusions

This chapter has, firstly, summarised the One Health concept, giving insights into the human, animal, and environmental drivers of AMR at the global level. One key gap in the literature was identified; the need for community based ‘bottom-up’ approaches to understanding drivers of AMR and to identify acceptable and appropriate interventions for these drivers. In identifying this gap, this chapter then moved towards generating an analytical framework that could be applied to qualitative data generated through community-based research projects. This framework was developed using the CARAN project at a case study, as well as drawing from the wider One Health literature. This framework, as applied above, can yield information that can impact future research and policy. The above analysis shows areas that need further focus, such as awareness campaigns for communities, as well as key gaps in understanding of AMR.

Key recommendations for future research include a focus on One Health concepts from the very beginning of research projects. While the focus of a study may be routed in one dimension of One Health, the above analysis shows the value of applying a One Health lens to data analysis. The CARAN project, as previously

stated, focussed on human health drivers of AMR but still yielded much information on animal and environmental drivers of AMR at the community level. Future research should be planned to reflect that daily life in some contexts includes agricultural activities and, as such, should give some focus to the wider One Health implications of behaviours.

Chapter 5: Analysis of the CARAN data using a gendered lens

Previous chapters in this thesis have established a need to unpack the complex community-level behaviours that can drive AMR. The previous chapter presents the value in seeking nuanced understandings of complex, intersectional behaviours, and systems as a means to better understand and address AMR-driving behaviours. This chapter will unpack gendered elements within those behaviours, analysing the CARAN data for gendered themes that impact AMR at the community level. This chapter will address research objective 3: To unpack the relationship between gender and AMR driving behaviours in a community setting.

There is, currently, very little focus on how gendered behavioural roles and power dynamics within community's influence AMR. Firstly, this chapter will establish a need for a gendered lens in data collection and analysis within AMR research, then apply an analysis framework (developed in Chapter 3: Methodology) to the CARAN data. Using the CARAN data, this chapter will present emergent themes linking gendered behaviours and power dynamics to AMR drivers within two Nepali communities. These findings will shape recommendations for future research and interventions. This chapter places a spotlight on gender in the wider AMR conversation, an area that is currently neglected, to improve our collective knowledge on the drivers of AMR from a gendered perspective.

Introduction

Sex is often considered biological or anatomical, based in the reproductive organs of the individual, assigning people into 'male' or 'female' categories. This binary, though, is debated as reductive and lacking nuance (Hird, 2000; Johnson and Repta, 2012) and that sex is also based in societal structures, histories and norms rather than in biology alone (Fausto-Sterling, 2018). Gender is viewed as a constructed set of behaviours, with actions based on a culture's view of a particular sex (West and Zimmerman, 1987). Gender and gender roles are the patterns of behaviour that are attributed to each sex; every culture holds differing ideas on what it is to be either male or female. Gender norms and roles are constructed from factors such as media, religion, family traditions etc. rather than biological factors alone (Basow, 1992). As such, the conceptualisation of what is considered male/masculine or female/feminine vary across time and culture (Godman, 2018). Gender includes the rights and obligations expected for each biological sex in their

given society (Brinkerhoff et al., 2013). Gender is not an inherently binary term, every individual has coexisting masculine and feminine traits that are displayed in differing ways (Mauvais-Jarvis et al., 2020). Furthermore, many people identify as ‘genderqueer’; a diverse group of identities that dis-identify with the binary terms of male and female (Monro, 2005).

The binary terms of ‘male’ and ‘female’ often serve in health research as a means to categorise members of a participant group or intervention community (Hird, 2000). Though useful, there is growing interest in representing wider gender groups into health research as well as specific focus on transgender groups to better understand the impact of sex and gender on health within those communities (Mauvais-Jarvis et al., 2020). There were no resources found, during scoping searches of the available literature linking gender to AMR, that discussed any non-binary sexes or genders in relation to AMR drivers.

While these ‘genderqueer’ communities should be the focus of future studies that explore AMR-related behaviours, the CARAN project did not categorise workshop participants beyond ‘male’ and ‘female’. Showcasing audience members were not asked how they identify, though feedback FGD members were also categorised into ‘male’ and ‘female’. As discussed, there is a total absence of literature focusing on ‘genderqueer individuals’ and AMR. Therefore, this chapter will deal only in male and female binary terms. It may be that future research should focus on these often-marginalised communities to better understand AMR-related behaviours within them. However, as stated, any questions beyond the binary sexes are beyond the scope of this thesis.

Gender disparities appear in early childhood through education (Evans, 1998) and typically widen in adolescence (Pradhan and Ram, 2010). Young boys typically experience the benefits that come from being defined as male within patriarchal societies, such as bodily autonomy, whereas girls typically experience restrictions in social mobility, opportunity and advocacy (Pradhan and Ram, 2010). These issues continue into adulthood and are experienced throughout life. Gender norms sustain patriarchal hierarchies where attributes considered to be masculine are perceived as superior to those considered feminine. These views perpetuate a system where women bear the highest burden of health-based gender inequality though all are ultimately affected (Heise et al., 2019). Where inequality is prevalent within a country or community, women are often disproportionately affected. Women are more likely to perform the unpaid jobs around the home, have less

access to education and paid employment and around 48% of women are not able to make their own decisions about healthcare (UNWomen, 2020).

Antimicrobial resistant infections occur through the same channels as other infectious diseases and are most common in countries/areas where there is limited access to improved sanitation facilities, reliable healthcare, and health education(WHO, 2020b; Sulis et al., 2021; Planta, 2007). Infectious diseases are, for many social and biological reasons, usually more severe for women (Gerberding, 2004). Women work in 70% of health and social care jobs globally (WHO, 2019a). These jobs are usually low-paying and expose women to infections on a regular basis. A recent article looking into the gendered elements of the COVID-19 pandemic found that globally women, and in particular women of colour, are more likely to be in low-paid work that exposes them to the infection than men (World Health, 2020b). Simultaneously, women are under-represented in positions of power and are therefore less likely to have equal representation in any policymaking decisions, including in the area of health (Ravanera, 2020).

Though women and girls certainly experience worse health outcomes as a result of these power structures, all are negatively impacted by restrictive gender norms and structures (Shannon et al., 2019). Research suggests that men are more likely to engage in dangerous health behaviours than women (Currie, 2016; Courtenay, 2000; Moffitt, 2018). Additionally, many men work in labour intensive jobs that put their physical health at risk (NHS, 2018). While these do not relate directly to AMR and antibiotic use, male health behaviours can lead to injury and illnesses that sometimes require appropriate and timely antibiotic treatment. This, in combination with a traditionally masculine aversion to treatment-seeking, might put men at higher risk of health complications (WHO, 2020c; Courtenay, 2000). Patterns in infectious disease spread, including AMR infections, are deeply influenced by the social and political dynamics of a community (WHO, 2015b). The Intersections between gender and other social elements such as poverty, work division and roles in a community need to be better understood in the fight against AMR infections. A 2018 WHO bulletin identified multiple areas where SGDs 3 (health) and 5 (gender) intersect, including regarding social determinants, health behaviours and health systems. Under health systems issues, women can experience barriers in health education, employment opportunities (limited income), governance issues, gender roles etc. (Manandhar et al., 2018).

Upholding these gender norms, in health terms, negatively impacts the health of women through lack of bodily and financial autonomy and poorer service provision, where men's health is impacted through negative associations with seeking help and positive associations to risky behaviours. If gender can influence every part of an individual's experiences, then this extends to all attitudes and practices that relate to AMR drivers and reducers.

Gender and AMR in human health

Biological sex can influence trends in antibiotic usage and prescription, for example common urinary infections can differ by sex (den Heijer et al., 2013). There is little focus, though, on how gendered behavioural and cultural norms can influence AMR. There is some evidence to suggest that trends in AMR-related topics occur, though these studies often conclude that further research is needed to better understand the behavioural mechanisms that cause these trends. Data across surveillance networks in Germany, for example, show that men are approximately twice as likely to have an AMR infection than women (Brandl et al., 2021). The gender of a patient can impact patterns in prescribing behaviours, for example in Estonia, one study found that women were more likely to be prescribed antibiotics unnecessarily (Tisler-Sala et al., 2018). Interestingly, this differs by study population; a 2007 study in Tanzania found that men were more likely to be prescribed antibiotics unnecessarily (Leonard, 2007). Gender inequalities can influence the level of access to various health facilities. Where patriarchal values are prominent, boys and men are often prioritised for treatment over female family members (Barasa, 2019). Though predetermined by biological sex, these trends are based in behaviours. Gender norms shape health needs and use of medications through access to a utilisation of health services, decision-making power, access to and control over resources (including paid employment) as well as risk behaviours in relation to the seeking and use of antibiotics and antimicrobials (ReAct, 2020).

A meta-analysis, conducted in 2016, compiled quantitative data around antibiotic prescriptions in primary care (Schröder et al., 2016). A search was completed for all articles on this topic, and a total of eleven studies were uncovered. These studies collectively gathered data on 44333839 individuals. Data were sourced from a mixture of community pharmacy, insurance, and national healthcare systems. The meta-analysis found that, on average, women were 27% more likely than men to

receive an antibiotic prescription in their lifetimes. The study looked at cases for individual antibiotic trends, as well as trends in age groups and found that women in the age group 35-54yrs were 40% more likely than men in the same age category to be prescribed antibiotics. The study recommends that there should be further research into the reasons for this disparity.

Similar findings were shown in a recent cross-sectional analysis of electronic health data across the UK. A study published in 2018 (Smith, D.R.M. et al., 2018) found that women received, on average, 67% more antibiotic prescriptions than male patients. The study partly attributes this to health-seeking behaviours of men and women; women are more likely to attend a consultation (64% of consultations were attended by women) and so they receive more antibiotics than men.

An article written in 2016 reviewed the care received of 50 consecutive patients to one intensive care unit that required treatment for sceptic shock. The study, conducted over a period of months in 2015, found that there was a delay for 34% of patients in receiving antibiotics - these patients were more likely to be female (70.6% vs 42.5%). Female patients were also more likely to continue on to sequential organ failure. There were no significant differences between patients for other risk factors such as age, time and day of admission, location prior to admission, culture positivity or serum lactate. Being male was associated with a reduced risk of delayed admission of antibiotics after hypotension. This study found that being female was a risk factor for receiving antibiotics after a delay of at least 2 hours. The paper suggests setting targets for quality improvement for female care in MICU for patients requiting antibiotics in these circumstances (Lemieux et al., 2016).

In relation to self-medicating practices, a KAP (Knowledge, Attitudes & Practices) survey where participants were asked to complete semi-structured questionnaires (Mate et al., 2019) found a strong association between the male gender and use of non-prescription antibiotics. The study suggests that women may be less likely to buy non-prescription antibiotics than men because they are more likely to interact with formal health services due to reproductive and child health needs. An online survey conducted on Chinese university students, published in 2016, found that gender was a risk factor in self-administration of antibiotics, along with age and prior knowledge(Zhu et al., 2016). The study states that the female gender, along with older age and prior knowledge of antibiotics are risk factors for self-medicating behaviours with antibiotics. Though no conclusions can be drawn for the reasons

why female respondents are more likely to report self-medicating with antibiotics, the authors suggest that this might be influenced by female disposition to caution when self-treating as well as a likeliness to treat menstrual symptoms with antibiotics. The study concluded that stricter regulations around non-prescription antibiotics are needed. However, the study did not give an insight into the reasons for each risk factor associated with self-administration of antibiotics.

A 2005 article describing a large questionnaire study completed in Sudan (Awad et al., 2005) that had 1750 respondents, found that a number of socio-economic factors influence self-medication with antibiotics. Females were more likely to self-medicate (OR: 1.5; 1.16-1.87). The study found that self-medicating with antibiotics was explained by respondents as being viewed as the cheaper and more convenient way to treat an illness; people prefer to visit private pharmacies rather than visit primary health centres.

Gender in agricultural practices

Gender inequality is present in farming and agriculture; only 13% of landowners are women (UNDP, 2021). However, women typically do more livestock care than men and make up around two thirds of all ‘poor livestock farmers’ (ILRI, 2021). This farm work is often unacknowledged (Shortall, 2006; Whatmore, 2016). As a consequence of completing the majority of the care for animals, women are more likely to be exposed to AMR residues and pathogens (and other harmful pathogens) than men, a study of farmers in the Philippines found that female farmers had high prevalence of respiratory infections due to exposure to harmful chemicals from activities such as manuring, ploughing and plant protection (Lu, 2007). In contrast, the male farmers in the same study were most likely to experience back pain, reflecting the nature of gendered roles within farm work (Lu, 2007; ILRI, 2021). Though women farmers are typically more involved with daily care for animals, men are more likely to be landowners and therefore are prioritised by animal health services and receive higher access to medications and information on animal care (ILRI, 2021). This prioritization of men when delivering farming information, especially in relation to AMR, is reflected in a 2020 study that found female farmers to have lower knowledge levels than their male counterparts (Caudell et al., 2020). The paucity in research relating to gendered issues in agricultural AMR drivers highlights a key gap in our collective understanding of these issues. Where gender either includes or excludes communities from specific

elements of food production, there are more risks of exposure to zoonotic and food-borne illnesses (ILRI, 2021).

It is interesting to note that gender can influence an animal health professional's confidence in adhering to and enforcing antimicrobial stewardship actions (Tebug et al., 2021). The first two studies in this topic suggest that farmers and livestock keepers should receive information and education on AMR (Caudell et al., 2020; Benavides et al., 2021) to push towards seeking professional help in diagnosing and treating animals. This study, though, suggests that there is a need for improved training and reinforcement of AMR messaging directed at animal health professionals in order to better supply farmers with appropriate antimicrobials for their animals (Tebug et al., 2021). More research is needed to draw conclusions from this area, though it is interesting that gender can influence prescription patterns from the supply chain, as well as the demand from farmers and livestock keepers.

Global guidance on AMR and gender

SDG 5 (Gender Equality) aims to reduce discrimination for women globally and improve access to public services for women and girls (UNDP, 2021). In addition, SDG 3 (Health) aims to provide access to health services to all as a human right (UN WOMEN, 2019). As discussed in the previous chapter, AMR appears only once across all SDGs, though this has yet to be added officially to the list of indicators. This additional indictor relates to the surveillance of specific strains of AMR bacteria and not to AMR driving behaviours. Global surveillance systems, such as GLASS (described in the previous chapter), are essential to understanding the extent of AMR and must be desegregated by factors such as sex in order to better inform responses. Desegregation alone, though, is not enough to fully understand the impact of gender in AMR.

In 2018, the WHO published a working paper that promotes the enhanced focus of gender and equity in relation to AMR (WHO, 2018e). The guidance document describes how better understanding risk factors and drivers, as well as who might 'fall through the net' is essential in reducing AMR. Although there is limited research on the differences between genders in knowledge, attitudes, and practice (KAP) in relation to prescribing and use of antibiotics, the report presents a small number of relevant studies. A study in Spain found that, of the over 60's population, a higher proportion (57%) of women were receiving antibiotics, while among

children under 10 years more boys were receiving antibiotics than girls (Malo et al., 2014). In Malaysia, men were less likely to comply with direction to take a full course of antibiotics (56.8%) compared to women (44%) (Fatokun, 2014). In Poland, males were more likely to incorrectly state that antibiotics were effective against viruses colds and flu and would expect an antibiotic prescription as a result. (Mazińska et al., 2017). Finally, In Portugal, men were twice as likely as women (odds ratio 2.88) to self-medicate with antibiotics (Ramalhinho et al., 2014).

This guidance, alongside the literature described, highlights the potential value in applying a gendered lens to AMR research at the community level. There are, though, no currently known studies or projects that explicitly look to understand and/or unpack the gendered nuances in AMR-driving behaviours. The next section of this chapter will use the CARAN project as a case study, applying a gender-focussed analysis framework to the data. In doing so, this chapter will identify and describe areas for potential focus in future research.

Analysis

This section of the chapter will present an analysis of the CARAN project data, using an adapted health systems research (HSR) analysis framework developed in Chapter 3: Methodology. This analysis aims to take the data generated through workshops and FGDs as well as the films made by participants in the CARAN project, exploring how they reveal the relationship between gender and AMR at the community level. During the process of analysis and write-up, there are opportunities to critically reflect on the ways in which participants of the project view and chose to represent their own gendered experiences related to AMR.

Aim:
What can the CARAN project tell us about how gendered power dynamics affect behaviours that relate to the seeking, use and disposal of antibiotics that can drive AMR?

Method

This analysis applies the framework developed in Chapter 3: Methodology to the CARAN data to pull out gendered themes from within the data. The analysis was approached thematically, using the framework as an overarching structure to identify and categorise emerging themes.

This analysis uses transcript data gathered in focus group discussions (FGDs) with workshop participants and showcasing participants, transcripts from recorded

workshop sessions, feedback from facilitators in the form of reflective notes and the videos produced by participants. Iteratively generated through multiple reads of text and screening of videos, this analysis was produced to reflect on the main themes in gendered elements of AMR behaviours. Data from transcripts and videos were separately analysed to unpack enforcing and contradicting information between the two data sources. The transcript data was analysed using thematic analysis, using a modified health systems research framework as a stimulus, as described below. Once this analysis was completed, the next stage was to assess the films generated by participants. The films were analysed using a coding framework (below) that was created through the process of transcript analysis. A full description of the film analysis can be found later in this passage.

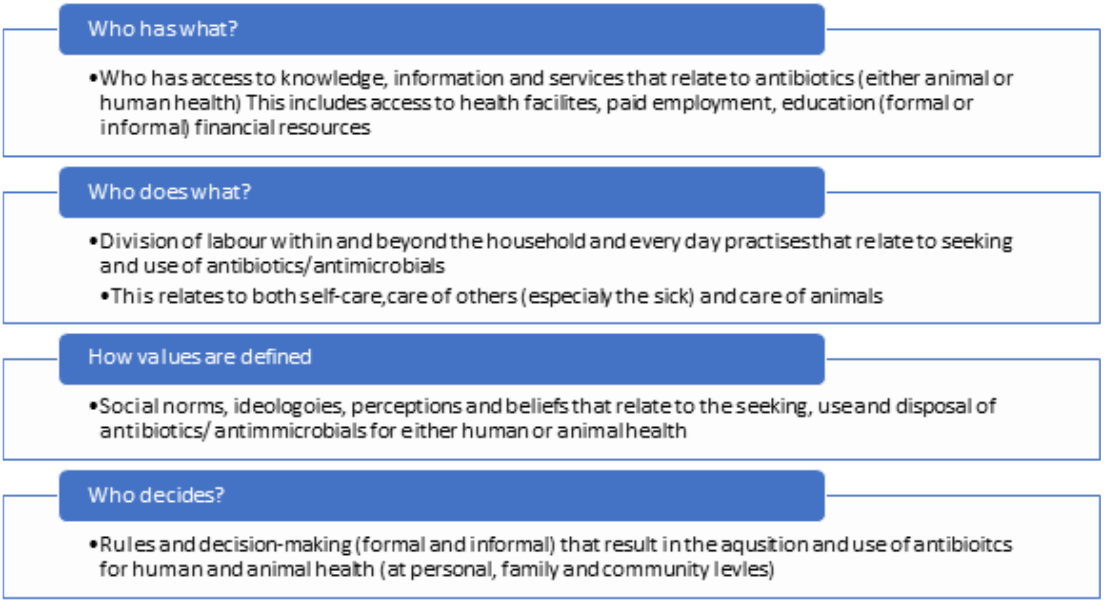


Figure 13 - Analysis framework applied to CARAN data

Film analysis

An argument put forwards by Cooke et.al in his 2020 analysis of the CARAN films is that often the products of PV projects are overlooked as data sources, with researchers relying on more traditional qualitative data such as FGD transcripts for analysis (Cooke et al., 2020b). This chapter, therefore, aims to combine transcript data with the films created by participants. Text (as understood via English subtitles) and visual information were taken as a means of observing the gendered elements of AMR-related behaviours from the perspectives of the participants –

participants in the CARAN project were given control over their own storylines, shooting footage and editing.

The audio-visual narratives created by participants were analysed through thematic analysis, using the adapted over-arching categories of *who has what, who does what, how values are defined and who decides.* The coding frame was applied to the films to test where themes either reinforced or contradicted those emerging in the transcripts.

To give context to the data discussed from films, below is a summary of each film's plot:

Location	Title	Plot
Chandragiri	Film 1 - Kusum (a tragedy)	The film begins with a mother grieving over the dead body of her daughter, then proceeds to flash-back to the days prior. In this we see a mother tending to her sick daughter. Her child is often sick. The mother decides to treat her with non-prescription antibiotics and traditional healers. When the daughter dies the mother is told that she should have sought hospital treatment for her daughter sooner.
Chandragiri	Film 2 - Antibiotics in Agriculture	Three farmers (crop farm, pig farm and chicken farm) are interviewed about their farming practises and use of antibiotics/antimicrobials. Each farmer shows how their farm is run and describes how they treat their crops/animals for sickness.
Chandragiri	Film 3 - Pharmacy	This film shows two scenarios: first 'bad behaviour' then 'good behaviour'. The first scenario shows a man trying to buy antibiotics from a pharmacist without a doctor's prescription and becoming angry when refused. The second scenario shows a man bringing his younger brother to the pharmacy for advice, agreeing to be seen by a doctor and the brother getting better as a result.
Lockthani	Film 1 – Agriculture	A man finds that his cow is unwell and choses to medicate it without proper instruction. When the

		cow does not get better, he seeks advice from a vet who administers antibiotics correctly and advises the man on better future care for the animal.
Lockthani	Film 2 – TB	A Female Community Health Volunteer (FCHV) visits a wife whose husband is rumoured to be sick. When the husband visits the health centre he is diagnosed with TB and told to take medications for 6 months. He stops his course of medicine after 2 months and soon becomes unwell again. The FCHV advises that he return to the doctor. When he does, he accepts advice and states that he will complete the new course of antibiotics.
Lockthani	Film 3 – Doctors' advice	A woman visits the doctor and seeks his advice on her own health as she has been feeling unwell and self-medicating. Upon hearing his advice, she asks him other questions about correct antibiotic use and says that she will tell others in her community about AMR and correct antibiotic use.

Once the above films were finalised, they were grouped together by location into longer films that were intercut with interviews from each group. This process produced two (approximately) 30-minute videos, one for each study location, that were shown at showcasing events. After each of the PV films, members of that group appeared to describe either elements of their films or the filmmaking process itself.

After numerous viewings to become familiar with the data, a table was generated to group observations and direct quotations from each film into one of the four overarching categories*: who has what, who does what, how values are defined and who decides.* Once all relevant data was gathered that related to gendered roles or power dynamics relating to AMR drivers, each category was separately assessed for themes and sub-themes. This process was undertaken working with the same set of phases described above for the transcripts, with each over-arching theme analysed for sub-themes then assessing the strength of each theme before writing up results. Most data fitted into the coding framework generated through the previously described analysis of transcripts. Where observations or quotations did

not directly fit, new sub-themes were created and added into the ‘results’ of the analysis

Limitations of the dataset

The original CARAN project was designed to look at community level drivers of AMR and therefore did not explicitly collect data with gender as a focus. I recognise that, because of this, the data set used for analysis was limited. However, during initial readings of the CARAN data, it became clear that gendered themes were present in the data. I felt it was important to explore emergent themes coming from the data that related to gender by applying this analysis. I conducted a critical reflection of the CARAN project’s use of PV in this setting and found that the topics and discussions present in the data emerged organically from workshop participants’ understanding of AMR in the local context (Cooke et al., 2020b).

Results

Within each of the four codes, listed in the above framework, several gendered themes emerged. Primarily, in the question of ‘who has what’, key themes of knowledge/information and access emerged, with sub-themes developing within each of these. When asking ‘who does what’, key themes of self-care and childcare emerged. Within the question ‘how are values defined’ the key emergent gendered themes were in beliefs, trust, and social norms in childcare. Finally, when asking ‘who decides’ the key themes that emerged were in permission and violence. Each of these questions, and the themes that emerged within them, will now be unpacked further.

Who has what

The two main themes in this category were knowledge/information and access to facilities.

Knowledge/information: At numerous points, respondents of both genders reflect that woman (in particular wives/mothers) are the ones who should/do know about the medicines given to children. Women in both communities have access to Female Community Health Volunteers who provide health information relating to childcare, women also attend locally run mothers’ groups. Women are seen as the ones in the household that have been taught about how and when to give children antibiotics, and that they are responsible for receiving and acting upon this information. One male participant states:

P: The mothers have the information about those things. Antibiotics are supposed to be had for about 3 to 5 days. They have been taught that.

In the film '*Kusum, a tragedy'* we are shown the potential risks if a mother does not follow the guidance of a doctor in caring for her sick child. The mother, who decides to trust in a traditional healer as well as buying antibiotics without a prescription for her daughter, eventually finds that her daughter dies as a result of her choices. The short film highlights key points where the mother could have acted differently (according to medical advice) and therefore could have avoided the death of her child. During the film, the mother is the one solely responsible for the sick child and makes medical decisions on her behalf. The only men in the film are the traditional healer, who visits the sick child and a man (possibly the father) who speaks with the mother at the end of the film to tell her that she was wrong to behave in such a way and has caused the death of her daughter. The film was designed by participants to advise mothers to trust medical professionals with the health of their children and provide a cautionary tale to those considering traditional healers alone as a reliable source of treatment. Here, though, the use of PV as a communicative tool risks perpetuating potentially damaging gendered power dynamics; the mother is held as responsible for the tragedy yet is less able (by the participants own reasoning within workshops) to advocate for her daughter's health beyond using traditional healers and home remedies. While this video can provide insights into potential cultural norms here, researchers must exercise caution in perpetuating narratives around responsibility and power in these complex issues. This contradiction highlights a need for careful curation from researchers; films of this nature might provide a trigger point for critical reflection rather than taken simply as instructional to other communities.

When considering who imparts knowledge, both transcripts and films indicate a gendered divide in depictions of trusted sources of information. Community, primarily maternal, health messages and services are seen to be provided by health posts and Female Community Health Volunteers (FCHV). In the film '*TB*' a FCHV advises a woman to encourage her husband to visit a health post with a suspected case of TB; this advice is followed and later (when the husband stops adhering to the medicine schedule) the FCHV is asked to reach out to the family to advise them to return to the doctor. This trust in FCHVs to impart community, domestic level advice is echoed in discussions during workshops, where participants describe the role of FCHVs as well as women's groups. FCHVs are seen to be trained to give information to communities, particularly in matters

relating to women's health issues. One FCHV participated in the workshops and reflected that she and her colleagues (also FCHVs) often consult with people on matters such as menstrual health, pregnancy, and children. Additionally, participants discuss the opportunity to educate community members about AMR through existing groups: women's and mothers' groups are mentioned as a possible avenue for education:

P2: We need to include everyone. The women's group, mothers' group…

M1(moderator): When you said facilitator, you are referring to the people in the women's group, mothers' group, sisters' group, and other groups as such?

P7: Yes, they meet every Saturday where they give a lot of information.

When depicting more formal channels of health advice within films. However, the trusted sources are most commonly played by men. Veterinarians and doctors are exclusively depicted as male within films and are accepted within films and workshop transcripts as a trusted source of information. These decisions on roles were not questioned within participant feedback sessions, so the motivation for these castings cannot be unpacked here. The casting choices within most films do, though, continue to reinforce gendered stereotypes within patriarchal societies.

Access: Women have access to support groups that aim to educate women and mothers on basic health topics such as hygiene, participants discuss the opportunity for spreading AMR information through these groups. These groups run in local health posts, participants describe women accessing them with children, after they have completed household chores. Participants describe that men in the community rarely attend health posts, even though they are a free service:

F: People know that they do not have to pay any doctors' fee there [at the health post]. They also know that all the medication that they get there is for free. The doctor comes to our health post on Sundays, Mondays, and Wednesdays. Even when they come here for three days a week… We get the women there. However, we do not see men coming there.

F: They do not come.

In discussing health posts, participants reflect on why men access these health posts less than women. A discussion between participants finds that men may feel *'uncomfortable'* in accessing health posts:

F: I do not know. Maybe they feel that… We can see that there are a lot of women when we go there. I think that it is why they feel uncomfortable going there.
F: There are the Female Community Health Volunteers as well.
M: All the health volunteers there are female.
I: So, would you say that the men are uncomfortable going to the health post because there are a lot of women there?
F: Yes, I think so.

In another conversation, one female participant even jokes that men *'aren't supposed to go to health posts'.* This theme does not appear in any films. However, in the film '*TB*' the male patient attends a health post, and the camera shows an all-female staff behind the desk as well as many women in the waiting area. The predominantly female environment portrayed in the health post reflects the services described by participants within workshops; health posts are staffed primarily by women and therefore primarily serve women. The doctor in the film, though, is male and provides clear advice and treatment for the male patient competently. Here the film, perhaps inadvertently, presents a contradiction to the themes men discuss around health posts within workshops. Further studies could explore these discussions further to unpack the messages participants include, consciously or otherwise, within films and how they align with the lived reality of the community.

While health posts are described as easily accessible to women, transcripts only mention men accessing private health facilities and pharmacists. Within films, most male characters seek health services from private vets and pharmacists, except in the film '*TB*' where the husband decides to visit with a doctor at the free health post under advisement from his local FCHV. In one interaction between a male and female participant, the man suggests visiting a hospital to seek medical help and the woman assumes that a hospital would be *'too far away'* to visit in the first instance. Additionally, one female participant states that:

…the women are a bit shy in nature. There are some women that do not step out of their house at all. Some women do not even get on the public vehicles. So, the women are not able to go to the hospitals that are far away and get checked up there. Instead, they go to a health facility that is nearby or even the traditional healers. The women check if there is a medical nearby

Men are often described as seeking treatment and medications from private health services such as hospitals and pharmacies. Men's responses do not focus on distance or cost of treatments sought outside of free health posts, suggesting that

they do not experience such barriers to access. Cost as a barrier to accessing health treatments is only mentioned in one of the films (Kusum, a tragedy); a mother is tending to her sick daughter and chooses to seek advice from a traditional healer as well as sending another child to buy non-prescription antibiotics from the local pharmacy. When local women advise the woman to take her daughter to the hospital, one woman asks the mother if she has the money to visit the hospital, but the mother does not answer.

One male participant describes how health posts are often closed on Sundays, presenting their opening hours as a barrier to access that is not discussed when referring to private pharmacies or hospitals. This barrier to accessing the free health posts is only mentioned in relation to men, suggesting that this issue is gendered due to the typical types of work performed within the family unit.

Who does what

The themes of responses in this category are: childcare, self-care practice and types of work (paid work/household work).

Childcare: Women are expected to provide the majority of care for children, including healthcare. One participant states:

P10: I feel that the mothers need to care more for the children compared to the fathers.

Participants of both genders express expectations that a mother or 'housewife' would know how to administer antibiotics to their child, simultaneously male participants describe leaving matters of childcare to their wives. Participants often comment on a mother caring for a child, rather than a father. Participants also comment on mothers/housewives being the reason for any instances of poor hygiene or missed antibiotic doses leading to illness/AMR, reinforcing the gendered roles and power inequalities within some households:

M1:… you said that the housewives take care of the treatment as you mentioned in the previous discussion… in your opinion, what are the things that they do or do not do which is causing a rise in the antibiotic resistance?

P10: They do not pay attention to the hygiene of the children.

…….

P1: The number one [reason for illness] would be that the housewives and the family members need to give time to the children. They do not give time.

This expectation is reflected in responses to theoretical situations; participants were asked to take part in an activity called ‘And So…’ where a hypothetical prompt is randomly selected for the group and each member takes a turn to add a sentence beginning with the phrase ‘and so’. Each response is supposed to follow from the previous and each prompt described a different scenario relating to AMR. The following examples are given from the activity when the prompt began by asking about what they would do if they had a sick child. Many female responses first refer to home remedies such as hot water and rest. One participant sums up this response as follows:

P2: They do not give them medicines as soon as they see them start having fever, common cold and cough. They give them warm water, turmeric water, or cumin water. But if their fever keeps increasing, then they will be taken for a check-up and medicated accordingly. Unlike the adults, we do get the children a check-up before getting them any medicines.

By contrast, when male participants are asked to respond within the same group activity, their responses often escalate quickly towards more formal treatment:

M: My daughter is suffering from sore throat. I do not know what medicines I should get her.
F: And So…, I got her to gargle her with salt water.
M: And So…, I took her to the doctors’
M: Then I took her to visit a good ENT (Ear, Nose & Throat) doctor.

Later in that same group discussion, one of the male participants expresses the opinion that, should his daughter have been sick in real-life, he would have taken her straight to hospital. One film, in which a mother decides to treat her sick daughter at home using non-prescription antibiotics and a traditional healer, shows a man at the end of the film tell the mother that she should have taken her daughter to the hospital. Each of these points illustrate an inherent contradiction around gendered responsibilities, especially within childcare. Women (particularly mothers) are described as responsible for infection prevention and general wellbeing for children, told that they must react according to medical advice when their child does get sick but are simultaneously less able to access formal healthcare facilities than their male counterparts.

Within these conversations, men describe an unwillingness to delay treatment-seeking for a sick child but are not the ones ultimately described by the group as responsible for acquiring said treatment. This contradiction is most clearly illustrated in the film '*Kusum a tragedy'* and highlights the sensitivity required by filmmakers when supporting communities to present messages to their communities. Care must be taken to ensure that messages are representative of the communities whilst reducing potentially harmful rhetoric around gender.

Self-care practices: In seeking health-care for themselves, women are described as likely to attend health posts. Female participants state a desire to avoid taking medication (referring mainly to common drugs e.g. paracetamol) wherever possible. One male participant states that women are more likely to follow the instructions given by a doctor when taking antibiotics – echoing the notion that women are more likely to seek medical advice/help at a health post and therefore receive instructions on how and when to take antibiotics. One film does, though, show a female patient visit her doctor having not taken the correct course of antibiotics. In this film, the woman is seen to disregard the advice of the doctor in order to take fewer tablets, the woman in the film states:

I took the medicine you prescribed for 2-3 days, but left as I started feeling better

By contrast, men in the community are described as often seeking the fastest form of recovery. Participants reflect:

F: The men tend to go and directly purchase the medicines that they require... The men, even our husbands, go to the medical and get the medicines that they want. They get the medication without the prescription.

…the men tend to search for an alternative that will help them get rid of the health issues as soon as possible. They will demand for medicines that are not prescribed.

Participants state that men are likely to seek antibiotics without prescription and that they are seen as wanting to speed recovery due to being busy with work. In the film '*Pharmacy*' a man is shown to become agitated by a pharmacist who refuses to sell him antibiotics without a prescription. The man, even after being told it can be harmful to take antibiotics without a prescription, tells the pharmacist:

(speaking angrily) if you have this medicine, please give it to me. If not I'll buy it somewhere else….. If you don't give the patients their desired medicine then what is the point of coming here? (the pharmacy)

As described previously, the films are presented alongside short interviews with the participants, in these interviews, participants are asked to reflect on the messages they wanted to share as well as the film-making process. In their interview, participants who made the film *'Pharmacy'* quoted above, describe the situation depicted to be 'common in the community'.

Types of work: References to work for women are mostly based around housework. Women attend health appointments once their household chores are completed. Female participants make reference to completing household chores within group activities such as the 'and so' game where participants generate a scenario; referring to sweeping, cleaning and cooking as part of their responses. One participant at a FGD after viewing the films at a showcase event reflected that women in the community may have struggled to attend the community film screening event:
P3: I think some people might have been stuck in some personal workload. Mostly female are required to do laundry and help their children in cleaning up during Saturday and that also might had been a reason to become unable to make it to our screening.

Reinforcing ideas of patriarchal gendered norms at the household level, many women within films are shown when working around the household, multiple films depict women as completing household chores and typically women in each film speak less than their male counterparts. In the film *'Agriculture'*, the main character's wife only appears on-screen to offer her husband food and bring him tea. Women are seen, in the film *'Kusum, a tragedy',* gathering to talk at a small tap outdoors as they collect water in buckets. The film '*TB*' presents multiple scenes where a woman is preparing food at home when talking to her husband about his health. In the film '*Antibiotics in Agriculture'* local farmers are interviewed about practices on their farms, footage shows many scenes where women are tending to plants and animals around the farm as well as preparing food for animals. Finally, in the film '*Doctor's Advice'* a woman is attending a doctor's appointment, the woman describes how she is responsible for tending to the chickens at home. She then leaves her appointment by saying:

OK I will take my leave now, I have chores to do at home

There are no references to men completing household chores. Men are referred to as having paid work; work that generates income rather than work completed around the home. In the films where the men are farmers, they are generally shown to be completing tasks such as administering medications, speaking with vets, and selling products from animals. One female participant reflects:

F: The women go to the health post or the nearby health facilities after they complete their household chores. But the men usually go out [of house] for their work.
M: Yes.

One man refers to women working in an office space that suggests women's ability to leave work early in order to look after family members, with an emphasis on it being normal that a female colleague would leave early for a health appointment or to visit their parents. At another point a female participant speaks of '*educated women'* that might work in offices and therefore buy their own medicines and antibiotics from pharmacies. However, she reflects that they are not as common-place as housewives.

How are values defined

The main themes in this category relating to antibiotics and antimicrobials are beliefs, perceptions, and social norms around childcare.

Beliefs: A notable gendered difference in beliefs arises here around what is the best method of treatment. Women's responses, as stated in previous categories, are based in herbal remedies and traditional healers. Participants state numerous times that women seek these treatments as an initial intervention for both their own health and for their children. One participant states:

M: Women tend to have first priority towards the traditional healers. They have such a mentality that going to the big hospitals, visiting the doctors, and taking the medicines that they have prescribed has not helped their children get better immediately. That is usually because the doctor starts them off on a low dose of medicines. The women think that they need to go to the traditional healers to see any kinds of improvements in health. About 90% of women have such a mind-set. .

The film '*Kusum, a tragedy'* shows the story of a mother and sick daughter; the mother chooses to trust in the advice of the traditional healer despite other women telling her that she should take her daughter to the hospital. The storyline reflects the view that women tend to see traditional healers as a good initial response; the mother believes that the traditional healer will help her daughter and if she sees no improvements will then take her daughter to the hospital. The seeking of help from traditional healers, in this film, is presented as problematic and a contributing factor to the death of the child. The use of traditional healers, though, might not always have a negative impact on AMR. Here, again, we identify an area of nuance that should be handled carefully by any researchers in this field.

In a conversation during a workshop, female participants discuss an aversion to seeking medicine when they are feeling unwell:

F: No, I do not ask for it.
F: Neither do I. [Laughing]
F: I try home remedies whenever possible. I try not to use medicines. I do not even take a paracetamol. That is why I do not have any such issues

In a discussion about the difference between men and women's responses, one participant describes a belief in traditional healers from women in the community, where men tend to rely on hospitals or doctors:

M: If the suggestions and the medication that the doctors provide is not working for the patients immediately, then the women want to automatically go to the traditional healers. But 99% of the men think that they have to go to the health facilities and hospitals for a check-up instead.

In multiple discussions, both male and female participants describe a male response to sickness that leans towards seeking 'strong' antibiotics as an initial treatment for any illness. Participants describe men as wanting to feel better very quickly, and that they feel as though they need to get better fast in order to work:

M: … I feel that the men have such a mentality which makes them think that they might have to go out somewhere immediately. So, they want to go to the medical and have a medicine or antibiotic that gives them fast relief.
F: They feel that they need to go out fast which is why they need to get better soon.
M: That is the reason why most of the men go to the medical instead.

This sense of males being busy is reflected in parts of some films. When asked why he did not attend the health post to receive his full course of medication, the main character in the film '*TB*' states that he was too busy with work. In the film '*Agriculture*' footage follows the story of a male farmer seeking veterinary treatment for his sick cow, both the man and vet (male) are ostensibly too busy for a home-visit to assess the cow. Consequently, antibiotics are given inappropriately.

Perceptions: Following on from the previous theme, a typical male perception of health posts is negative; most male participants describe a level of distrust in the quality of treatment given there. Male participants frequently describe medicines that are freely available at health posts as being too weak to work properly, the staff that work at health posts as not being competent or focussed, and taking time to engage with them as simply delaying their accessing of effective treatment. One FCHV describes a common situation she experiences in her role:

F: They (men) think that we do not understand or we do not have the medicines which is why we did not give them.
M: They want all the medicines immediately.
F: If we tell them they are not supposed to have that medicine, then they assume that we are not giving it to them because we do not have it. Then, they choose to go to another pharmacy where they can get it.

This is echoed implicitly in the film showing a FCHV approaching a wife about her sick husband rather than directly approaching the sick man himself.

This distrust of health posts is combined with a trust of pharmacists, and staff at the pharmacies. On multiple occasions, male participants express concerns that doctors might not be giving the correct dosage for a particular illness, that nurses might not follow a doctor's instructions or that the free antibiotics at the health posts are less effective than those that can be bought at pharmacies. When discussing pharmacies (sometimes referred to as medicals in workshops and FGDs) male participants seem to perceive them as generally trust-worthy and reliable:

P1: We do have capable people at the pharmacies who can identify when the patient is suffering from fever or common cold or cough.
P10: That is right. I am also saying the same thing.
[Audible external noise of mobile phone ringing]

P1: They know that much.
P10: They know more than that. They are even senior than the doctors. There is a person, his son, at the medical [pharmacies] has much more knowledge about the medicines. You will find that there is a crowd of people that get to the pharmacy [to get medicines] every day. But they do not go to get checked by the doctor.

If a negative statement is made by a female participant about a health post, it is relating to a practical issue such as lack of medication or long queues. There are no examples of female participants making statements about the strength of antibiotics given at health posts, or that they fear receiving poor treatment.

While men are perceived to be active in pursuing antibiotics without prescription, women are seen to follow instructions. Participants described how women, when they do receive antibiotics from a doctor, are likely to follow directions:

F: The women follow exactly as per the suggestions.
I1: Are you telling me that the women follow what they are told when it comes to the number of times and the number of days that they need to take their medicines. They do it completely?
M: Yes. It might not be true for the men.

This narrative does, though, contradict the storyline presented in the film ‘Kususm, a tragedy’ where a mother ignores the advice of her friends to seek medical attention for her sick daughter and instead decides to buy non-prescription antibiotics. Additionally, the film ‘Doctor’s Advice’ shows a woman seeking help from a doctor after having stopped a previous course of antibiotics prematurely. Workshop participants, during one conversation about gendered trends in antibiotic seeking behaviours, described how these behaviours should be attributed to individuals rather than to genders:

M1: Suppose the men go to the pharmacy instead of the doctor and take their medicines. And let us assume that the women tend to go to the doctor and only take the medicines that they have been prescribed. Do you think that there is such a mind-set or not? Do you see that in practice here?
P2: No, there is not a mind-set as such.
P4: No, there is not. People do not have such mind-set when it comes to diseases.
P10: It also depends upon the husband and the wife. There are some couples that

fight with each other.
[Participants laughing]

Participants agreed, on this occasion, that health behaviours cannot be generalised by gender alone. Other demographic factors such as socio-economic status, location, employment status may influence the decisions made by an individual seeking antibiotics more than gender, more research in this area should focus on the intersectional nature of decision making in this area.

Childcare norms: As with the category of 'who does what' it is clear that the social norm experienced by participants is that most childcare is the responsibility of the mother. Participants, at various intervals, described that knowing the medications for a child is the mothers' responsibility. Similarly, participants made statements such as:

GK: The thing is that the mothers care more for their children than the fathers.
P10: Yes, they do.

P10: Even our fathers were very careless with our health. The mothers on the other hand care a lot for their children

P10: I feel that the mothers need to care more for the children compared to the fathers.

M: No. The father does not have the medicine in it. [Laughing] The father simply gives the same medicine to the son.

These statements, documented in separate workshop transcripts, indicate both the social expectation that mothers care for their children and that the fathers are less responsible. Participants mention many times that the mother is the main family member to care for a child's health – with male participants describing how their wives handle medication for their children.

Who decides

The themes arising in this category were: permission; the seeking/giving of and violence.

Permission: Female responses within workshops and focus groups in this category referenced a need for seeking permission from a husband in order to seek health facilities and/or medication. The role of the female, as discussed in the workshops, is as subservient to the man and as a primary caregiver to children, these roles are also presented in multiple films where women are shown as caregivers who perform household tasks. It is impossible to know, from a small participant group, how applicable this sentiment is to the wider population. More research that focuses on the specific experiences of different genders in relation to health-seeking behaviours is needed. Participants acknowledge that women make up a part of the workforce in paid jobs. However, they are not described as the norm during workshops or in films. Interestingly, women who work in paid jobs sometimes display the same behaviours as men when seeking antibiotics from pharmacies without prescriptions:

P3: some of the women who are educated and go to work in the afternoons usually go to the medicals [pharmacies] on their own and buy the medicines that they need to take. But most of the women are dependent upon their husbands.

As above, in the theme of 'perceptions' participants seem to suggest that intersectional issues impact decision making, and that these decisions are not based in gender alone. More research is needed to explore the intersections of gender with other demographic factors in understanding the reasons for AMR driving behaviours at the community level. While working women may have autonomy over their own health-seeking behaviours, the participants mostly describe a more traditional setting where husbands work and wives look after the home and children. In this dynamic, participants reflect that husbands decide on the means of getting medicines for their wives:

P3: … Some of the husbands tell their wives that they should stay home as they are suffering from fever. Instead of taking them for a check-up, he brings home the medicines directly…We tell them that they need to go to the health facilities. Then, they reply that their husbands have asked them to stay home. They have even told me that they do not bring them the medicines sometimes. I have seen a lot of such cases. And we tell them that they should take the medicines only after they have

had a check-up. But they will go for a check-up only if their husbands were to take them there.

Though this is the account of one participant only, it is worth noting here that the transcript states a general agreement from all participants with this statement, suggesting that this is in fact the norm for this community. This sentiment is echoed in another workshop transcript where one female participant states:

P7: We do not get to go out of the house whenever we want.

There is a suggestion, from one male participant, that this idea of instruction, or giving permission, informs approaches to the healthcare of the children also:

P10: There are separate doctors for children. The husbands tell their wives to take their children to the doctor on time and get a check-up before giving them any medicines.

Within discussions around permission, participants reflect on the potentially violent consequences for women who do not fully comply with their husband's wishes. In a jovial and conversational tone (transcript denotes laughter at points in the conversation), participants talk frankly about men beating their wives should they ask for medicines:

P3: Their husbands come home from work in the evenings. And instead of bringing them medicines, they tend to beat up their wives.

This conversation, relating to a known member of the community, ends in communal laughter. Another conversation between participants suggests the common-place nature of violence between married couples:

P3: Instead of bringing her a medicine, he beats her.

One participant, a FCHV, even states that women who have been allowed to seek health appointments are often accompanied by their husbands and are unable to speak freely about their health needs. She relays that:

... as soon as I leave, their husbands will beat them because of the things that they discussed with me. We have seen that happen as well. I go to everyone's homes so I know everything about them.

A sub-theme of influence emerged when viewing both transcript and film data together. Most discussions of power and decision making in the household (as shown above) display strong patriarchal norms. In one instance, in the transcript data, a male film-screening audience member discusses how his daughter persuades him to attend a doctor's appointment for a health condition. This type of behaviour is only noted once:

P1: …When I developed this skin issue [Referring to his skin rashes on his face], my daughter told me I myself was neglecting my skin issues despite being part of this informative program. So, I promptly visited hospital yesterday. [laughing]

The participant suggests that his behaviour was influenced by his daughter; instead of ignoring the issue and/or misusing antibiotics to treat it, he agreed that it would be beneficial to visit a hospital. The shared knowledge gained through the showcasing event, in his view, held him more accountable to his family members. In future studies, it would be useful to know if any similar influences were experienced with female audience members.

The film '*TB'* also shows the influence a woman has on her husband's health behaviours. When a FCHV hears that a man is sick, she chooses to speak with his wife who asks him to visit the health post for testing and treatment. Later in the film, when he has prematurely stopped taking his TB medication, it is his wife who is instructed by the FCHV to have him re-visit the health post. Finally, at the end of the film, the wife reminds the husband that it is time to visit the health post for his daily medication (antibiotics), at which point he leaves the home to visit the health post. Although not directly discussed in the film, the wife is influential on the health behaviours of her husband.

Discussion

The results from the CARAN data provide an insight into gendered power dynamics in relation to AMR-driving behaviours and raises multiple areas of interest for future research. In conducting PV in health projects, though, is the potential to reinforce and reproduce potentially harmful narratives around gender roles in relation to AMR. This challenge echoes reflections from the wider participatory arts research literature. Challenges in defining terms like 'community' and 'participation' can undermine research in these areas (Kenny et al., 2015) and sometimes

unintentionally reinforce traditionally western ‘top-down’ approaches to research (Eversole, 2012).

The inclusion of films as a data source enriched the available data for analysis, sometimes presenting contradictory messaging to that present in workshop activities that would not have been found if analysing transcripts alone. A strong example of a contradiction can be seen when comparing workshop discussions to the messages in the film ‘Kusum, a tragedy’. In workshops, participants often discuss barriers to healthcare that women face, alongside a typical power dynamic that diminishes women’s ability to make health decisions (Budhathoki et al., 2017). However, when the child in the film ‘Kusum, a tragedy’ dies, this death is presented as the fault of the mother alone and not as a discussion on wider social factors. Workshop discussions presented men/husbands/fathers as the primary decision makers in a household and women as the more ‘submissive’ in the decision-making process (Budhathoki et al., 2017). Participants chose to relay a cautionary tale to women, even though they themselves identify men and fathers as the ones with the authority to make decisions. Future research should seek to identify and address contradictions in the roles and responsibilities of each gender in relation to AMR drivers; asking questions around whose responsibility it is to ensure the safe and appropriate access to antibiotics for children, who should take responsibility for the health of a child and hoe reliable different sources of health information are (i.e. health posts, pharmacies and traditional healers).

Future research should also carefully consider the messages presented in films from a gender-sensitive perspective. While researchers should not push participants towards specific content, it is important for researchers to consider the impact films could have on both AMR and gendered power dynamics within their chosen communities. In representing stories which they felt relevant to their communities, participants relayed information, sometimes unconsciously, about the role gender plays in every-day antibiotic use and misuse. For example, where participants chose to show women collecting water from a shared tap or when farming practices were only discussed by men (even though women were shown to be conducting animal-rearing chores around a farm). Researchers could, in future projects, place an emphasis on unpacking gendered messaging and gendered norms with participants during the development of their films.

When considering who has access to which facilities, gender plays a huge role. Women tend to only have access to local and free health posts while men have a

wider selection of options; pharmacies, hospitals and doctors seem to be the male preference. Arguably, this difference in access has both negative and positive repercussions on AMR-related behaviours for both genders. Women, who are only able to seek help from health posts, are more likely to receive antibiotics only when needed and have more regular access to support and information through groups run by FCHVs etc. Although this is, of course, dependent on the level of training, staffing and medication available at their local health post(Aryal et al., 2018). Studies across Nepal suggest that uptake in these services increases when community members view services as high-quality, particularly when the health post is located within the community (Acharya, L.B. and Cleland, 2000) and have lower waiting times and overcrowding issues (Mehata et al., 2017). The support groups and established health facilities act as a potential means to disseminate AMR information, studies suggest that uptake in services is increased when outreach workers (such as FCHV's) interact with communities routinely (Acharya, L.B. and Cleland, 2000). However, women's' inability to seek paid medical help without express permission from their husband limits access to medications that might not be freely available at a health post (participants discussed a tendency for health posts to run out of essential medication). Men, who are unlikely to attend health posts, are potentially at risk of misusing antibiotics both for themselves and for the animals they care for. Men do not need permission to seek medicines from a pharmacy in the same why that women frequently do and have been seen to pressure health staff into providing 'strong' antibiotics in order to 'get well quickly'. However, men having agency to seek hospital treatment for an illness might make them more able to access appropriate types and strengths of antibiotics when needed. While male participants in this study view accessing 'strong' antibiotics from a pharmacy to be beneficial and efficient, it would be impossible to know if they are accessing safe doses of appropriate antibiotics when not receiving a prescription from a trained health professional. Studies on the prescription patterns of antibiotics by pharmacists in different LMIC settings found that, while pharmacists are often aware of the issue of AMR and the role of over-supplying antibiotics has on AMR, this awareness did not lead to a reduction in the overuse of antibiotics(Pearson and Chandler, 2019). Private pharmacies in Nepal do not keep routine information on patients (Nepal et al., 2019), meaning it would be impossible to know if the prescriptions were accurately dispensed and/or adhered to by the patient. The discussion around men requiring 'strong' antibiotics is an area that should be unpacked further in future research projects. Where male participants within workshops describe medications at health posts to be 'too weak' to heal

themselves, it raises questions around what community members perceive to be a strong or weak medication, as well as perceptions on who requires either stronger or weaker antibiotics and why. Further probing of these topics in future research projects could provide insights into the motivations of seeking stronger antibiotics from pharmacies and potentially identify areas of education for communities on how and why stronger antibiotics are used.

It is interesting to note, on the point of access, that women who engage in paid work are seen to behave in similar ways to men regarding antibiotics – buying directly from a pharmacy without a prescription. More focus on the nuances in the gendered experience across other intersecting factors such as age, employment status, education, socio-economic status, religion etc are needed to better understand which factors are most influential on the behaviours that impact AMR at the community level.

Following from the point of permission-seeking, participants discuss the presence of violence within households. Women are expected to seek permission from their husbands before seeking health treatments and are unable to visit hospitals or pharmacies due to either their location or cost. Wider research into maternal healthcare access for women in Nepal suggests that factors such as women's low decision-making power within the household reduces access to essential services for some women (Panday et al., 2019; Deo et al., 2015). Some participants discuss husbands reacting violently when their wives have not sought permission to get medicines, or if they have spoken too freely with health staff. This worrying behaviour impacts women's access to appropriate medical treatments and antibiotics. These topics were not touched upon within films, perhaps due to their sensitive nature. Additionally, as one FCHV describes that women often attend appointments accompanied by their husbands, it could indicate that some women are having to wait to seek health appointments and treatments until their husbands are available. It is important, though, to consider the opinions of participants who see these responses as more individually driven than by gender. More research is needed to know the extent to which we can generalise these responses to wider gender groups, rather than only in this community group.

It is, perhaps, unsurprising that the participants consider childcare to fall under the responsibility of the mother. Parenting is typically considered a female role within a family; evidence suggests that parenting skills are more socially constructed than biologically predetermined (Arendell, 1997). Participants, in their attitudes in this

area, reflect the wider discourse surrounding typically female roles within patriarchal societies and families; women undertake unpaid caring roles around the home before seeking employment (Bowlby et al., 1997). Furthermore, female participants seem to have a practice-based response to caring for a sick child, where male participants seem to escalate quickly to expert interventions. Considering this point from the perspective of power dynamics, the female behaviour of relying on home remedies for a sick child could be seen as an indication of their level of authority in the home. It could also suggest that the male perspective, in the same category, of going directly to the hospital/doctor for a sick child is indicative of the point at which they become involved in a child's health. In the scenario given by a male participant, the role of his daughter was as an influencer to his behaviour – she referred to their experience of having learned about AMR via a showcasing event and it made him visit a doctor where he might not have previously. It is an outlier in the data as this does not seem to be experienced by any other participants, however it could be a sign of the importance of shared learning; a daughter can become a decision-maker in the house if all are educated to the same level. It is, though, difficult to draw conclusions from such limited information. More must be understood about these family dynamics and what could be the vehicle to promote better household equality.

Social norms differ between genders when looking at AMR-related behaviours. Among participants, normal behaviour related to health-seeking for women is based in avoiding medication and opting first for home remedies and traditional healers. This is directly reflected in an earlier study in Nepal that found, when considering treatment for TB, women are more likely to first seek treatment from traditional healers and therefore delay their diagnosis and treatment course (Yamasaki-Nakagawa et al., 2001). This behaviour pattern is also recognised in studies into health-seeking behaviours in Bangladesh; sick women from multiple types of households were less likely to seek healthcare than men (Ahmed, S.M. et al., 2000). However, this does differ from evidence in other areas of the world that indicates women are typically more likely to seek out the help of a health professional than men (Thompson et al., 2016). There is a need for further research into the motives behind health-seeking behaviours in relation to AMR.

Conclusions

The CARAN project provides insights into how the gendered power dynamics of these communities may influence AMR-related behaviours. In illustrating current

power dynamics within communities and not challenging them within films, the messages within films were (unintentionally) reproduced and reinforced. The films produced by participants within the project also illustrated responses from participants suggest that experiences of the local health system are heavily gendered at all levels; gender influences who has and does what, how values are refined locally and who decides on issues related to health, especially in relation to seeking antibiotics. When considering this through the lens of AMR, it is important that we learn more about these power dynamics and how to balance them to reduce AMR-driving behaviours. Future research, focussed on gender from the outset, should probe further into issues of gender-based inequalities that relate to the access and use of antibiotics as well as typical roles within the household. Specifically, research is needed to identify and unpack potential AMR-driving behaviours, such as the beliefs held around the need for 'strong' antibiotics, how permission-seeking behaviours impact women's and children's health, and what wider socio-economic factors should be considered in AMR messaging.

CARAN also highlights potential routes for disseminating appropriate AMR information through well-established and trusted networks. Negative behaviours that drive AMR at the community level occur in both male and female community members, ideally information would be disseminated equally to all within a community. However, participants identify women's groups and mothers' groups as a means to spread AMR information and show films to raise awareness and change behaviours. This information, once delivered via women's groups, has the potential to reach and influence men within those communities indirectly. Women are, though, described as having less autonomy than the men in their families and communities therefore potentially less able to act on the information shared within these groups. More research is needed to establish the feasibility and impact of disseminating AMR information via these existing groups and networks. Further research could also explore the use of PV films as a trigger point for discussion, rather than solely as a means to disseminate AMR information.

This analysis identifies multiple areas of the health system that must be researched through a gendered lens when considering AMR drivers. Contradictions in responses provide an opportunity to identify possible areas of focus for later research – access, childcare, decision-making etc. Given that these contradictions appear most strongly when comparing films to workshop transcripts, this analysis highlights the value in considering community-produced films as valid and rich data to be analysed alongside traditional transcript data. Researchers in future PV

projects that focus on health issues should consider films as part of the dataset. Researchers in future projects should, though, carefully consider the implicit and explicit messaging included within films and aim to unpack these gendered norms with participants during workshops. Future work that centres gender from the early planning stages could aim to identify where participants reproduce harmful narratives and use those opportunities to discuss potential alternatives that still share their chosen messages.

During this process of analysis on the ways participants both view and chose to represent their own gendered experiences relating to AMR, it became clear that there is a need for a strong focus on gender within these projects. Researchers must critically reflect on the ways that AMR messaging is shared; messages that are locally appropriate that neglect to consider nuances around locally held traditions and power dynamics have the potential to reproduce potentially harmful gendered stereotypes. Placing gender as a central focus within PV in AMR projects could promote equity within the research process and in the messages shared within films

Chapter 6: Participatory Video in health research; developing an evaluation framework

This is the final chapter of Section 2. The previous chapters have provided insights into the outputs of a PV in AMR research project, this chapter will focus on process evaluation. As identified in Chapter 2: Participatory Video Scoping Review, there is a need for an interdisciplinary evaluation framework that looks specifically at the value of using PV methods in health research. Currently there is no standard practice to evaluating PV in health research projects. Papers identified in the scoping review chapter of this thesis were published across a range of journals with differing foci.

This chapter will address research objective one, specifically 1c: To develop an evaluation framework as a means to standardise PV in health reporting methods. This chapter aims to provide an evaluation framework that combines the key elements of both PV and public health evaluation measures. In doing so, this chapter aims to bridge the gap between disciplines and develop a truly interdisciplinary measure of a PV in health research project.

Introduction

Interdisciplinary evaluation poses multiple challenges (Gavens et al., 2018; Klein and Newell, 1997; Bindler et al., 2012). This chapter will, from the wider PV evaluation literature and health promotion literature, develop a theoretical framework that can be applied to a PV intervention within health research topics. The framework laid out in this chapter moves towards providing the research community with a framework that can aid in planning, implementing, and evaluating a PV in health study. This chapter will firstly outline relevant literature and existing frameworks in both PV research and health promotion research, highlighting key gaps in each when considering PV in health projects specifically. This chapter will then combine and adapt relevant frameworks to deliver a theoretical framework that can be used to evaluate any future PV in health research.

As an emerging field of research, there is currently no standard practice for shaping, reporting, or evaluating PV in health research projects. Evaluation frameworks are a key tool in planning and assessing the value of any research project or intervention. In the absence of an exemplar ‘gold standard’ it was not possible to evaluate the articles systematically (in Chapter 2: PV Scoping Review), nor to test the extent to which their finding could be solely attributed to the specific

intervention under examination (implementation fidelity). Articles included in the review were found across multiple journals, some from a health perspective and others from a humanities perspective. In order for the growing field of PV in health research to be rigorously evaluated, a truly interdisciplinary evaluation method must be developed.

Interdisciplinary research, necessitated by complex behavioural systems (Newell et al., 2001) presents challenges in comprehensive and effective evaluation (Klein and Newell, 1997; Aagaard-Hansen and Henry Ouma, 2002; Gavens et al., 2018). Interdisciplinary health research, though challenging, is needed to further advance our collective knowledge and has become an integral part of global research strategies (Nair et al., 2008; Clarke et al., 2012). Effective interdisciplinary research equips researchers and policy makers with nuanced solutions to complex, multifaceted health problems through approaches that promote impartiality in research approaches (Bindler et al., 2012; Gavens et al., 2018). Interdisciplinary evaluation has the potential to enhance the reliability of knowledge beyond any one specific discipline (Huutoniemi, 2016; Brewer, 1999).

Barriers to effective reporting and evaluation are present at all levels of research processes. The terminology used, for example, across disciplines varies greatly. Additionally, arts and health researchers must define outcomes, as well as attribute value to evidence for said outcomes in order to analyse and draw conclusions from an intervention (Raw et al., 2012). Where evaluation and reporting methods vary greatly, as with arts and health disciplines, projects can be vulnerable to academic dismissal or limited visibility and impact (Raw et al., 2012).

Public health evaluations, especially where value is mostly placed in evidence-based practices and interventions, can be restricted by lack of sufficient evidence (Des Jarlais et al., 2004). Furthermore, where ideas of ‘best-practice’ are shaped by large studies such as Randomised Control Trials, public health interventions may lack the complexity and nuance needed to be effectively implemented in different contexts (Kemm, 2006). In recent years, adaptations to evidence-based-interventions have been challenging to evaluate due to their deviation from original core elements of the intervention (Escoffery et al., 2018; Hailemariam et al., 2019). This rigidity in implementation, evaluation and reporting can limit public health interventions and potentially create a conflict between the needs of a community and the core elements of an intervention. When considering community

engagement projects in public health, an element of flexibility is required to contextualise an intervention to the community needs.

The PV method, as described in Chapter 2, has the potential to begin dialogues with community members and move towards understanding the complex behavioural divers of AMR at community level. PV, in enabling sometimes uncomfortable conversations around systemic issues, could provide insight into a community-level understanding and use of antimicrobials and begin to produce community-led solutions. There is, though, no current PV evaluation framework that can be used to identify direct health outcomes from the intervention. PV evaluation, as will be discussed in further detail in this chapter, incorporates language that is difficult to define and therefore measure. In order to be recognised as effective in health interventions, PV evaluations should incorporate some of the elements of public health evaluation tools which allow for measurable indicators of rigour and potential impact.

There is, here, an opportunity to develop an evaluation framework for PV in health research that takes into account the potential value of interdisciplinarity in complex health issues. A framework that considers both PV methodologies and health outcomes could be useful in planning and executing research projects.

Identifying/adapting frameworks

The PV methodology was first developed as a participatory means to engage a community or group in creating their own videos that explored local issues, voiced concerns or simply encouraged creative story-telling (Lunch and Lunch, 2006). PV was initially intended to explore social issues and often aimed to empower minority or oppressed communities to voice their opinions and perspectives (Lunch and Lunch, 2006). The Handbook for Participatory Video reminds its reader that as practitioners of PV we must continuously ask ourselves "*Who are we doing the participatory video for, and why?" (Milne et al., 2012).* The below framework; a 2013 triangular PV evaluation framework by Plush et. al was developed as a tool for PV practitioners when planning and evaluating a study. Focusing on three key elements, the framework aids researchers in identifying the main outcomes of a PV study; Awareness/Knowledge, Person-Centred Advocacy and Capacity for Action (Plush, 2013). In setting out these parameters, Plush et.al presented a means to

answer '*why'* the study was taking place as laid out in The Handbook for Participatory Video.

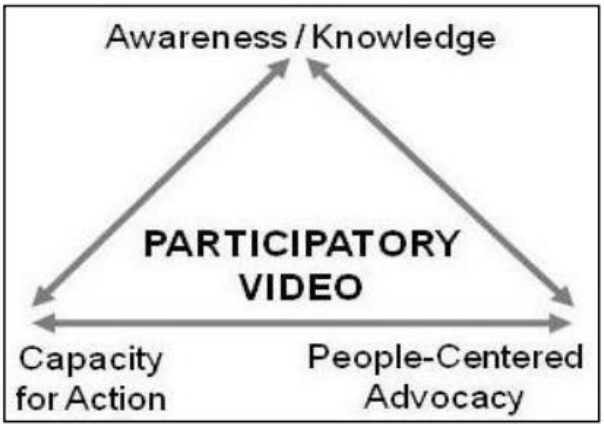


Figure 14 -(Plush, 2013)

Through these three elements, a PV study can be evaluated to understand its impact in each of these fields on a particular social issue. In unpacking these three elements, the Plush framework is useful for showing the value of the methodology itself, but does not take into account the necessary elements to be included in health research reporting. The three core elements of this framework could, therefore, be adapted using elements of well-established health research frameworks in order to better understand the value of PV methodologies in the context of health research. The shape of this framework highlights the interconnected and iterative nature of PV interventions; each of the outcomes have arrows that indicate their influence on and relationship with the other outcomes. An adapted framework should include similar elements to reflect these relationships in PV in health research outcomes. However, the listed outcomes should be adapted to include health indicators.

Instead of only asking who the study is for and why, we must ask *who* the research is for, *why* it is being undertaken and *how* it is positively impacting on health issues in that community.

Awareness/ knowledge:

Co-production of videos and knowledge is a core component to PV research. Co-producing knowledge is a collaborative approach to knowledge production which

combines interdisciplinary, transdisciplinary, cross sector and policy approaches to societal problem solving (Polk, 2015) and is an integral part of generating sustainable development in any area of research (Pohl et al., 2010). By enabling participants to co-produce knowledge, and in this case videos, participants become owners of the process of the intervention (Milne et al., 2012). The traditional power dynamics between researcher and participants become more even as knowledge is generated for and with all parties.

In health research there is a focus on, instead of knowledge/awareness alone, knowledge attitudes and practices and how a study has impacted them. Public health research seeks to understand the knowledge, attitudes and practices that relate to a particular health outcome and how an intervention might successfully address and/or improve these areas within the study community. Here, then, a need arises to integrate elements of health study evaluation frameworks to better unpack the health outcomes alongside advocacy, capacity for action and awareness. Instead of asking who the study is for and why (Milne et al., 2012), we must ask *who* the research is for, *why* it is being undertaken and *how* it is positively impacting on health issues in that community.

Health promotion combines public health policy with service provision and education (Webber, 2019). Education alone does not improve health outcomes; effective health promotion must also consider socio-economic factors, local attitudes to sometimes sensitive health topics and the availability of alternative treatments such as traditional healers (Webber, 2019). Described as the public health ‘three pillars’, researchers can use Knowledge, Attitudes & Practices (KAP) indicators to assess the value of an intervention, however complex it may be (Badran, 1995). KAP studies are often used as a tool in public health research to provide insight on a particular health issue/group of issues (Green, A., 2007). Practitioners can, through asking a study population questions relating to their knowledge, attitudes and practices around a particular health issue, gather insights that impact research and policy design (Tillyard and DeGennaro, 2018). Though KAP surveys rely heavily on accurate reporting from survey participants, they are often seen as effective and efficient tools in gathering health information that can be widely generalised to larger populations (Launiala, 2009).

As described in the introduction section of this chapter, potential barriers to effective interdisciplinary evaluation can arise in ambiguity of terminologies. Practitioners across different disciplines may cultivate differing understandings of

key terms. As a first step in reworking the terminology to be included in a framework it is, then, important to clearly and unambiguously define each word or term. This framework is designed to be universally applicable to any PV in health research study. As such there will be no referrals to specific health topics. It is possible, though, to establish clear parameters for each term included in each element of the framework. KAP, though a familiar term used in health research, is not commonly found in Arts research. As a means to evaluate the health outcomes of a PV in health study, the following definition will be adopted as part of this framework:

Knowledge

Broadly defined as an understanding or information on a particular subject (Cambridge Dictionary, 2021) the term knowledge in this framework refers specifically to the use of PV in health. Knowledge should refer to the learning gained by participants through the study period. Additionally, given the nature of PV, it may be appropriate to include knowledge gained in the practical skills of creating videos. Reporting on knowledge in this type of evaluation could include data relating to any knowledge gained by participants in areas relating to the methodology itself as well as the health topic in question. While this would ultimately depend on the aim(s) of an evaluation, giving evidence of skills gained in video-making may provide tangible examples of elements of evaluation that are more difficult to define. For example, PV evaluations often incorporate feelings of empowerment, with participants referring specifically to gaining skills and knowledge around video-making as a core element of that empowerment. As such, the following definition of knowledge will be adopted by this framework:

Information held by participants relating to the particular health topic in question as well as information relating to the process of creating a video.

Attitudes

Based in opinions, attitudes are defined as feelings towards something or someone (Dictionary, 2021a). Within the field of PV in health, the term attitudes should relate to the feelings held by either individuals or larger groups relating to a particular health issue. PV helps to capture how a participant experiences/feels a health issue or intervention. It may be useful for an evaluation to reflect specifically on how the use of video creation allowed for participants to share attitudes freely. Furthermore, evidence of attitudes from participants should be present within videos both

explicitly and implicitly. Researchers could, again depending on the aim(s) of an evaluation, seek evidence of attitudes in both the data from the process of creating videos (i.e. during workshops) and in the videos produced. For the purposes of this framework, the term attitudes will be defined as follows:

The thoughts and/or feelings held by an individual or larger group relating to the particular health topic in question. Attitudes should also include the feelings of participants regarding the process of the study.

Practices

Practices refer to the act of doing, rather than in understanding or feeling (Dictionary, 2021b). In the context of this framework the term practice relates to the actions of participants regarding a particular health issue. It may be prudent for researchers to include intentions for future behaviours here though this should be made clear in reporting. For the purposes of this framework, the term practice is defined as follows:

The actions (or intentions) of participants as a result of the study in relation to the particular health topic in question.

Person-Centred Advocacy

The Plush et. al. framework defines advocacy, in the case of PV studies, as the creation of videos that can communicate knowledge and influence decision makers at various levels (Plush, 2013). This frames PV as a tool to generate social change, but does not include any specific indicators. The term advocacy in health research, by contrast, uses particular indicators to measure evidence in any collected data. Health research seeks evidence of advocacy within a study group or population in activities that aid in navigating and accessing a health system, addressing health inequalities and influencing/changing health systems through policy (Hubinette et al., 2017). Though similar, the definition of advocacy through a health-research lens moves beyond influencing social change to also focus on health outcomes as a result of the intervention.

As a means to provide clear guidance to researchers, this framework will adopt the original elements of the Plush et.al. framework, integrating a public health message to move beyond social change alone. Researchers, in this element of the framework, will need to collect evidence from their data that shows participants

engaging in the creation of videos to influence decision making in relation to the particular health topic at hand. Additionally, researchers will be prompted to seek evidence of participants improving their understanding of seeking/accessing healthcare and health systems and addressing any health inequalities in relation to the particular health topic in question. As a result, the following description will be included in the final framework under the heading 'Person-Centred Advocacy':

Using participatory video as a strategic process to communicate knowledge generated by communities to improve knowledge of and access to local health systems, identify and address any health inequalities and influence decision making at local, national, and global levels.

Capacity for Action

PV practitioners have been guided, from its inception as a distinct methodology, to use PV at a platform to share the views and experiences of often underrepresented groups (Milne et al., 2012; Lunch and Lunch, 2006). Capacity, in the Plush et.al. framework refers to the participants ability to communicate knowledge to wide audiences during the project and potentially beyond (Plush, 2013). For a PV in health project to promote capacity for action, it must promote action towards the improvement of a particular health issue.

The term community capacity building has been used for many years in health promotion globally (Labonte and Laverack, 2001; Craig, 2007; Raeburn et al., 2006). Capacity, in health research, refers to the availability of certain resources, structure and workforces to plan, implement and evaluate interventions (Brownson et al., 2018). Therefore capacity building in communities is essential to facilitating improved health behaviours (Liberato et al., 2011) from a 'ground-up' approach (Craig, 2007). The process for building capacity within a community, in relation to health topics, can be iterative in nature (Moreno et al., 2017), potentially improved through measures such as training for workforces, use of appropriate tools and assistance, rigorous assessment and providing incentives for improvement (Brownson et al., 2018).

A newly adapted framework must combine these two definitions of capacity to consider both the ability of participants to communicate a particular message, and participants ability to identify (and potentially improve) their local capacity to improve health outcomes in relation to a particular health topic. The following will be

included as a definition of ‘Capacity For Action’ within the newly developed framework:

Building on the strengths of local actors in using participatory video with communities to ensure that knowledge on a particular health issue is shared, potential barriers/opportunities are identified and capacity for change assessed through participatory means both during the participatory video workshop and through its long term use.

Fidelity

One key element of health research evaluation lies in assessing the fidelity of that research, that is to say, to what extent the implementation stage of research adheres to initial plans and designs (Mihalic, 2004). Based on the findings of a literature review performed in 1998 (Dane and Schneider, 1998) that discussed the various ways studies reported on fidelity in health studies, a 2004 article defined four main components to fidelity; Adherence, Exposure, Quality of program delivery and Participant responsiveness (Mihalic, 2004).

- ***Adherence*** *refers to the extent to which the study followed the initial design and includes factors such as delivering to the appropriate population, appropriately trained staff, using correct materials and techniques and completing studies in the appropriate context.*
- ***Exposure*** *catalogues elements such as the number of sessions implemented or attended by participants as well as the duration and frequency of said sessions.*
- ***Quality of program delivery*** *focuses on the manner in which sessions are conducted. The person delivering the program could be assessed for skills in certain techniques or methods, enthusiasm, preparedness, and attitude as well as any other elements appropriate to the study.*
- ***Participant responsiveness*** *refers to the extent to which participants appear to be engaged and involved in the different elements of a session.*
  (Mihalic, 2004)

When considering community interventions, such as PV, adherence to research protocols may be affected by issues that would not occur in highly controlled environments. These might include a lack of adequate financial resources or a lack of training and support at the site level (Breitenstein et al., 2010; Dane and Schneider, 1998). Ultimately, diminished fidelity can lead to weakened outcomes for a study and even portray potentially useful strategies as ineffective (Breitenstein

et al., 2010; Dane and Schneider, 1998). Researchers should ensure that implementation fidelity is considered throughout the planning and implementation of a research project and develop clear and feasible measures to monitor fidelity at all stages (Breitenstein et al., 2010).

In addition, given the complexity of PV in health studies, facilitators should consider inclusion of elements that could positively impact fidelity. The below framework lists a number of 'moderators' and shows their potential impact on the implementation and outcomes of a study. The framework, by Carroll et. al, is well established in health literature and is a widely accepted format for evaluating the fidelity of health research.

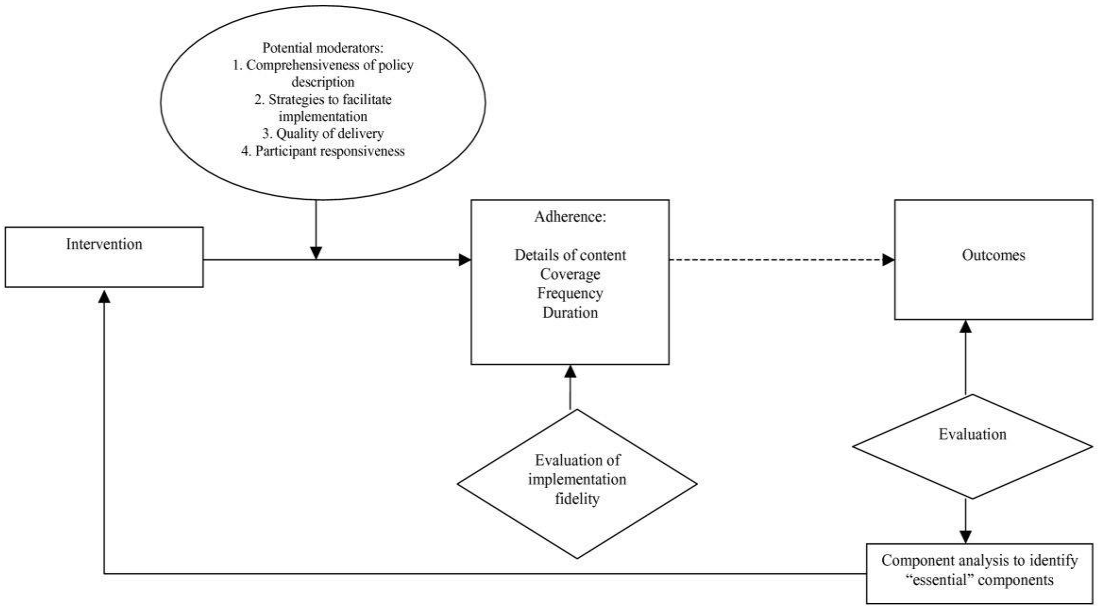


Figure 14 - -(Carroll et al., 2007)

Though not all elements of the above framework would be appropriate in evaluating a PV in health study, the framework lists moderators as:

Comprehensiveness of policy description

In generating this framework, Carroll et. al. found that more detailed and specific interventions were more likely to have higher fidelity than those with vague plans. The term policy, here, refers to the research plans. In the article it is suggested that more complex interventions are more likely to require detailed planning and reporting to enhance homogeneity (Carroll et al., 2007). As a means to limit any potential variance from a protocol, it is suggested that researchers comprehensively detail all aspects of research before delivery and include maximum detail in reporting.

Strategies to facilitate implementation

PV in health studies are complex and as such may need strategies put in place to support facilitation of the study. In developing strategies to facilitate implementations, researchers can improve adherence to protocols as well as improve uniformity of delivery. The Carroll et.al. framework, in this moderator, highlights the value of supporting implementation through activities such as monitoring, feedback and training (Carroll et al., 2007).

Quality of delivery

This moderator echoes the message from Mihalic; the quality of delivery within a study can greatly impact the fidelity and therefore quality of outcomes for any intervention and should be moderated for in the planning and implementation stages (Carroll et al., 2007; Mihalic, 2004). Delivery quality can be improved through training, provision of support and resources and feedback to those delivering an intervention. Researchers should, in the planning stages, allow time for those implementing interventions to be extensively trained on the subject matter and methods of delivery and support should be provided through appropriate means.

Participant responsiveness

Again similar to the work of Mihalic, the Carroll et.al. framework poses participant responsiveness as an essential element to high fidelity in research. Where participants are engaged in the process of an intervention and see said intervention as relevant to themselves, they are more likely to partake more enthusiastically in

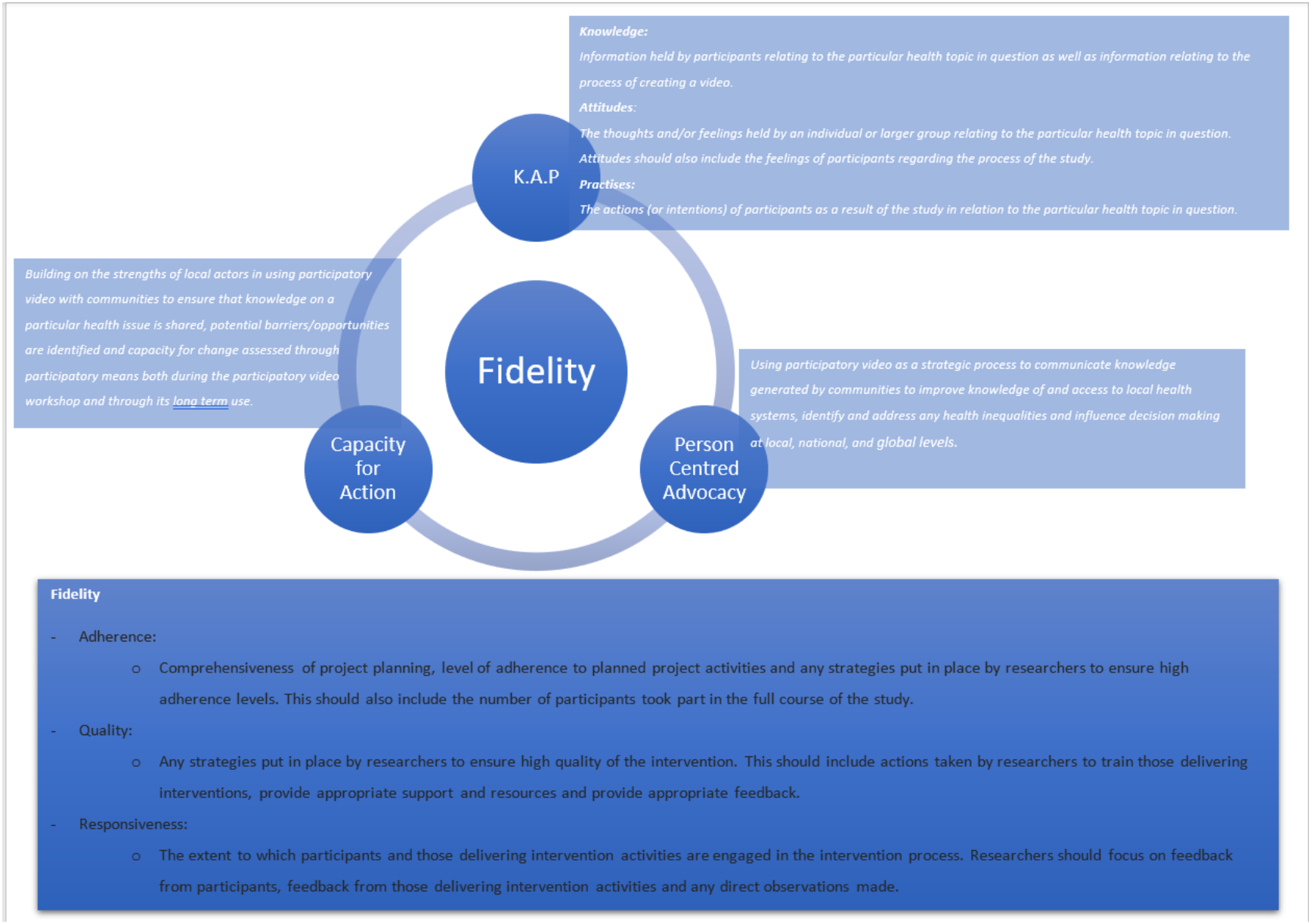
the process. Furthermore, Carroll et.al. propose that implementation fidelity is not only affected by participants responsiveness, but also the responsiveness of those delivering interventions (Carroll et al., 2007). That is to say, all parties must find the content of an intervention relevant, interesting and engaging in order to improve or ensure implementation fidelity is achieved.

From this section, the final adapted framework will include the following elements as a means to moderate and measure fidelity:

- Adherence:
    - Comprehensiveness of project planning, level of adherence to planned project activities and any strategies put in place by researchers to ensure high adherence levels. This should also include the number of participants that took part in the full course of the study.
- Quality:
    - Any strategies put in place by researchers to ensure the high quality of the intervention. This should include actions taken by researchers to train those delivering interventions, to provide appropriate support and resources and provide appropriate feedback.
- Responsiveness:
    - The extent to which participants and those delivering intervention activities are engaged in the intervention process. Researchers should focus on feedback from participants, feedback from those delivering intervention activities and any direct observations made.

Final framework

The following framework combines each of the components described throughout this chapter:


Knowledge:
Information held by participants relating to the particular health topic in question as well as information relating to the process of creating a video.
Attitudes:
The thoughts and/or feelings held by an individual or larger group relating to the particular health topic in question. Attitudes should also include the feelings of participants regarding the process of the study.
Practises:
The actions (or intentions) of participants as a result of the study in relation to the particular health topic in question.
K.A.P
Building on the strengths of local actors in using participatory video with communities to ensure that knowledge on a particular health issue is shared, potential barriers/opportunities are identified and capacity for change assessed through participatory means both during the participatory video workshop and through its long term use.
Fidelity
Capacity for Action
Person Centred Advocacy
Using participatory video as a strategic process to communicate knowledge generated by communities to improve knowledge of and access to local health systems, identify and address any health inequalities and influence decision making at local, national, and global levels.
Fidelity
- Adherence:
  - Comprehensiveness of project planning, level of adherence to planned project activities and any strategies put in place by researchers to ensure high adherence levels. This should also include the number of participants took part in the full course of the study.
- Quality:
  - Any strategies put in place by researchers to ensure high quality of the intervention. This should include actions taken by researchers to train those delivering interventions, provide appropriate support and resources and provide appropriate feedback.
- Responsiveness:
  - The extent to which participants and those delivering intervention activities are engaged in the intervention process. Researchers should focus on feedback from participants, feedback from those delivering intervention activities and any direct observations made.

Knowledge, Attitudes & Practices:

K: Information held by participants relating to the particular health topic in question as well as information relating to the process of creating a video.

A: The thoughts and/or feelings held by an individual or larger group relating to the particular health topic in question. Attitudes should also include the feelings of participants regarding the process of the study.

P: The actions (or intentions) of participants as a result of the study in relation to the particular health topic in question.

Person-Centred Advocacy:

Using participatory video as a strategic process to communicate knowledge generated by communities to improve knowledge of and access to local health systems, identify and address any health inequalities and influence decision making at local, national, and global levels.

Capacity for Action:

Building on the strengths of local actors in using participatory video with communities to ensure that knowledge on a particular health issue is shared, potential barriers/opportunities are identified and capacity for change assessed through participatory means both during the participatory video workshop and through its long term use.

Fidelity:

- Adherence:
    - Comprehensiveness of project planning, level of adherence to planned project activities and any strategies put in place by researchers to ensure high adherence levels. This should also include the number of participants took part in the full course of the study.
- Quality:
    - Any strategies put in place by researchers to ensure high quality of the intervention. This should include actions taken by researchers to train

those delivering interventions, provide appropriate support and resources and provide appropriate feedback.

- Responsiveness:
    - The extent to which participants and those delivering intervention activities are engaged in the intervention process. Researchers should focus on feedback from participants, feedback from those delivering intervention activities and any direct observations made.

Conclusions

This chapter has highlighted a need, identified in Chapter 2: PV Scoping Review and reinforced by the wider available literature, for truly interdisciplinary evaluation tools that can guide all stages of PV in health research. By adapting an existing PV evaluation tool, this chapter has combined relevant health terminology and practice alongside arts evaluation that aims to place equal value on both the health outcomes and process of an intervention. Though interdisciplinarity presents challenges, work that spans disciplines is seen as essential in future health research and every effort should be made to ensure interdisciplinary methods are employed and supported at all stages of an intervention. Robust, reliable reporting and evaluation are essential to ensuring PV in health studies are acknowledged for their potential influence on ‘ground-up’ responses to any given health issue. Where an intervention can truly represent the opinions, needs and issues of a community or group it can aid in developing community-led, locally acceptable solutions to a health problem that may prove elusive to more traditional health study designs. This framework, though developed through theory, is applicable to any future PV in health research project and can be used in future projects to avoid unnecessary heterogeneity in reporting styles.

Section 3

This is the concluding section to this thesis, presenting summaries of key findings and illustrating their application to resources within the research field. This section will summarise the key areas explored in this thesis; One Health analysis of community-level research, the gendered dynamics of AMR-driving behaviours at the community level and the development of an evaluation framework for PV in health research projects.

Chapter 7: Discussion with Summaries and Recommendations

AMR

This thesis has focussed on the topic of the behavioural drivers of antimicrobial resistance (AMR) from multiple perspectives. Using community engagement (CE) methods to generate community-led solutions to complex issues is a growing trend in public health, this thesis has explored the use of Participatory Video (PV) in AMR research and put together a set of recommendations and tools for future research projects.

Although AMR is a naturally occurring process which emerges over time, resistance has increased at an alarming rate due to the overuse and misuse of antimicrobials worldwide (WHO, 2018a). Around 4.95 million deaths were associated with bacterial AMR in 2019 (Murray et al., 2022). These recent figures suggest that we are on track to meet the WHO prediction of approximately 10 million deaths per year caused by AMR by the year 2050 (WHO, 2019c). AMR infection rates are directly affected by factors such as levels of sanitation, infection control and access to safe, clean water (Holmes et al., 2016). Research shows a significant relationship between resource-poor countries and a presence of antimicrobial resistant infections (Alvarez-Uria et al., 2016). Citizens living in LMICs are, in addition to experiencing higher rates of infections, also more likely to struggle with treatment options for antimicrobial resistant infections. Common infections are becoming more difficult to treat, with increasingly expensive combinations of medications needed to effectively treat these illnesses (CDC, 2018). Globally, the burden of AMR will place strain on even well-established health systems (Le Doare et al., 2015) and pose a potentially disastrous threat to health systems that already struggle to meet the health needs of a population. Out of pocket expenses for patients in LMICs account for up to 42.3% of national health expenditure (World Health Organization, 2016). Where costs at the individual level are ‘catastrophic’ i.e. equal to or exceeding 40% of the household income (World Health Organization, 2016) poorer populations will be disproportionally affected by increased treatment costs. Many households chose not to seek medical services out of fear of these ‘catastrophic’ costs (Xu et al., 2003), further exacerbating the spread of communicable diseases.

One Health and Intersectionality

The concept of One Health emerged in the early 2000s as an official summary of an idea that had been understood by experts across the human, animal and environmental fields for many years (OIE, 2020). The One Health approach sets global standards of practice to better develop understanding as well as interventions to reduce AMR. One Health recognises that the goals set out are unlikely to succeed without the cooperation of all stakeholders, and places equal importance on all risk factors: human, animal, agricultural and environmental. Any interventions to slow the spread of AMR require multi-agency cooperation as well as prolonged concentrated efforts to educate the public on infection prevention, sustainable consumption and safe disposal of antimicrobials as well as strong regulations and policy (Moran, 2017). AMR is primarily driven by the inappropriate use of antimicrobials (across both human and animal/agricultural health sectors); a human behaviour that will take much effort to change (WHO, 2018f).

While global guidelines can inform regional and national governments on best practices, community generated solutions to local issues with antimicrobial and antibiotic misuse are essential to effect behaviour change (Chhorvoin Om, 2017; Anna K. Barker, 2017; Peng et al., 2018. Community engagement offers an opportunity to develop an applied understanding of One Health principles as experienced within communities on a daily basis; through running smallholdings, seeking subtherapeutic antibiotics and more.

Patterns in infectious disease spread, including antimicrobial resistant infections, are deeply influenced by the social and political dynamics of a community (WHO, 2015b). The Intersections between gender and other social elements such as poverty, work division, roles in a community need to be better understood in the fight against antimicrobial resistant infections (White and Hughes, 2019). Health systems research, with a gendered lens, can identify the areas in which different genders experience health systems differently. Gender inequalities can influence the level of access to various health facilities. Where patriarchal values are prominent, boys and men are often prioritised for treatment over female family members (Barasa, 2019). Though predetermined by biological sex, these trends are based in behaviours. Gender norms shape health needs and use of medications through access to an utilisation of health services, decision-making power, access to and control over resources (including paid

employment) as well as risk behaviours in relation to the seeking and use of antibiotics and antimicrobials (ReAct, 2020).

Community Engagement and Participatory Video

The PV methodology is generally viewed as a positive means for co-production of knowledge and prompts for positive social change (Milne et al., 2012). The design of PV aims to diminish traditional hierarchies between researchers and participants and, if used correctly, can create spaces of learning and transformation for participants and researchers (Kindon, 2003). PV can play a significant role in supporting and amplifying the voices of marginalised communities (Jiang and Kobylinska, 2020).

Within AMR research, community engagement projects are a growing area of interest. AMR research should aim to reflect the complex and diverse nature of the issue at multiple levels. CE as a means to co-produce knowledge is growing in popularity, though there is still very little known regarding the success in using CE to address AMR (Mitchell et al., 2019). Much of the evidence available in this area relies on knowledge, attitudes, and practices (KAP) data to show success. While KAP studies can give an indication of any misconceptions or misunderstandings within a health topic, they can only report what participants say rather than what they actually do (SPRING, 2011). More research is needed into the value of specific methods of community engagement in AMR research, and health research more broadly.

Research Objective 1: An exploration of the use of participatory video in health research

When considering what the current literature can tell us about the potential value of using PV methodologies in health research, the most prominent theme was that of a positive participant experience. Health researchers, by using an intervention widely considered to be enjoyable, increase the potential for meaningful and lasting research that engages key stakeholders in health topics. Studies also suggest how PV can shift the power dynamic between researchers and their participants (Waite and Conn, 2011a), highlighting how this can lead to the generation of community-led solutions to health problems. PV, often used as a tool for co-creating positive social change, has the potential to positively impact the lives of participants, building skills, developing

dialogues within communities and between communities and policymakers. Further research is needed to better understand the potential long-term impact of such a participant-led approach to generating health solutions.

From the scoping review in chapter 2, there is evidence that PV methodologies provide nuanced and tailored approaches to socially complex health issues. The review found evidence that outcomes of PV projects could be used as health education materials in their host communities, over 20 of the included papers reported using videos produced in their projects as health education tools. The videos produced within PV projects are highlighted as a potential means to communicate local health issues and empower community members to directly impact their local health system. Clabots and Dolphin (1992) described how community members were given the opportunity to take active roles in healthcare delivery for their community through creating and distributing educational videos aimed at improving access to minority communities.

The review did, though, find little evidence of the impact of these videos on wider communities. Multiple articles reflected on a need for accurate measurements of the impacts of PV-produced videos after a project, including how incorporating online dissemination might provide insights into reach. Harou (2017) describes how the educational campaign the team created emphasised the need for monitoring where and how often the videos are shown. Other studies highlight the value of online dissemination and how this could be measured to gauge the impact of a given intervention (Chávez et al., 2004; Warren, K., Holl, Gupta, , 2014), although it is fair to say that this tends to be presented as a future possible development for the work, rather than as a feature of the current intervention.

The articles included in the review describe positive experiences through which participants were able to discuss sometimes challenging health topics in a safe and creative environment. Participants in PV studies reflected that the use of a creative video approach, especially where they chose to use scripted dramas and play character roles, allowed them to explore a taboo health topic (such as leprosy or sexual health) more openly than through other means (Moletsane et al., 2009; Waite and Conn, 2011b; Peters et al., 2016)

Several articles indicate a positive health outcome, such as improved awareness around a specific topic or improved health behaviours. However, none of the studies put forward measurable improvements in any health outcome for their study communities. Either as a sole methodology or in conjunction with another, participatory video has the potential to elicit data on a multitude of health topics. While many health topics have been addressed, this study shows many gaps in the literature remain. PV can be applied in a wider range of contexts, and it has been shown to have positive effects on behaviour and health. Future research should widen the pool of knowledge and focus on detailed reporting of methodology.

Future research should consider using clear reporting and evaluation frameworks to enhance the rigour of their reported outcomes. Additionally, future research should consider the potential for long-term impacts on community health and its potential to effect policy. Researchers should detail the challenges, opportunities and solutions that occurred during the production process to further enrich our understanding of participatory video making – much is known of the potential uses of PV, but little is documented on the actual process of using PV in health topics. As an emerging methodology in health research, it is important for researchers to reflect critically on the process of implementation, including assessing fidelity to understand the extent to which we can attribute the outcomes of each study to its methodology. Interdisciplinary evaluation tools should be developed to assess elements of measurable health outcomes alongside core PV concepts such as advocacy and shared learning.

Interdisciplinary research, necessitated by complex behavioural systems (Newell et al., 2001), poses multiple challenges at evaluation stages (Gavens et al., 2018; Klein and Newell, 1997; Bindler et al., 2012), particularly in ensuring comprehensive and effective methods to evaluate studies (Klein and Newell, 1997; Aagaard-Hansen and Henry Ouma, 2002; Gavens et al., 2018). Effective interdisciplinary research equips researchers and policy makers with nuanced solutions to complex, multifaceted health problems through approaches that promote impartiality in research (Bindler et al., 2012; Gavens et al., 2018). Interdisciplinary evaluation has the potential to enhance the reliability of knowledge beyond any one specific discipline (Huutoniemi, 2016; Brewer, 1999).

The combination of arts and health disciplines can be vulnerable to academic dismissal or to limited visibility and impact (Raw et al., 2012). Greatly varying terminology across

and within both areas poses a challenge for interdisciplinary working. Additionally, arts and health researchers must define outcomes, as well as attribute value to evidence for said outcomes, in order to analyse and draw conclusions from an intervention (Raw et al., 2012). Having identified a need for an interdisciplinary evaluation framework for PV in health research projects in Chapter 2, this thesis then developed an evaluation framework that combines key elements of PV evaluation and public health evaluation measures.

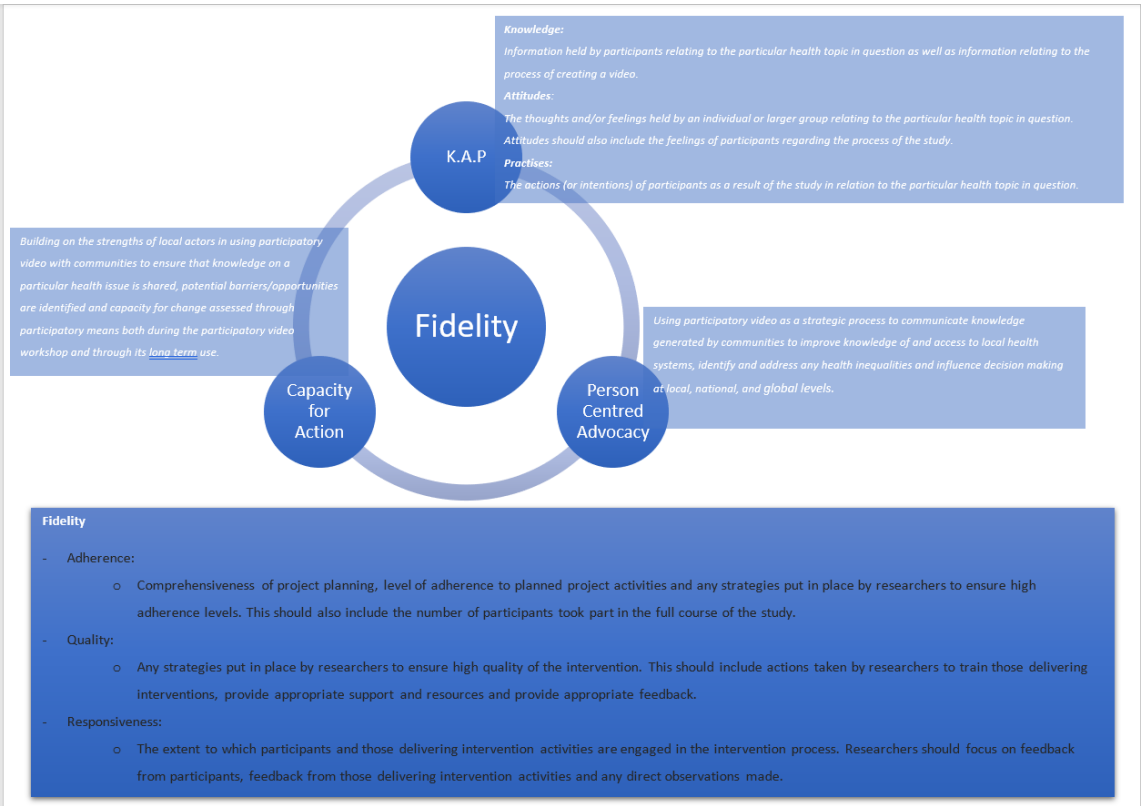


Figure 15 - PV in health evaluation framework

Key recommendations

It might be useful for future research projects to reflect explicitly on the process of developing a shared understanding of value within an interdisciplinary project. The outcomes or knowledge produced from a project might remain the same but stakeholders (including researchers) may have an enhanced perception of the value of those outcomes/knowledge.

Robust, reliable reporting and evaluation are essential to ensuring PV in health studies are acknowledged for its potential influence on ‘ground-up’ responses to any given health issue. Where an intervention can truly represent the opinions, needs and issues of a community or group, it can aid in developing community-led, locally acceptable solutions to a health problem. This framework was developed to be applicable to all PV in health projects. As a theoretically developed framework, not developed during primary data collection, it must be tested for its use in new data collection and evaluation. If used, this framework could reduce unnecessary heterogeneity in PV in health research reporting. Applying the framework in the field will help to move towards a genuinely interdisciplinary process from planning to publication. This framework could act as the first component in a process of developing standardised reporting guidelines for researchers.

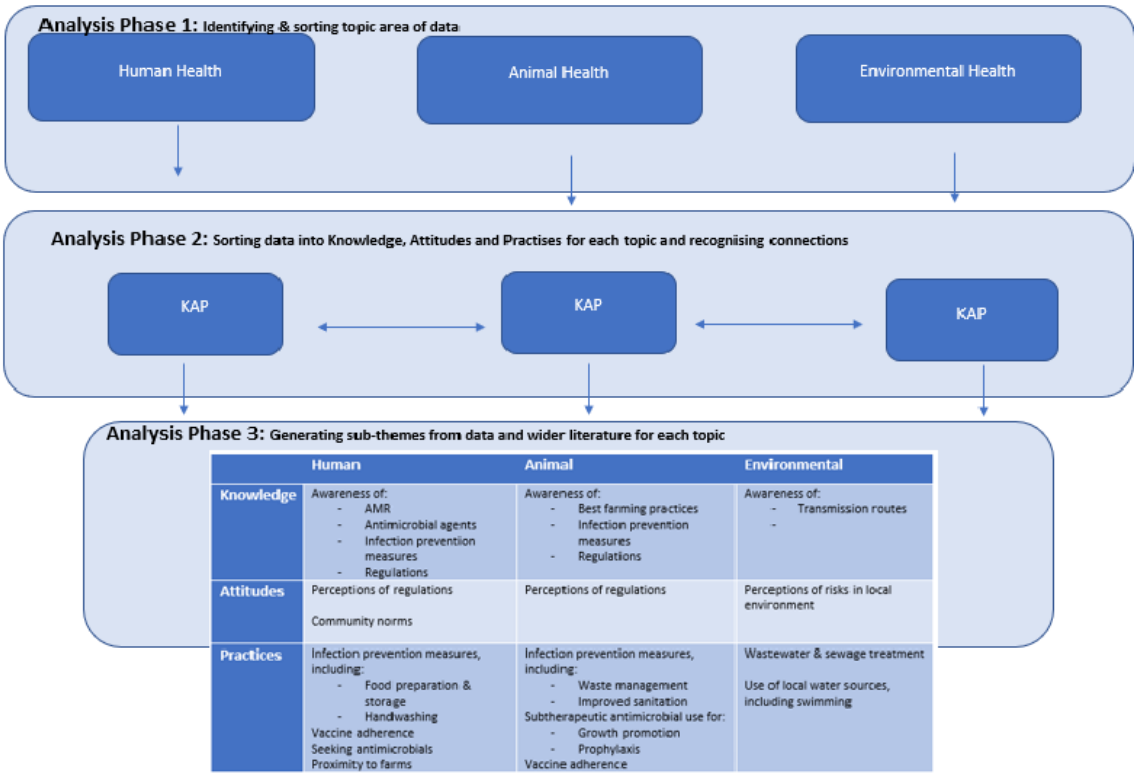
Research Objective 2: To develop a framework for analysing a qualitative data set for One Health AMR driving behaviours at the community level

The One Health approach holistically considers the drivers, as well as the solutions to AMR, at the global level. As resistance to treatment builds across multiple strains of harmful bacteria, our behaviours drive AMR at ever-increasing rates. Any interventions to slow the spread of AMR require multi-agency cooperation, prolonged and concentrated efforts to educate the public on infection prevention, sustainable consumption and safe disposal of antimicrobials and strong policly-level regulations (Moran, 2017). AMR is largely driven by the inappropriate use of antimicrobials (across both human and animal/agricultural health sectors); a human behaviour that will take much effort to change (WHO, 2018f).

While global guidelines can inform regional and national governments on best practices, community generated solutions to local issues with antimicrobial and antibiotic misuse are essential to effect behaviour change (Chhorvoin Om, 2017; Anna K. Barker, 2017; Peng et al., 2018). The most recent IAC report, though, makes no mention of community engagement. There is one reference to engaging ‘civil society’ for more effective action against AMR (IACG, 2019). It is imperative that we use community engagement to first understand then address the community-level barriers to optimising antimicrobial usage. Community engagement offers an opportunity to

develop an applied understanding of One Health principles as experienced within communities on a daily basis.

In Chapter 3 an analysis framework was developed and applied to the CARAN data to pull out animal and environmental themes from this data. The framework, below, was developed through multiple iterations of wider reading and CARAN data analysis.



	Human	Animal	Environmental
Knowledge	Awareness of: - AMR - Antimicrobial agents - Infection prevention measures - Regulations	Awareness of: - Best farming practices - Infection prevention measures - Regulations	Awareness of: - Transmission routes -
Attitudes	Perceptions of regulations Community norms	Perceptions of regulations	Perceptions of risks in local environment
Practices	Infection prevention measures, including: - Food preparation & storage - Handwashing Vaccine adherence Seeking antimicrobials Proximity to farms	Infection prevention measures, including: - Waste management - Improved sanitation Subtherapeutic antimicrobial use for: - Growth promotion - Prophylaxis Vaccine adherence	Wastewater & sewage treatment Use of local water sources, including swimming

Figure 16 - One Health analysis framework

The analysis, presented in Chapter 3 found key information relating specifically to different One Health drivers of AMR at the community level. A strong focus on all three One Health sectors from the outset of a research project at the community level, using this framework, could enhance the findings of a CE project. Furthermore, applying a One Health lens to a project from its inception would align a project with the global agenda on AMR and make findings more widely relevant to the public health literature.

Key recommendations

Key recommendations for future research include a focus on One Health concepts from the very beginning of AMR-related research projects. While the focus of a study may be routed in one dimension of One Health, the above analysis shows the value of applying a One Health lens to data analysis. While it might not be feasible for a project to consider all One Health elements of their study community, a careful reflection on the intersections between human animal and environmental health locally would provide researchers with essential contextual information. Furthermore, a focus on AMR at the community level might find the separation of different one health elements challenging, given that many communities share close proximity to their livestock and have various uses for animal waste, both in agriculture as fertiliser and around the home as fuel and building material. The CARAN project, as previously stated, focussed on human health drivers of AMR but still yielded much information on animal and environmental drivers of AMR at the community level as a direct result of the intersectional nature of community life in those settings. Future research should be planned to reflect the intersectional and multifaceted nature of daily life, especially for those living in communities where animal rearing is commonplace.

This framework illustrates the value of a One Health focus on qualitative, community level data analysis. The findings from this framework, presented in Chapter 4, suggest that placing an intersectional, One Health focus at every stage of a community engagement project could enhance the detail of findings. This framework should be developed further, outside of the Nepal context, to ensure its applicability to other settings and widen the list of sub-themes for each of the three sectors. There are currently no similar frameworks in the wider literature on this topic, therefore it is not possible to compare its effectiveness to other frameworks analysing similar datasets. Further development, using community-level data from different settings, could enhance the sub-themes within the framework and ensure its appropriateness in multiple settings.

Research Objective 3: To unpack the relationship between gender and AMR driving behaviours in a community setting

Though predetermined by biological sex, issues around gender are based in behaviours. Chapter 1 outlined the need for a gendered lens when looking at health seeking behaviours that drive AMR at the community level. In communities where patriarchal values are prominent, boys and men are often prioritised for treatment over female family members (Barasa, 2019). Gendered behaviours and norms shape health needs and use of medications through access to and utilisation of health services, decision-making power, access to and control over resources (including paid employment) as well as risk behaviours in relation to the seeking and use of antibiotics and antimicrobials (ReAct, 2020).

Patterns in infectious disease spread, including antimicrobial resistant infections, are deeply influenced by the social and political dynamics of a community (WHO, 2015b). The Intersections between gender and other social elements, such as poverty, work division, roles in a community, need to be better understood in the fight against antimicrobial resistant infections (White and Hughes, 2019). Health systems research, with a gendered lens, can provide insights into areas where health experiences differ by gender. A 2018 WHO bulletin identified multiple areas where SDGs 3 (health) and 5 (gender) intersect, including social determinants, health behaviours and health systems. Under health systems issues, women can experience barriers in health education, employment opportunities (limited income), governance issues, gender roles etc (Manandhar et al., 2018). Health systems research must take gender (and sex) into account when looking at all areas of health behaviours and outcomes in a community (Johnson et al., 2009). Gender inequality can also negatively impact men's health, in particular men have lower life expectancies and are more likely to engage in unhealthy behaviours as a result of various social norms (Sen and Östlin, 2008). If gender can influence every part of an individual's health experiences (Östlin et al., 2006), then this extends to all attitude and practises that relate to AMR drivers and reducers.

When considering community-level AMR drivers through a One Health lens, it is possible to see where issues of gender intersect with specific agricultural and environmental factors. In farming and agriculture, only 13% of landowners are women (UNDP, 2021). However, women typically tend to livestock more than men and make

up around two thirds of all poor livestock farmers (ILRI, 2021). A 2007 study of farmers in the Philippines found that female farmers had high a prevalence of respiratory infections due to exposure to harmful chemicals from activities such as manuring, ploughing and plant protection (Lu, 2007). In contrast, the male farmers in the same study were most likely to experience back pain, reflecting the nature of gendered roles within farm work (Lu, 2007; ILRI, 2021). Men are more likely to be landowners and therefore are prioritised by animal health services to receive access to medications and information on animal care (ILRI, 2021). Female farm work is often unacknowledged (Shortall, 2006; Whatmore, 2016).

Key recommendations

The analysis presented in Chapter 5 identifies multiple areas of the health system that must be researched through a gendered lens when considering AMR drivers. Contradictions in responses from participants provide an opportunity to identify possible areas of focus for later research – access to information and services, childcare, decision-making etc. With regard to the data used in this thesis, given that these contradictions appear most strongly when comparing the films to workshop transcripts, this analysis highlights the value in considering community-produced films as valid and rich data to be analysed alongside traditional transcript data. Researchers in future projects should, though, carefully consider the implicit and explicit messaging included within films and aim to unpack any gendered norms with participants during workshops. Future work that centres gender at all stages of a project could aim to identify where participants reproduce harmful narratives and use those opportunities to discuss potential alternatives that still share their chosen messages. Researchers must critically reflect on the ways that AMR messaging is shared; messages that are locally appropriate but that neglect to consider nuances around, for example, locally-held traditions and power dynamics have the potential to reproduce potentially harmful gendered stereotypes. Placing gender as a central focus within PV in AMR projects could promote equity within the research process and in the messages communicated through the films produced by community members.

Limitations

As described in Chapter 3, the original CARAN project did not focus on gender or One Health explicitly. As a result, the dataset used in this thesis is limited by the original

aims of the project; to look widely at community level drivers of AMR. Through early readings of the data, it became apparent that there was evidence of both One Health and gendered themes within the data, though these were not always fully explored/probed by researchers. This thesis, and the analyses presented within it, use the CARAN data as an illustration that these foci are essential to both identifying key drivers of AMR and potential solutions to those drivers.

This chapter has presented the main findings of exploring One Health and gendered dimensions within a community engagement project (CARAN) and highlights the value of using these themes to shape future research to created a more nuanced view of community-level drivers of AMR. This chapter has summarised the findings and outputs from Research Objectives 1-3. The final research objective aims to apply these outcomes to a facilitator's manual. This manual, described in the next chapter, aims to act as a toolkit for future PV in AMR researchers.

Chapter 8 – Applying Research Findings to a Toolkit

Introduction

This chapter will present the most significant additions to a toolkit for facilitators/researchers conducting PV in AMR research projects. The previous chapter presented a summary of the main findings of this thesis for research objectives 1-3. To illustrate the application of these findings, this chapter will present sections from a facilitator's manual, revised during the process of this PhD project.

Revisions to Facilitators manual

As described in Chapter 3: Methodology, one primary output from this PhD project is a revised facilitator's manual. The findings from this PhD informed the development of a second iteration of the manual (originally called the CARAN user's manual) to incorporate detail around One Health approaches to understanding AMR, the gendered dynamics of behaviours that drive AMR and detail around evaluation processes. As stated in Chapter 3: Methodology the first iteration of the manual was designed as a working document, to be updated as our shared understanding of the complexities around community-level drivers of AMR developed. The original manual, created prior to this PhD project, can be found here:

https://ce4amr.leeds.ac.uk/wp-content/uploads/sites/84/2019/11/CARAN-manual-version-1.1-1-min.pdf

The review process was approached pragmatically; guided by a desire to generate useful knowledge using iterative cycles of abductive reasoning (Feilzer, 2009). Pragmatism, in this review and revision process, allowed for a clear focus on the needs and perspectives of those the next iteration of the manual was designed to guide (stakeholders) and aimed to integrate research with practice (Glasgow, 2013). Using this approach, the original manual was reviewed at key stages of this PhD project with the aim of reshaping specific sections as needed. Within each of the chapters, specific learning and resources were developed that were considered for inclusion into the revised manual. Initial stages focussed on meetings and feedback sessions with CARAN team members, then later developed into wider meetings with key stakeholders in larger projects across the One Health sectors. This process is discussed in detail in

Chapter 3: Methodology so will not be reiterated here. Instead, this chapter will focus on summarising findings and presenting how these findings were incorporated into specific pages within the revised manual.

Please find a full copy of the manual here: Appendices

Below is a summary table of the large additions revisions:

Manual changes summary		
Introduction sections	**Nature of change**	**Rationale**
Move away from language directly related to CARAN process	Change nature of language throughout manual, instead of directly relaying the CARAN language should be broadly applicable to many settings and use CARAN as an example where appropriate	To apply more broadly to other teams and groups – this next iteration is a guide on best practice with examples from the field instead of a recounting of experiences in Nepal only.
	Include a summary of the CARAN project	To provide context for the reader
Move from ABR to AMR	Consistent change in language throughout existing passages included in intro sections	From wider reading, current global concern is with AMR - national action plans aim to address AMR widely rather than ABR specifically. Also, focus on the larger AMR issue is more applicable to wider audiences (e.g., some areas use antifungals more than antibiotics)
	Include current literature on AMR - what the issue is, what the drivers are, what different stakeholders can do	Updated figures and more detailed information that discusses AMR.

Incorporate One Health	Include current literature on One Health Approach - summary on human, animal, and environmental sectors	From wider literature and research outcomes of thesis, current global focus on interdisciplinary work in AMR - OH approach considered the best way forwards. Summaries of each OH sector should assume that researchers come from multiple backgrounds and therefore might not be familiar with transmission and treatment routes for all three sectors.
Stakeholders	Include guidance on stakeholder mapping	From feedback meetings - useful as a guide for facilitators who are not experienced in community engagement or familiar with study community
	Include one-page guidance on initial stakeholder engagement methods	From feedback - to link to existing CE4AMR handbook guiding community engagement work. Guidance for facilitators who are not experienced in engagement or community work
AMR and Intersectionality	Include passage here on gender and AMR - considerations and current understanding	From research findings of thesis - a need for a clear focus and consideration of gendered behaviours around the seeking and use of AMs at community level
	Include passage on AMR and age - considerations and current understanding	From research findings of CARAN analysis by team-member (JM)
Guidance on community engagement	Include guidance from wider literature on best practices for CE methods	From wider literature, work from partner researchers & feedback from CARAN team - to include a table of core values and principles when conducting CE research. To guide researchers who are not experienced in CE work.

Implementation of project	Nature of change	Rationale
Consent	Include a page guiding on consent process	From feedback - to reflect the complex levels of consent (e.g., from workshop participants, people being filmed, FGD participants)
A guide for Facilitator 2	Include a page to guide F2 on note taking and observations	From feedback and research outcomes from thesis - helpful to direct observations especially for facilitators with less experience. Can act as guidance for facilitator team to take notes on specific aspects of a workshop e.g., gendered dynamics
	An example table for notes	From feedback - useful to give an example to facilitation team on how to organise reflective notes for easier analysis at later stages
Potential adaptations - workshop 2	Include a page giving an example of a project that adapted these methods	From feedback - useful for researchers to see the flexibility in these activities & gives example outside of CARAN experiences
Potential adaptations & additional activity - workshop 3	Include an activity on definitions (AMR specific definitions and other medical terminology in local dialects)	From feedback and training sessions - this process was informal during CARAN project but would be useful as a formal activity to guide facilitators when discussing AMR terms with participants. Discussions around translations also highlight a need to develop a shared understanding as terms like AMR are not directly translatable into many languages
	Adaptation of WHO quiz - to incorporate other OH elements more	From wider literature and feedback - a need for a clear focus on all OH areas wherever possible.

Monitoring & Evaluation	Nature of change	Rationale
Move some of core stakeholder engagement information to intro sections	Keep messaging around engagement of stakeholders - move to intro	To provide instructions in a linear way - from feedback
Interdisciplinary evaluation	Include a page on the nature and importance of interdisciplinary evaluation	From research outcomes of thesis - summary of chapter 6.
	include PV evaluation framework	From research outcomes of thesis - summary of chapter 6. From feedback, researchers can sue guidance on points of evaluation to guide write-up stages.
	Include page on who benefits from evaluation	From wider reading - considering the layers of evaluation and who benefits from each. Helps to shape research outputs (e.g., what is considered as a positive outcome for participants, researchers, policymakers etc and how can we measure?)

As discussed in Chapter 3: methodology, one key area for revision was in adapting the language of the original manual away from ABR specifically and towards AMR more broadly. This, as with other additions, was reviewed by wider team members at key stages and feedback was solicited. Changes to the text were made consistently throughout the manual but are most notable in the introductory section where AMR is introduced and described. To give an overview of the changes, below is a series of pages, first from the original manual discussing ABR only, then from the revised manual where AMR is introduced and described. When comparing the two manuals, there are also changes in ordering; the original manual contained information on stakeholders towards the end where the revised version contains such information and guidance directly after introducing AMR. Furthermore, additional information around the One Health Approach was added to the revised manual, presented in more detail later in this chapter.

AN OVERVIEW OF ANTIBIOTIC RESISTANCE

WHAT ARE BACTERIA?

Bacteria are some of the smallest forms of life. They are too small to see with the human eye. They live all around us (including in the soil, air and water). Millions live in and on our bodies. Most are not dangerous to humans and many keep us healthy such as gut bacteria that help us digest food. Less than 1% make us sick. Diseases caused by bacteria include tuberculosis, tetanus, cholera, diphtheria, gonorrhoea and urinary tract infections.

WHAT ARE ANTIBIOTICS?

Antibiotics are drugs used to prevent and treat infections caused by bacteria in humans and animals. Depending upon their type, they work by either killing the bacteria or stopping their reproduction. When clinically-appropriate, antibiotics must be used to cure bacterial infections in humans and animals. This prevents morbidity (ill-health from the infection) and mortality (death), both for the affected individual and to prevent the spread of infectious disease and thus morbidity and mortality to others. A large proportion of antibiotics taken by humans and animals pass through their systems unchanged and then enter the environment.

WHAT IS ANTIBIOTIC RESISTANCE?

ABR occurs when bacteria become resistant to antibiotics, i.e. the antibiotics are not effective against them. Some people mistakenly think that people or animals become resistant to antibiotics when in fact it is the bacteria themselves that become resistant.

HOW DO BACTERIA BECOME RESISTANT TO ANTIBIOTICS?

There are three mechanisms that enable bacteria to become resistant to one or more antibiotics:

- **Some bacteria have natural resistance against certain type of antibiotics.**
- **Some bacteria develop resistance through their genes mutating.**
- **Some bacteria acquire resistance from other bacteria by sharing genes.**

These mechanisms occur naturally but the use of antibiotics speeds up this process by applying 'selective pressure'. When bacteria resistant to a particular antibiotic come into contact with that antibiotic they are no longer killed. Over time, these resistant bacteria become more common whilst the non-resistant bacteria, which are killed off by the antibiotic, become less common. Thus the use of antibiotics increases the 'selective pressure' and promotes the survival of resistant bacteria. As resistant bacteria reproduce, their offspring have the same resistance genes.

WHAT ARE THE CONSEQUENCES OF ANTIBIOTIC RESISTANCE?

When bacteria become resistant to a certain antibiotic, the antibiotic is no longer effective against the bacteria. This means that the infections caused by resistant bacteria may be harder to treat or – in a worst case-scenario – not treatable. Therefore, people will experience more ill-health or even death from infections which were used to be treated by the antibiotics before the bacteria became resistant. They will have to stay longer in hospital, pay higher health costs and experience greater consequences of ill-health, such as loss of earnings. Some procedures, such as caesarian sections or surgery; some illnesses such as immunosuppressive diseases e.g. HIV; and other treatments such as renal transplants or chemotherapy will become much more dangerous without effective antibiotics to prevent or treat infections.

THE IMPORTANCE OF ADDRESSING ANTIOBIOTIC USE, MISUSE/ABUSE, AND ANTIBIOTIC RESISTANCE

Tackling antibiotic misuse/abuse and ABR are global priorities. They are some of the biggest threats to global health, food security and development. ABR is rising to dangerously high levels in all parts of the world. It can affect anyone, of any age, in any country. Given the ease and frequency with which people now travel, ABR is a global problem, requiring efforts from all nations and all walks of life. ABR is a major problem now and will get worse if it is not addressed. We all have a responsibility to think about and address ABR. We know that certain behaviours and circumstances makes the situation worse:

CONTRIBUTORS THAT EXACERBATE ANTIBIOTIC RESISTANCE:

- MISUSE, OVERUSE AND UNDERUSE OF ANTIBIOTICS.
- AVAILABILITY OF ANTIBIOTICS FOR HUMAN OR ANIMAL USE WITHOUT PRESCRIPTIONS.
- LACK OF STANDARD TREATMENT GUIDELINES, LEADING TO OVERPRESCRIBING BY HEALTHCARE WORKERS AND VETS AND, AS A RESULT, OVERUSE BY THE PUBLIC.
- LACK OF KNOWLEDGE ON ABR IN THE PARAPROFESSIONALS AND PHARMACY STAFF
  POOR INFECTION PREVENTION AND CONTROL MEASURES

Figure 17 - Excerpt from original manual (ABR information pages)

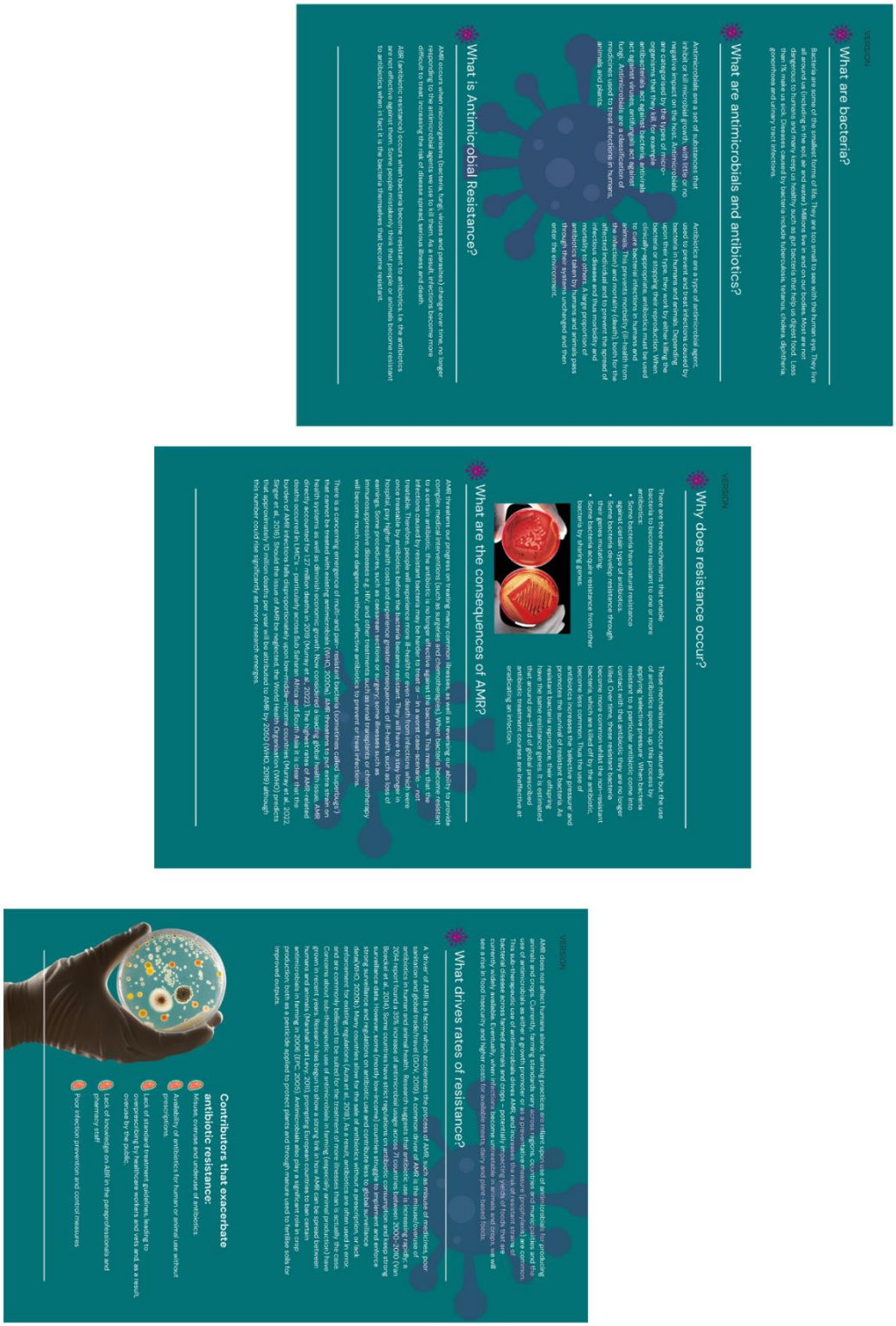


Figure 18 - Excerpt from revised manual (AMR information pages)

For more detailed information, below are the introductory pages added to the revised manual, following a similar format to the original manual but enhanced to include AMR facts and drivers more broadly:

VERSION

What are bacteria?

Bacteria are some of the smallest forms of life. They are too small to see with the human eye. They live all around us (including in the soil, air and water). Millions live in and on our bodies. Most are not dangerous to humans and many keep us healthy such as gut bacteria that help us digest food. Less than 1% make us sick. Diseases caused by bacteria include tuberculosis, tetanus, cholera, diphtheria, gonorrhoea and urinary tract infections.

What are antimicrobials and antibiotics?

Antimicrobials are a set of substances that inhibit or kill microbial growth, with little or no negative impact on the host. Antimicrobials are categorised by the types of micro-organisms that they kill, for example antibacterials act against bacteria, antivirals act against viruses, antifungals act against fungi. Antimicrobials are a classification of medicines used to treat infections in humans, animals and plants.

Antibiotics are a type of antimicrobial agent, used to prevent and treat infections caused by bacteria in humans and animals. Depending upon their type, they work by either killing the bacteria or stopping their reproduction. When clinically-appropriate, antibiotics must be used to cure bacterial infections in humans and animals. This prevents morbidity (ill-health from the infection) and mortality (death), both for the affected individual and to prevent the spread of infectious disease and thus morbidity and mortality to others. A large proportion of antibiotics taken by humans and animals pass through their systems unchanged and then enter the environment.

What is Antimicrobial Resistance?

AMR occurs when microorganisms (bacteria, fungi, viruses and parasites) change over time, no longer responding to the antimicrobial agents we use to kill them. As a result, infections become more difficult to treat; increasing the risk of disease spread, serious illness and death.

ABR (antibiotic resistance) occurs when bacteria become resistant to antibiotics. I.e. the antibiotics are not effective against them. Some people mistakenly think that people or animals become resistant to antibiotics when in fact it is the bacteria themselves that become resistant.

VERSION

Why does resistance occur?

There are three mechanisms that enable bacteria to become resistant to one or more antibiotics:

- Some bacteria have natural resistance against certain type of antibiotics.
- Some bacteria develop resistance through their genes mutating.
- Some bacteria acquire resistance from other bacteria by sharing genes.

These mechanisms occur naturally but the use of antibiotics speeds up this process by applying 'selective pressure'. When bacteria resistant to a particular antibiotic come into contact with that antibiotic they are no longer killed. Over time, these resistant bacteria become more common whilst the non-resistant bacteria, which are killed off by the antibiotic, become less common. Thus the use of antibiotics increases the 'selective pressure' and promotes the survival of resistant bacteria. As resistant bacteria reproduce, their offspring have the same resistance genes. It is estimated that around one-third of global prescribed antibiotic treatment courses are ineffective at eradicating an infection.

What are the consequences of AMR?

AMR threatens our progress on treating many common illnesses, as well as reversing our ability to provide complex medical interventions (such as surgeries and chemotherapies). When bacteria become resistant to a certain antibiotic, the antibiotic is no longer effective against the bacteria. This means that the infections caused by resistant bacteria may be harder to treat or – in a worst case-scenario – not treatable. Therefore, people will experience more ill-health or even death from infections which were once treatable by antibiotics before the bacteria became resistant. They will have to stay longer in hospital, pay higher health costs and experience greater consequences of ill-health, such as loss of earnings. Some procedures, such as caesarean sections or surgery; some illnesses such as immunosuppressive diseases e.g. HIV; and other treatments such as renal transplants or chemotherapy will become much more dangerous without effective antibiotics to prevent or treat infections.

There is a concerning emergence of multi-and pan- resistant bacteria (sometimes called 'superbugs') that cannot be treated with existing antimicrobials (WHO, 2020a). AMR threatens to put extra strain on health systems as well as diminish economic growth. Now considered a leading global health issue, AMR directly accounted for 1.27 million deaths in 2019 (Murray et al., 2022). The highest rates of AMR-related deaths occurred in LMIC's – particularly across Sub Saharan Africa and South Asia it is clear that the burden of AMR infections falls disproportionately upon low-middle-income countries (Murray et al., 2022, Singer et al., 2016). Should the issue of AMR be neglected, the World Health Organisation (WHO) predicts that approximately 10 million deaths per year will be attributed to AMR by 2050 (WHO, 2019) although this number could rise significantly as more research emerges.

VERSION

AMR does not affect humans alone; farming practices are reliant upon use of antimicrobials for producing animals and crops. Currently, farming standards vary across regions, countries and municipalities and the use of antimicrobials as either a growth promoter or as a preventative measure (prophylaxis) are common. This sub-therapeutic use of antimicrobials drives AMR, and increases the risk of resistant strains of bacterial disease across farmed animals and crops – potentially impacting yields of foods that are currently widely available. Eventually, when infections become untreatable in animals and crops, we will see a rise in food insecurity and higher costs for available meats, dairy and plant-based foods.

What drives rates of resistance?

A 'driver' of AMR is a factor which accelerates the process of AMR, such as misuse of medicines, poor sanitation and global trade/travel (GOV, 2019). A common driver of AMR is the misuse/overuse of antibiotics in human and animal health. Research suggests that antibiotic use is increasing rapidly; a 2014 report found a 35% increase of antimicrobial usage across 71 countries between 2000-2010 (Van Boeckel et al., 2014). Some countries have strict regulations on antibiotic consumption and keep strong surveillance data. However, some (mostly low-income) countries struggle to implement and enforce strong surveillance and regulations on antibiotic use and contribute less to global surveillance data(WHO, 2020b). Many countries allow for the sale of antibiotics without a prescription, or lack enforcement for existing regulations (Auta et al., 2018). As a result, antibiotics are often used in error, and are commonly believed to be suited for the treatment of more illnesses than is actually the case. Concerns about sub-therapeutic use of antimicrobials in farming (especially animal production) have grown in recent years. Research has begun to show a strong link in how AMR can be spread between humans and animals (Marshall and Levy, 2011), prompting European countries to ban certain antimicrobials in farming in 2006 (EPC, 2005). Antimicrobials also play a significant role in crop production; both as a pesticide applied to protect plants and through manure used to fertilise soils for improved outputs.

Contributors that exacerbate antibiotic resistance:

- Misuse, overuse and underuse of antibiotics.
- Availability of antibiotics for human or animal use without prescriptions.
- Lack of standard treatment guidelines, leading to overprescribing by healthcare workers and vets and, as a result, overuse by the public.
- Lack of knowledge on ABR in the paraprofessionals and pharmacy staff
- Poor infection prevention and control measures

From discussions with the CARAN team, alongside facilitators who had used key parts of the original manual in their own research, it was identified that guidance for facilitators conducting workshops would be useful. Guidance for facilitators would benefit the facilitation team in identifying key roles as well as increase reflective notes and data for later evaluation. Further reading around the importance of guidance for especially novice qualitative researchers highlighted a need for careful focus for any observations made by facilitators/researchers (Moser and Korstjens, 2018). Here, the term novice applies to inexperienced researchers (for example at the masters level) or researchers experienced in other fields (such as qualitative data collection and analysis) (Moser and Korstjens, 2018). The first additional page with this topic prompts the facilitators to consider what they are observing, how and why. This page aims to briefly prompt facilitators to record behaviours as they witness them, capturing notes on behaviours that are routine in the participant group and therefore unlikely to be reflected on by participants themselves (Merriam and Tisdell, 2015). The second additional page acts as an example for facilitators to log structured and selective (Moser and Korstjens, 2018) observational notes on specific elements of the workshops they are observing:

VERSION

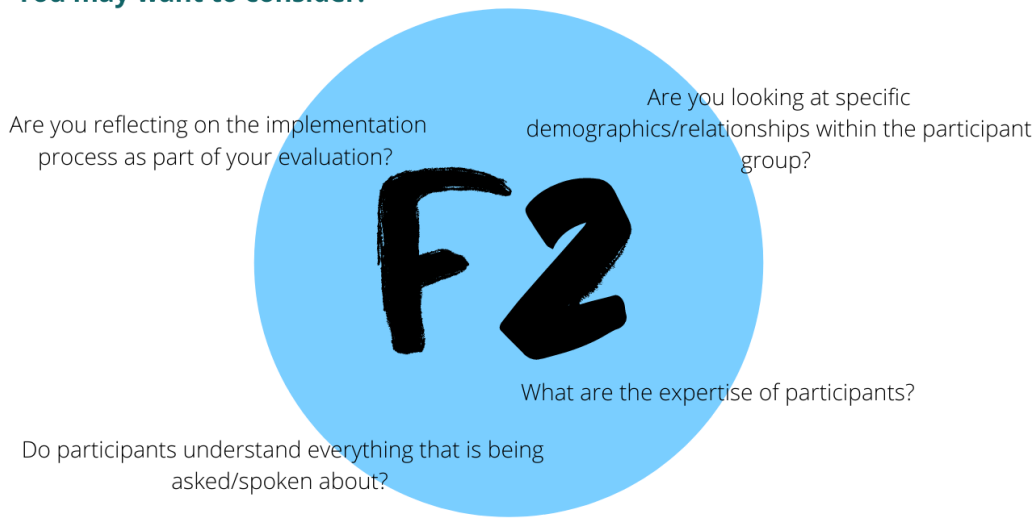
A guide for F2

Tips on making effective observational notes

As a Facilitator, you are expected to make accurate and useful observational notes during workshop sessions. It will be useful to speak as a team before workshops to make sure all facilitators understand what is expected from their notes, as well as how they will be used.

Establishing the aim of each observation session will help to gather the most useful data; discussing within the facilitator team will ensure that each facilitator is clear on they aims of their observations and the types of notes they should take. For example, some activities may require observations on group dynamics during activities (to evaluate the process of the implementation) and some activities may require observations on topics mentioned by participants (to be revisited in later activities).

You may want to consider:



During planning and recruitment stages, consider:

- What training might facilitators need?
- What experience do facilitators have?
- What materials do you need to enable facilitators to conduct their roles? *E.g do you need a table for observations? Do you need to record all sessions?*

VERSION

Organising, storing and sharing observations

Consider how to organise observations according to their function;
- Might it be useful to draft a standard table for paper notes?
- Are you using an electronic platform to make and share notes? *If so, how are you making it secure?*
- Is there a specific focus of your observations? (*eg gender roles*)

An example:

Session:
Activity:
Participants:

Observer:

Interactions between participants:	AMR topics to be revisited :	Group reaction to activities/topics:	Issues raised with activity?

It might be useful to allocate timekeeping activities to F2, to ensure activities do not run over

The final stage of development for this iteration of the manual was a training session, delivered to a team of future PV facilitators based in Bangladesh (ARK Foundation). This training took place as part of a research fellowship in the COSTAR project; a community engagement and AMR project, based in Nepal and Bangladesh, that has been informed partly by the work of the CARAN project. The COSTAR project seeks to co-produce community-led resources and solutions to the complex and context-specific drivers of AMR (CE4AMR, 2022). Each of the team members receiving training were experienced community engagement practitioners but had never conducted PV work before. With support from team members at the University of Leeds and HERDi, I facilitated a 1-week online training programme that used the most recent version of the manual as a guide. Each of the daily sessions was designed to engage ARK team members in activities included in the manual, as well as prompt discussions and feedback sessions around the introductory sections of the manual. The sessions prompted additions in the text which sought to clarify some activities, particularly around the phrasing in activity descriptions. Additionally, the discussions during feedback sessions prompted the development of one new activity, to be undertaken with workshop participants during a PV workshop project. The new activity focusses on developing shared understanding and definitions for medical and scientific terms, as participants in the workshops highlighted a difficulty in translating often western terminologies into context-specific language.

Below is the new activity, developed after these sessions and guided by feedback via email exchanges:

WORKSHOP 3 – ACTIVITY 2: ESTABLISHING SHARED TERMS: INTRODUCING TECHNICAL LANGUAGE

To establish the commonly used terms for antibiotics, antimicrobials and other drugs across human, animal and environmental sectors. To create an understanding of technical terms

Short discussion on drug types, reflection and discussion.

Group sit around in a circle

Capture the activity and document the process for evaluation

F1 Running/Explaining the activities. F1 to keep the mood light

F2 responsible for documentation (film, notes, stills…) making observational notes and timekeeping.

Pens and paper, strips/boxes of antimicrobials and other common drugs

Antimicrobial substances, such as antibiotics, are commonly used across human and animal health. Participants should be familiar with these types of drugs, but may not use terms like 'antibiotic' to refer to them. It is important that, from this point in the workshop process, participants can utilise specific terminology in order to avoid spreading incorrect messaging through films. For this reason, it's really important for the group to establish shared definitions of specific medical terminology from this point.
Facilitators should, at this point, introduce different drug types to participants to establish an idea of current knowledge levels and common terminology. Facilitators can use open discussions to ensure that all participants have a shared understanding of key terms. Participants should end this session with a clear understanding of what antimicrobial drugs are and what they should be used for.

PROCESS
Make sure to avoid a feeling that you are 'testing' participants – this should feel like an open discussion to maximise honest knowledge exchange. It might be useful to begin this activity with asking participants about how they treat common illnesses.

F1 example questions:
-If you have a headache, what do you do?'
-'If your animal is not eating, what do you do?'

F1 can then introduce the conversation of different drug types to the group. Again, this should be open and conversational. F1 can ask the group about the different drugs they are aware of, what they use them for:
-Be mindful to prompt around all 3 One Health sectors
-This conversation can be helped by passing around examples of different drugs:

F2 could pass around strips/boxes of antimicrobials, paracetamol etc as a prompt to discuss the uses and effects of common drugs

F1 should steer the conversation towards categorising drugs by use, for example:
-Pain relief (in humans and animal)
-Treatments for different illnesses
-Pesticides/ other preventative measures used in agriculture

F1 should begin to ask the group if they are familiar with terms like
-Antibiotic
-Antimicrobial

During these conversations, facilitators should begin to share information on AMR related terminology. Terms like antibiotic, antimicrobial etc should be explained to the group and given locally appropriate examples to provide context, for example:
-Facilitators can provide examples of an occasion where you might use an antibiotic in human/ animal health to help participants to understand

Once terms are clear to participants, it might be useful to document these definitions. Participants can later be reminded of their shared definition of specific terms, should they incorrectly describe AMR-related issues alter in the workshop process.

At the end of this activity, participants should be comfortable using terms like 'antibiotic' and 'antimicrobial' and facilitators should be confident that participants are using those terms correctly.

How CARAN did it:
CARAN facilitators found that their participants used the terms 'drugs' and 'medicines' to describe a wide range of medical substances. Facilitators found that, through open discussions, participants understood that there are different types of drugs for different illnesses, but commonly used these 'umbrella terms' to describe them all. Facilitators took time to listen to participants about their language, then worked with them to first explain the importance of using correct terminology then to establish a shared understanding of terms. Facilitators worked with participants to ensure their understanding of terms like 'antibiotic' was correct, then wrote their definitions on paper that was left in the space for later reference when needed.

Research Objective 1- Participatory Video

The learning from research objective 1 highlighted the potential for using PV methods within health research, particularly in exploring marginalised perspectives of a complex health issue. The review, presented in Chapter 2, also highlighted a need for a robust evaluation tool that takes elements of both PV and public health fields. This finding led to the development of an evaluation framework detailed in Chapter 6: PV in health research.

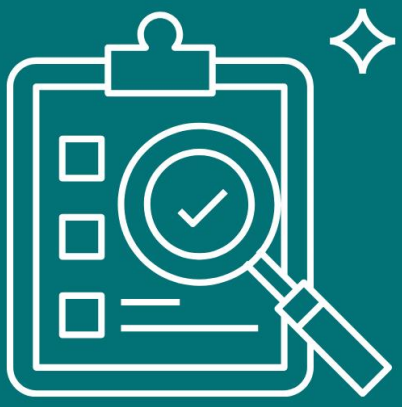
Robust, reliable reporting and evaluation are essential to ensuring PV in health studies is acknowledged for its potential influence on 'ground-up' responses to any given health issue. Where an intervention can truly represent the opinions, needs and issues of a community or group, it can aid in developing community-led, locally acceptable solutions to a health problem that may prove elusive to more traditional health study designs. This framework, though developed through theory, may be applicable to future PV in health research projects that aim to address complex community health issues and can be used in future projects to avoid unnecessary heterogeneity in reporting styles. In reducing this variety in reporting styles, it will be more possible in future to conduct reviews on existing literature that directly compare key elements of each study. Ultimately, if reporting becomes more homogenous, it could lead to a more rigorous evaluation of the wider impacts of PV in health studies.

As an example of the potential use for this framework in future projects, see APPENDIX 5 for a draft of a matrix, created using the above evaluation framework to guide researchers on points of data collection during the PV elements of a current ongoing project – COSTAR.

VERSION

INTERDISCIPLINARY EVALUATION

As an emerging field of research, there is currently no standard practice for shaping, reporting or evaluating PV in health research projects. Evaluation frameworks are a key tool in planning and assessing the value of any research project or intervention.



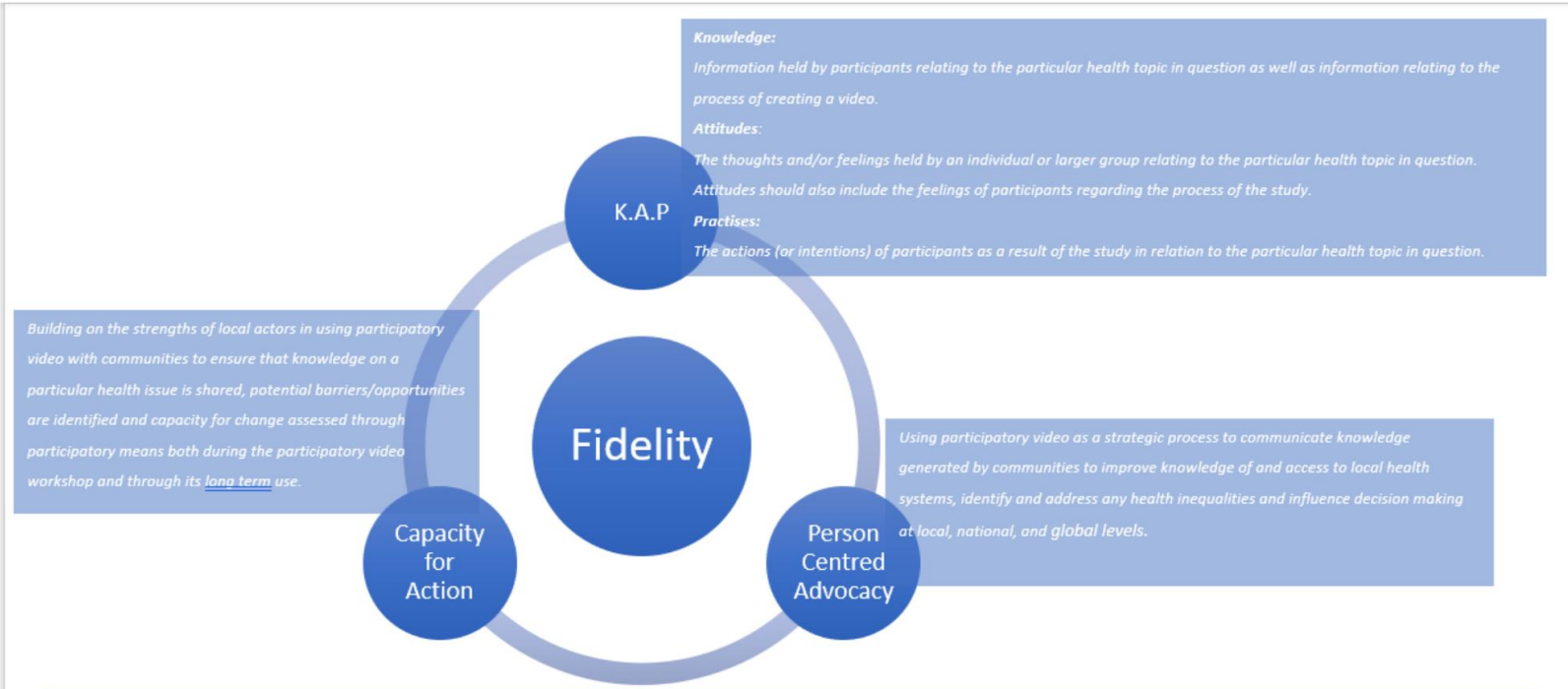
Interdisciplinary research, necessitated by complex behavioural systems (Newell et al., 2001) presents challenges in comprehensive and effective evaluation (Klein and Newell, 1997; Aagaard-Hansen and Henry Ouma, 2002; Gavens et al., 2018). Interdisciplinary health research, though challenging, is needed to further advance our collective knowledge and has become an integral part of global research strategies (Nair et al., 2008; Clarke et al., 2012). Effective interdisciplinary research equips researchers and policy makers with nuanced solutions to complex, multifaceted health problems through approaches that promote impartiality in research approaches (Bindler et al., 2012; Gavens et al., 2018). Interdisciplinary evaluation has the potential to enhance the reliability of knowledge beyond any one specific discipline (Huutoniemi, 2016; Brewer, 1999).

VERSION

INTERDISCIPLINARY EVALUATION

Though challenging, interdisciplinary evaluation is essential to the development of robust and measurably effective CE interventions in AMR research. Interdisciplinarity in public health should be supported at all stages of a PV for AMR study; robust, reliable reporting and evaluation are essential to ensuring PV in health studies are acknowledged for their potential influence on 'ground-up' responses to any given health issue. Where an intervention can truly represent the opinions, needs and issues of a community or group it can aid in developing community-led, locally acceptable solutions to a health problem that may prove elusive to more traditional health study designs.

The following framework was developed as part of a PhD project, it looks to combine the essential elements of both PV and public health evaluation measures to move beyond evaluations based in one disciplinary field alone.



Fidelity

- Adherence:
  - Comprehensiveness of project planning, level of adherence to planned project activities and any strategies put in place by researchers to ensure high adherence levels. This should also include the number of participants took part in the full course of the study.
- Quality:
  - Any strategies put in place by researchers to ensure high quality of the intervention. This should include actions taken by researchers to train those delivering interventions, provide appropriate support and resources and provide appropriate feedback.
- Responsiveness:
  - The extent to which participants and those delivering intervention activities are engaged in the intervention process. Researchers should focus on feedback from participants, feedback from those delivering intervention activities and any direct observations made.

The final page added to the manual from the reflection and revision process outlined above focussed on who benefits from the evaluation of a PV in AMR project. If researchers are aiming to engage stakeholders across multiple sectors of complex communities, researchers must consider the types of data produced, how this can be evaluated and which stakeholder either directly or indirectly benefits from that evaluation. Below are the specific pages of the manual that address these topics: pages 92-95 ‘Monitoring & Evaluation’.

As discussed in Chapter 6; PV Evaluation framework, outcomes and findings from this chapter informed content for a handbook for community engagement researchers undertaking AMR research. The findings from this chapter specifically informed some of the content of section 6 of that handbook, available here:

https://ce4amr.leeds.ac.uk/resources/project-manuals/the-handbook-of-community-engagement-for-antimicrobial-resistance/

In light of this contribution, and to better inform facilitators about key elements of community engagement work, the final page added to the manual on evaluation focuses on who benefits from an evaluation process. Facilitators are asked to consider layers of evaluation and establish

VERSION

WHO BENEFITS FROM THE EVALUATION?

Using the framework provided, it might be useful for your research team to consider which elements of the evaluation process serve the interests of which stakeholder group. The aims and goals of participants were established during Workshop 2 activities, these could act as a guide for evaluating the project from the perspective of participants:

? Have the initial goals stayed the same?

? Have the goals been met? How?

The aims of participants might differ slightly from those of the research team; eg a research team may value generating publishable results more than the studv communitv.

Questions to consider might include:

? What might different stakeholders consider to be markers of 'success' or 'failure' in their own terms

? Do these markers match up with your own?

? How do you strike a balance in priorities here?

? How involved should P's be in this process?

For further reading and guidance on evaluating a community engagement project, see (INSERT LINK TO HANDBOOK)

Research Objective 2 - One Health

The findings from research objective 2 highlighted a need for a ‘bottom up’ approach to understanding multisectoral the drivers of AMR at the community level to better plan and implement interventions. Findings from Chapter 4 suggest that placing a focus on intersectional One Health issues from the beginning of a project would enhance findings. For this reason, the revised manual needed to include information around One Health issues and sectors. Facilitators/researchers within a multidisciplinary team may require introductory information on the basic transmission and treatment routes for antimicrobials and AMR infections within community settings. Information in Chapter 1: Introduction was summarised into a 1-page introduction to the One Health Approach to sensitise researchers to the approach and prompt considerations for factors outside of their primary field of research:

VERSION

One Health

One Health is a tripartite approach between the WHO, OIE and FAO that recognises the interconnectivity between human, animal and environmental health, taking a multisectoral approach to addressing the crises that originate at the intersections between each. Recognised and endorsed globally by the CDC, World Bank, WHO, FAO, OIE, UNSIC as well as universities, NGOs and governmental bodies across the globe the One Health approach is the emerging best practice in addressing the rise in AMR.

Applying a One Health lens when planning and implementing a PV project will help to tailor the intervention to your specific community:

You should consider the study population holistically. Even if your study is based in one of these areas, you should consider the wider context of the area:
- What is the water and sanitation system locally?
- Are there many farms/smallholdings?
-Who provides the majority of human healthcare?

Directly following this page is a sequence of pages presenting typical transmission routes for antimicrobial resistance and infections at the community level. Each page was drafted using information from the literature supporting Chapter 1: Introduction around known patterns of transmission for AMR infections in low-resource settings. Initial drafts of these pages were shared to key members of the CARAN and COSTAR teams for feedback. Each team-member asked to provide feedback was from a relevant field (e.g. veterinary researchers, WASH specialists) and was asked to guide on the language of the text in each page as well as the accuracy of each included message. The full process for the development of these pages is described in Chapter 3: Methodology.

VERSION

One Health: Environment

Climate Change

Changes in the environment present stressors for bacteria, causing them to mutate in order to survive. Increased exposure to higher temperatures, or UV rays can lead to AMR

Factories & Large-scale Producers

Factories and drug producing plants polluting bodies of water

Stressors in the environment, such as pollution from production plants force bacteria to adapt.

Farms & Smallholdings

waste from animals are often used to fertilize crops and feed fish
The antimicrobials present in animal waste transfer to the soil, exposing existing colonies of bacteria to antimicrobials unnecessarily

Hospitals & Health-Posts

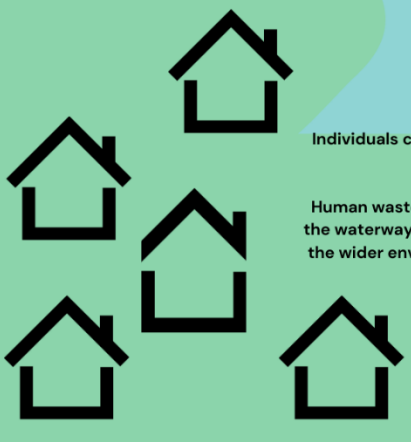
Waste from hospitals and health-posts entering the local environment and waterways

When Antimicrobials are present in waste from hospitals and health posts, they enter into the local environment. This helps to accelerate AMR at the local level

Waste water from farms enter the local environment, either through waterways or seepage from waste areas. The antimicrobials present in this waste spread to local wildlife, plants and humans.

When farm animals are able to roam freely, close to other animals and humans, they might pass along diseases through their waste.

Not much focus has been placed on the impacts of AMR on wild animals



Villages & Towns

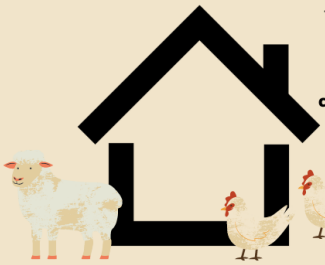
Individuals contribute to AMR in the environment through waste disposal.

Human waste that contains antimicrobials enters the waterways and local environment, spreading to the wider environment through water sources and wild animals

Many communities may preserve well water for drinking yet still wash foods, their hands, clothes and food containers in untreated water.

VERSION

One Health: Animal



Animals in smallholdings are often able to roam freely and interact with other farm or domestic animals. Sometimes animals share the same space as the humans who care for them. Living in close proximity to animals can increase rates of infections, and spread AMR pathogens between species

Strict rules on the sale of meats that have been treated with antimicrobials are not always enforced, meaning communities may be buying treated meats without knowing.
Meat products, if not stored or cooked properly, can contain AMR bacteria that cause various illnesses

Using antimicrobials in foods to promote growth and prevent illness (prophylaxis) exposes bacteria to antimicrobials unneccesarily, promoting selection for stronger bacteria

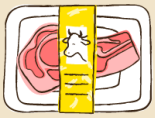
Waste from farm animals is often used as a crop fertilizer or feed for fish in aquaculture.

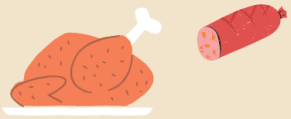
Antimicrobials don't fully break down, instead they transfer to the waste of an animal and enter the local environment.

When waste is digested by other animals, the same antimicrobials that were in the waste are passed along to the other animal.

Wastewater from farms also spreads antimicrobials into the wider environment, affecting local wildlife and other humans

When wild animals have access to livestock feed and waste, antimicrobials spread into wildlife ecosystems





Antimicrobial residues left in meats can pass into humans, then into the environment through waste

When bacteria is allowed to grow on meat, through improper storage and cooking, people can become sick with AMR strains of bacterial illnesses such as E.coli (food poisoning)

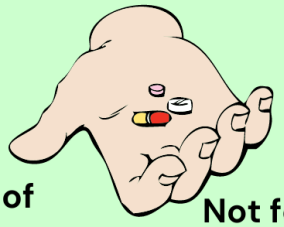
VERSION

One Health: Human

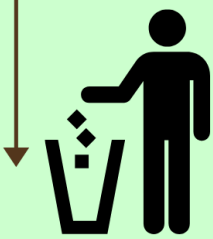
The three main areas of human health behaviour that drive AMR

It is difficult to know what type of infection a person has without diagnostic testing from a medical professional. A person may have a viral infection, and would not get better using antibiotics. Additionally, a person seeking antibiotics without a prescription is at risk of taking an incorrect type, dosage or duration of medication and continue to experience symptoms as a result.

Seeking antibiotics without a prescription



Incorrect disposal of antibiotics



When a full course of antibiotics are taken as directed by a healthcare professional, there are no 'leftover' antibiotics. However, people sometimes buy antibiotics without a prescription, or stop taking their course of antibiotics early. Improper disposal of antibiotics can pollute the local environment exposing colonies of bacteria to antimicrobials unnecessarily and driving AMR locally.

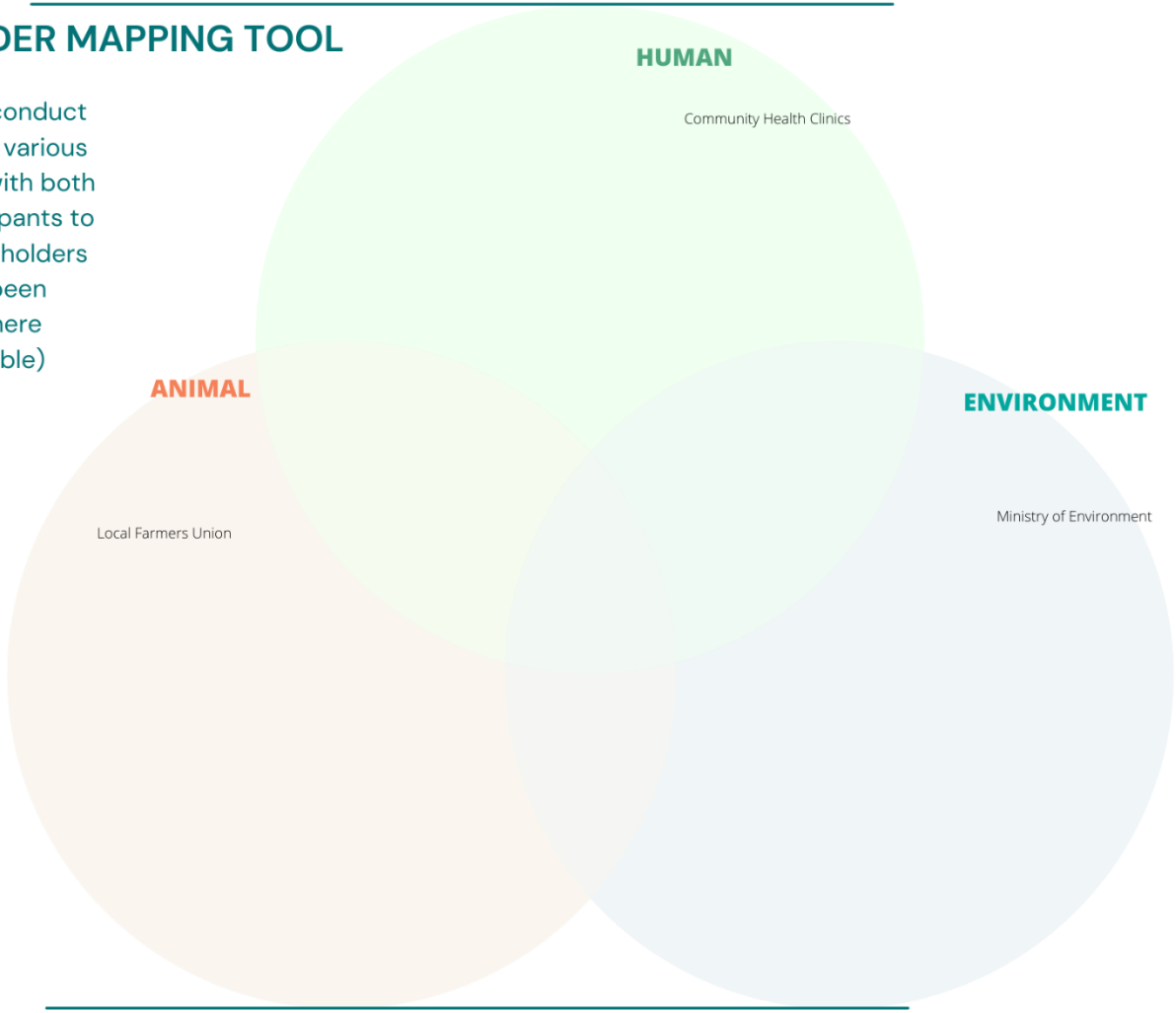
Not following guidance from a health professional

Doctors prescribe a set dosage of antibiotics to kill any bacteria present in a sick patient. A common AMR-driving behaviour occurs when patients decide to stop taking antibiotics once symptoms have eased. This allows the surviving bacteria time to repopulate and can lead to a more difficult-to-treat illness.

The final addition around One Health was in a stakeholder mapping tool, designed to prompt facilitators and workshop participants to consider actors and stakeholders from each of the human, animal, and environmental sectors at different levels. During feedback discussions with facilitators, we reflected on the challenging nature of identifying complex local networks and stakeholders. Should future facilitators/researchers be unfamiliar with community engagement methods, basic tools to prompt discussion might be useful as a starting point for discussions, both during planning stages of a project and during workshop implementation. As a result of this feedback, I drafted a set of designs to guide future facilitators and researchers to consider all three One Health sectors when identifying stakeholders. From feedback, it was decided that a simple Venn diagram style page would represent the interconnected nature of each sector and provide a clear visual prompt for future researchers and facilitators. Below is the page with the final design, included as part of the ‘stakeholders’ section of the manual:

STAKEHOLDER MAPPING TOOL

It might be useful to conduct mapping exercises at various points in your study, with both facilitators and participants to ensure as many stakeholders as possible have been identified and (where appropriate/possible) engaged with.



Research Objective 3 - Gender

The findings from research objective 3 highlight the potential value of placing a gendered lens on PV in AMR research projects. From the CARAN data analysis presented in Chapter 5, multiple areas of gendered behaviours were identified. The findings presented potential opportunities for future interventions and suggests that placing a strong focus on gender at all stages of the research process would strengthen out understanding of the nuances in behaviours that drive AMR at the community level. These findings prompted the inclusion of gender-specific guidance for future facilitators/researchers into the revised manual. Currently, there are no specific analysis frameworks to be included, so the included information highlights the value of looking at intersectionality within AMR research and provides the example of gendered finings within the CARAN project:

VERSION

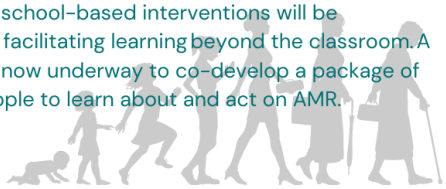
AMR and Intersectionality:

AMR-driving behaviours can be influenced by multiple demographic factors. Our health-seeking behaviours are shaped by our experiences of health systems, which serve different sectors of a population in different ways. Community members may experience barriers to accessing various health services based on gender, age, location, cost etc. These barriers to access can drive misuse of antibiotics and antimicrobials.

When analysing CARAN data, researchers reflected on two key areas for future focus:

Gender:
When analysing CARAN data, gender became an emerging theme that warranted further exploration. A gender-focussed analysis framework was adapted then used to pull gendered themes from the data. Researchers found themes in power dynamics within the participant groups and wider community that highlighted potential reasons for AMR driving trends by gender.

Age:
Transcripts from the CARAN project, featured in this manual's case studies, also reveal some interesting insights into the role of young people within AMR. A forthcoming publication (Mitchell et al 2021) discusses multiple routes for children to influence the global challenge of AMR, through purchasing non-prescription antimicrobials themselves and by being recipients of medication without prescription. Additionally, within the CARAN transcripts there is demonstrable motivation at community level to share the project's resources with school children. This would be an equitable and sustainable use of existing outputs. It also suggests that any school-based interventions will be supported by adults in the community, thus facilitating learning beyond the classroom. A follow-on funding project (AH/T007915/1) is now underway to co-develop a package of educational resources to support young people to learn about and act on AMR.



Considering your study population through various lenses might help to better understand nuances in AMR-driving behaviours. A study community should be viewed with the consideration of how local traditions, beliefs and power structures can influence the behaviours that drive AMR locally. These factors will differ between contexts, local gatekeepers and organisations will be essential to identifying the most relevant demographic factors to consider in your own study.

VERSION

AMR and Gender

Biological sex can influence trends in antibiotic usage and prescription, as can gender and gendered behavioural norms. The term sex is considered biological or anatomical, whereas gender can be viewed as a set of actions based on cultural norms for each sex. Every culture holds traditional and typical ideas of what it is to be male or female, and these norms can impact every aspect of our lives including health. Upholding these gender norms, in health terms, negatively impacts the health of women through lack of bodily and financial autonomy and poorer service provision, where men's health is impacted through negative associations with seeking help and positive associations with risky behaviours. If gender can influence every part of an individual's experiences, then this extends to all attitudes and practices that relate to AMR drivers and reducers. There is a need for research to focus on gendered aspects of behaviours that drive AMR at the individual, household and community levels.

Things to consider:

- What are the typical roles of men and women in your chosen community, and how might those roles interact with different One Health drivers of AMR?
  - How are household infection control tasks designated?
  - Who typically tends to animals?
  - Who typically makes household decisions?

- How does gender intersect with other factors, such as socio-economic status, employment status, age, ethnicity etc

This chapter has presented the most significant changes to the facilitator's manual. Each major finding from the thesis (RO's 1-3) have been incorporated into the facilitator's manual, to act as a toolkit for future PV in AMR researchers. This manual acts as a theoretical introduction to the issue of AMR, a practical guide for conducting PV workshops and as a guide for conducting data collection and evaluation processes within a PV in AMR project. This iteration of the manual, like the original, is designed to be used as a working document. Future work in this field will inform later iterations.

Final conclusions

This thesis has posed AMR as one of the leading health concerns globally (WHO, 2020b; Murray et al., 2022). Although AMR will affect us all, those in LMICs are most directly and profoundly affected (Singer et al., 2016). There is a need for effective collaboration across human, animal and environmental sectors globally to reduce AMR rates (WHO, 2017b). In such collaborations, it is essential to consider and respect the lived experiences of those within LMIC communities. Within AMR research, community engagement projects are a growing area of interest. AMR research should aim to reflect the complex and diverse nature of the issue at multiple levels (Mitchell et al., 2019).

Co-production of knowledge between community members and researchers has the potential to generate new insights into research practices and values, such as justice and equity, that transcend economic value alone (Filipe et al., 2017). As a method of co-production, participatory video is useful for unpacking community perspectives on complex health issues, particularly when seeking the perspectives of those who are often underrepresented(Lunch and Lunch, 2006). PV aims to reduce traditional power dynamics between researchers and participants and ultimately produces films that can be used as a resource to share with policy makers and other key stakeholders. Issues remain though in attempts to effectively measure the health outcomes of PV interventions. The scoping review presented in chapter 2 found that most articles report improvements in empowerment and advocacy, ideas that are difficult to quantify. Herein lies a key challenge in the combination of the two fields; health research requires measurable outputs and replicable reporting measures where arts research does not. Instead, in arts research, reporting is more discursive and exploratory.

There is, as identified throughout this thesis, a need for strong interdisciplinary evaluation measures that respect the core values of both arts and health research fields. This thesis has, in Chapter 6, answered the need for an evaluation tool that highlights

the value of using PV in research in complex health issues. This framework should be used in future projects, to move towards a standardisation that can aid in replicability and reliability of findings. This framework has also been added into a toolkit in the form of a facilitator's manual, developed in this thesis, to act as practical guidance for researchers in this field.

Chapters 1 and 4 of this thesis highlight a need for interdisciplinarity between the three One Health sectors: human, animal, and environmental health. Given that AMR is driven by problematic misuse behaviours across all three sectors (WHO, 2018f) any interventions aiming to slow the spread of AMR require multi-agency cooperation as well as prolonged concentrated efforts to educate the public on infection prevention, sustainable consumption and safe disposal of antimicrobials (Moran, 2017). This thesis has provided an analysis framework, applied to the CARAN data in Chapter 4, that highlighted key areas for future research and policy focus around common local farming practices and opportunities for bespoke interventions. Key recommendations for future research include a focus on One Health concepts from the very beginning of research projects. While it might not be feasible for a project to consider all One Health elements in their study community, researchers should carefully consider key One Health drivers locally and discuss them with participants and other stakeholders. Consideration of local One Health issues, at the planning stages of a project for example, would provide researchers with essential contextual information that might impact the delivery and ultimately the effectiveness of their projects. Furthermore, depending on the community, a focus on AMR at a community level might find the separation of different one health elements challenging. Many communities across LMICs share proximity to their livestock and have various uses for animal waste, both in agriculture as fertiliser and around the home as fuel and building material (Girotto and Cossu, 2017; Loss et al., 2019; Spengler, 2019). The CARAN project, as previously stated, focussed on human health drivers of AMR but still yielded much information on animal and environmental drivers of AMR at the community level as a direct result of the intersectional nature of community life in those settings. Future research should be planned to reflect the intersectional and multifaceted nature of daily life, especially for those living in communities where animal rearing is commonplace.

Finally, this thesis has highlighted the value of looking at the complexities of AMR through a gendered lens. The analysis presented in chapter 5 both presented key

gendered dynamics of AMR-driving behaviours at the community level and the need for a nuanced gendered approach to conducting PV projects. In illustrating current power dynamics within communities and not challenging them within films, the messages within films were (unintentionally) reproduced and reinforced. Responses from participants suggest that experiences of the local health system are heavily gendered at all levels; gender influences who has and does what, how values are refined locally and who decides on issues related to health, especially in relation to seeking antibiotics. When considering this through the lens of AMR, it is important that we learn more about these power dynamics and how to balance them to reduce AMR-driving behaviours. Future research, focussed on gender from the outset, should probe further into issues of gender-based inequalities that relate to the access and use of antibiotics as well as typical roles within the household. Specifically, research is needed to identify and unpack potential AMR-driving behaviours such as the beliefs held around the need for 'strong' antibiotics, how permission-seeking behaviours impact women's and children's health, and what wider socio-economic factors should be considered in AMR messaging.

Ultimately, this thesis has begun to identify and unpack some of the complex behavioural drivers of AMR at the community level and highlighted the value of using PV methods to explore these in future research. It has also highlighted where researchers in this field should use caution; PV outputs, once made publicly available, can be shared far beyond the initial study population where messages may be less relevant or applicable. PV films might be a valuable educational resource within the original study community, but their wider applications (beyond a research tool) must be better understood before any larger conclusions can be drawn.

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Appendix 1: Search Strategy

Search Strategies

Project Name: Participatory video

Date: 16-07-18

Database:

Searched 16/8/18 Monday, July 16, 2018 12:05:56 PM
Interface - EBSCOhost Research Databases
Database - Art Full Text (H.W. Wilson);Communication & Mass Media Complete;MLA International Bibliography;RILM Abstracts of Music Literature;Social Work Abstracts
NOTE: searched together so no Subject headings used. Best

38 S11 AND S37 23 PV & PA in LMICs

S37 S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23 OR S24 OR S25 OR S26 OR S27 OR S28 OR S29 OR S30 OR S31 OR S32 OR S33 OR S34 OR S35 OR S36 515,084

S36 TI (Georgia not (Atlanta or US or USA)) OR AB (Georgia not (Atlanta or US or USA)) 3,725

S35 TI (Montserrat not (Spain or Espana)) OR AB (Montserrat not (Spain or Espana)) 357

S34 TI (Taiwan* or Taipei* or Tajikistan* or Tanzania* or Thai* or Timor* or Tobago or Togo or Tokelau or Tonga or Tinidad or Tunisia* or Turkey or Turkish or Turkmenistan* or "Turks and Caicos" or Tuvalu* or Uganda* or Ukrain* or "United Arab Emirates" or Uruguay* or Uzbekistan* or Vanuatu* or Venezuela* or Vietnam* or "Virgin Is*" or "Wallis and Futuna" or Futuna or "West Bank" or Gaza or Yemen* or Zambia* or Zimbabw*) OR AB (Taiwan* or Taipei* or Tajikistan* or Tanzania* or Thai* or Timor* or Tobago or Togo or Tokelau or Tonga or Tinidad or Tunisia* or Turkey or Turkish or Turkmenistan* or "Turks and Caicos" or Tuvalu* or Uganda* or Ukrain* or "United Arab Emirates" or Uruguay* or Uzbekistan* or Vanuatu* or Venezuela* or Vietnam* or "Virgin Is*" or "Wallis and Futuna" or Futuna or "West Bank" or Gaza or Yemen* or Zambia* or Zimbabw*) 47,281

S33 TI (Samoa* or "Sao Toms*" or Principe* or "Saudi Arabia*" or Senegal* or Serbia* or Seychelles or "Sierra Leone" or Singapor* or Slovak* or Slovenia* or "Solomon Islands" or Somalia* or "Sri Lanka*" or "S* Kitts and Nevis" or "S* Lucia" or "S* Helena" or "S* Vincent and the Grenadines" or "South America*" or Sudan* or Suriname* or Swaziland* or Syria*) OR AB (Samoa* or "Sao Toms*" or Principe* or "Saudi Arabia*" or Senegal* or Serbia* or Seychelles or "Sierra Leone" or Singapor* or Slovak* or Slovenia* or "Solomon Islands" or Somalia* or "Sri Lanka*" or "S* Kitts and Nevis" or "S* Lucia" or "S* Helena" or "S* Vincent and the Grenadines" or "South America*" or Sudan* or Suriname* or Swaziland* or Syria*) 30,859

S32 TI (Namibia* or Nauru* or Niue* or Nepal* or "Netherlands Antilles*" or "New Caledonia*" or Nicaragua* or Niger or Nigeria* or Oman* or Pakistan* or Palau* or Palestin* or Panama or "Papua New Guinea*" or Paraguay or Peru* or Peruvian* or Philippines* or Pilipin* or Filipin* or Poland or Polish or Qatar* or Romania* or Russia* or Rwanda*) OR AB (Namibia* or Nauru* or Niue* or Nepal* or "Netherlands Antilles*" or "New Caledonia*" or Nicaragua* or Niger or Nigeria* or Oman* or Pakistan* or Palau* or Palestin* or Panama or "Papua New Guinea*" or Paraguay or Peru* or Peruvian* or Philippines* or Pilipin* or Filipin* or Poland or Polish or Qatar* or Romania* or Russia* or Rwanda*) 104,495

S31 TI (Macau* or Macao* or Macedonia* or Madagasca* or Malawi* or Malaysia* or Maldives or Mali or Malta or Maltese or "Marshall Islands" or Mauritania* or Mauritius or Mayotte* or Melanesia* or Mexico or Mexican? or Micronesia* or Moldova* or Mongolia* or Montenegro* or Morocco or Moroccan? or Mozambique* or Myanmar*) OR AB (Macau* or Macao* or Macedonia* or Madagasca* or Malawi* or Malaysia* or Maldives or Mali or Malta or Maltese or "Marshall Islands" or Mauritania* or Mauritius or Mayotte* or Melanesia* or Mexico or Mexican? or Micronesia* or Moldova* or Mongolia* or Montenegro* or Morocco or Moroccan? or Mozambique* or Myanmar*) 34,827

S30 TI (Jamaica* or Jordan* or Kazakhstan* or Kenya* or Kiribati* or Korea* or DPRK or Kosovo* or Kuwait* or Kyrgyz* or "Lao PDR" or "Lao People*" or Laos or Laotian or Latvia* or Lebanon or Lebanese or Lesotho or Liberia* or Libya* or Lithuania*) OR AB (Jamaica* or Jordan* or Kazakhstan* or Kenya* or Kiribati* or Korea* or DPRK or Kosovo* or Kuwait* or Kyrgyz* or "Lao PDR" or "Lao People*" or Laos or Laotian or Latvia* or Lebanon or Lebanese or Lesotho or Liberia* or Libya* or Lithuania*) 36,909

S29 TI (Ecuador* or Egypt* or "El Salvador" or Eritrea* or Estonia* or Ethiopia* or "Falklands Is*" or "Fiji* French Polynesia*" or Gabon* or Gambia* or Ghana* or Gibralta* or Grenada* or Guatemala* or Guinea* or Guyana* or Haiti* or "Hondura* Hong Kong*" or Hungary or Hungarian* or India or (Indian? not "American Indian?") or Indonesia* or Iran* or Iraq* or Israel*) OR AB (Ecuador* or Egypt* or "El Salvador" or Eritrea* or Estonia* or Ethiopia* or "Falklands Is*" or "Fiji* French Polynesia*" or Gabon* or Gambia* or Ghana* or Gibralta* or Grenada* or Guatemala* or Guinea* or Guyana* or Haiti* or "Hondura* Hong Kong*" or Hungary or Hungarian* or India or (Indian? not "American Indian?") or Indonesia* or Iran* or Iraq* or Israel*) 92,923

S28 TI (Cambodia* or Cameroon* or "Cape Verde*" or "Cabo Verde*" or Caribbean* or "Cayman Is*" or Chad or Chile* or China or Chinese or (Colombia* not "British Colombia*") or Comoros or Congo or "Cook Island*" or "Costa Rica*" or "ivory coast" or "cote d'ivoire" or Cuba* or Cyprus or Cypriot* or Czech* or Djibouti* or Dominica*) OR AB (Cambodia* or Cameroon* or "Cape Verde*" or "Cabo Verde*" or Caribbean* or "Cayman Is*" or Chad or Chile* or China or Chinese or (Colombia* not "British Colombia*") or Comoros or Congo or "Cook Island*" or "Costa Rica*" or "ivory coast" or "cote d'ivoire" or Cuba* or Cyprus or Cypriot* or Czech* or Djibouti* or Dominica*) 118,771

S27 TI (Afghanistan* or Albania* or Algeria* or Angola* or Anguilla* or Antigua or Barbuda or Argentin* or Armenia* or Aruba* or Azerbaijan* or Bahamas or Bahrain* or Bangladesh* or Barbados or Belarus* or Belize* or Benin* or Bermuda* or Bhutan* or Bolivia* or Bosnia* or Herzegovina or Borneo or Botswana* or Brazil* or Brunei* or Bulgaria* or "Burkina Faso" or Burundi*) OR AB (Afghanistan* or Albania* or Algeria* or Angola* or Anguilla* or Antigua or

Barbuda or Argentin* or Armenia* or Aruba* or Azerbaijan* or Bahamas or Bahrain* or Bangladesh* or Barbados or Belarus* or Belize* or Benin* or Bermuda* or Bhutan* or Bolivia* or Bosnia* or Herzegovina or Borneo or Botswana* or Brazil* or Brunei* or Bulgaria* or "Burkina Faso" or Burundi*) 45,106

S26 TI ((Africa* not "African American*") or (Asia* not "Asian American*")) OR AB ((Africa* not "African American*") or (Asia* not "Asian American*")) 70,500

S25 TI ((Developing or "under developed" or underdeveloped or "less* developed") N2 world) OR AB ((Developing or "under developed" or underdeveloped or "less* developed") N2 world) 454

S24 TI ((Developing or "under developed" or underdeveloped or "less* developed" or "third world") N3 (country or countries or nation? or economy or economies)) OR AB ((Developing or "under developed" or underdeveloped or "less* developed" or "third world") N3 (country or countries or nation? or economy or economies)) 2,137

S23 TI ((underserved or "under served" or deprived or poor*) N3 (country or countries or nation? or economy or economies)) OR AB ((underserved or "under served" or deprived or poor*) N3 (country or countries or nation? or economy or economies)) 345

S22 TI "transition* countr*" OR AB "transition* countr*" 18

S21 TI ((LIC or LICs) N3 (countr* or nation* or economy or economies)) OR AB ((LIC or LICs) N3 (countr* or nation* or economy or economies)) 2

S20 TI (LMIC or LMICs) OR AB (LMIC or LMICs) 6

S19 TI (low* middle N3 (countr* or nation* or economy or economies)) OR AB (low* middle N3 (countr* or nation* or economy or economies)) 64

S18 TI (middle income* N3 (countr* or nation* or economy or economies)) OR AB (middle income* N3 (countr* or nation* or economy or economies)) 51

S17 TI ((Low* income* N3 (countr* or nation* or economy or economies)) OR AB ((Low* income* N3 (countr* or nation* or economy or economies)) 103

S16 (S11 AND S15) 17 Evaluation of PV& PA in healthcare

S15 S12 OR S13 OR S14 75,338

S14 TI (pilot or feasibility) OR AB (pilot or feasibility) 7,482

S13 TI ((pre- N5 post-) or (pretest N5 posttest)) OR AB ((pre- N5 post-) or (pretest N5 posttest)) 3,249

S12 TI evaluat* OR AB evaluat* 66,549

S11 S9 AND S10 103

S10 TI ((health* or medical or clinical or therap* or disease*)) OR AB ((health* or medical or clinical or therap* or disease*)) 92,879

S9 S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8 1,765

S8 TI (participatory N4 (art* or theatre or theater or drama or drawing or painting or photograph* or music or poetry or singing or story* or stories or narrat* or writing)) OR AB (participatory N4 (art* or theatre or theater or drama or drawing or painting or photograph* or music or poetry or singing or story* or stories or narrat* or writing)) 626

S7 TI theater of the oppressed OR AB theater of the oppressed 63

S6 TI theatre of the oppressed OR AB theatre of the oppressed 73

S5 TI photovoice* OR AB photovoice* 52

S4 TI (digital N4 (story* or stories or narrative*)) OR AB (digital N4 (story* or stories or narrative*)) 560
S3 TI videovoice* OR AB videovoice* 0
S2 TI ((community N1 (video* or film* or documentar* or digital)) OR AB ((community N1 (video* or film* or documentar* or digital)) 353
S1 TI ((participatory N4 (video* or film* or documentar* or digital)) OR AB ((participatory N4 (video* or film* or documentar* or digital)) 165

evaluation

- RILM Abstracts of Music Literature (6)
- Communication & Mass Media Complete (5)
- Social Work Abstracts (4)
- Art Full Text (H.W. Wilson) (1)
- MLA International Bibliography (1)

LMIC

- Communication & Mass Media Complete (14)
- RILM Abstracts of Music Literature (5)
- Art Full Text (H.W. Wilson) (2)
- Social Work Abstracts (2)

Database: Global Health <1973 to 2018 Week 27>

Search Strategy:

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1 participation/ (3409)
2 community involvement/ (3305)
3 community action/ (617)
4 social participation/ (1502)
5 or/1-4 (7657)
6 exp video recordings/ or exp videos/ or "films (movies)"/ (480)
7 films.sh. (243)
8 6 or 7 (720)
9 5 and 8 (14)
10 (participatory adj4 (video* or film* or documentar* or digital)).tw. (19)
11 (community adj1 (video* or film* or documentar* or digital)).tw. (13)
12 videovoice*.tw. (2)
13 or/9-12 [participatory video] (46)
14 exp arts/ or literature/ or poetry/ or writing/ (3993)
15 photographs/ or exp photography/ (600)
16 14 or 15 (4590)
17 5 and 16 (87)
18 (digital adj2 (story* or stories or narrative)).tw. (30)
19 photovoice*.tw. (219)
20 "theater of the oppressed".tw. (2)

21 "theatre of the oppressed".tw. (1)
22 (participatory adj4 (art* or theatre or theater or drama or drawing or painting or photograph* or music or poetry or singing or story* or stories or narrat* or writing)).tw,kw. (97)
23 or/17-22 [2 participatory arts] (412)
24 13 or 23 (452)
25 program evaluation/ or exp evaluation/ (48259)
26 ((pre- adj5 post-) or (pretest adj5 posttest) or (program* adj6 evaluat*)).ti,ab. (22116)
27 evaluat*.tw. (516722)
28 or/25-27 [evaluation] (525905)
29 24 and 28 [1 evaluation of participatory arts & video projects] (90)
30 exp developing countries/ (746671)
31 (low* income* adj3 (countr* or nation* or economy or economies)).tw. (3482)
32 (middle income* adj3 (countr* or nation* or economy or economies)).tw. (6408)
33 (low* middle adj3 (countr* or nation* or economy or economies)).tw. (507)
34 (LMIC or LMICs).tw. (1193)
35 ((LIC or LICs) adj3 (countr* or nation* or economy or economies)).tw. (68)
36 "transition* countr*".tw. (189)
37 ((underserved or "under served" or deprived or poor*) adj3 (country or countries or nation? or economy or economies)).tw. (2677)
38 ((Developing or "under developed" or underdeveloped or "less* developed" or "third world") adj3 (country or countries or nation? or economy or economies)).tw. (753368)
39 ((Developing or "under developed" or underdeveloped or "less* developed") adj2 world).tw. (3877)
40 ((Africa* not "African American*") or (Asia* not "Asian American*")).ti,ab,in. (130278)
41 (Afghanistan* or Albania* or Algeria* or Angola* or Anguilla* or Antigua or Barbuda or Argentin* or Armenia* or Aruba* or Azerbaijan* or Bahamas or Bahrain* or Bangladesh* or Barbados or Belarus* or Belize* or Benin* or Bermuda* or Bhutan* or Bolivia* or Bosnia* or Herzegovina or Borneo or Botswana* or Brazil* or Brunei* or Bulgaria* or "Burkina Faso" or Burundi*).ti,ab,in. (189704)
42 (Cambodia* or Cameroon* or "Cape Verde*" or "Cabo Verde*" or Caribbean* or "Cayman Is*" or Chad or Chile* or China or Chinese or (Colombia* not "British Colombia*") or Comoros or Congo or "Cook Island*" or "Costa Rica*" or "ivory coast" or "cote d'ivoire" or Cuba* or Cyprus or Cypriot* or Czech* or Djibouti* or Dominica*).ti,ab,in. (388039)
43 (Ecuador* or Egypt* or "El Salvador" or Eritrea* or Estonia* or Ethiopia* or "Falklands Is*" or "Fiji* French Polynesia*" or Gabon* or Gambia* or Ghana* or Gibralta* or Grenada* or Guatemala* or Guinea* or Guyana* or Haiti* or "Hondura* Hong Kong*" or Hungary or Hungarian* or India or (Indian? not "American Indian?") or Indonesia* or Iran* or Iraq* or Israel*).ti,ab,in. (366505)
44 (Jamaica* or Jordan* or Kazakhstan* or Kenya* or Kiribati* or Korea* or DPRK or Kosovo* or Kuwait* or Kyrgyz* or "Lao PDR" or "Lao People*" or Laos or Laotian or Latvia* or Lebanon or Lebanese or Lesotho or Liberia* or Libya* or Lithuania*).ti,ab,in. (93198)
45 (Macau or Macao* or Macedonia* or Madagasca* or Malawi* or Malaysia* or Maldives or Mali or Malta or Maltese or "Marshall Islands" or Mauritania* or Mauritius or Mayotte* or

Melanesia* or Mexico or Mexican? or Micronesia* or Moldova* or Mongolia* or Montenegro* or Morocco or Moroccan? or Mozambique* or Myanmar*).ti,ab,in. (85020)
46 (Namibia* or Nauru* or Niue* or Nepal* or "Netherlands Antilles*" or "New Caledonia*" or Nicaragua* or Niger or Nigeria* or Oman* or Pakistan* or Palau* or Palestin* or Panama or "Papua New Guinea*" or Paraguay or Peru* or Peruvian* or Philippines* or Pilipin* or Filipin* or Poland or Polish or Qatar* or Romania* or Russia* or Rwanda*).ti,ab,in. (165722)
47 (Samoa* or "Sao Toms*" or Principe* or "Saudi Arabia*" or Senegal* or Serbia* or Seychelles or "Sierra Leone" or Singapor* or Slovak* or Slovenia* or "Solomon Islands" or Somalia* or "Sri Lanka*" or "S* Kitts and Nevis" or "S* Lucia" or "S* Helena" or "S* Vincent and the Grenadines" or "South America*" or Sudan* or Suriname* or Swaziland* or Syria*).ti,ab,in. (70216)
48 (Taiwan* or Taipei* or Tajikistan* or Tanzania* or Thai* or Timor* or Tobago or Togo or Tokelau or Tonga or Tinidad or Tunisia* or Turkey or Turkish or Turkmenistan* or "Turks and Caicos" or Tuvalu* or Uganda* or Ukrain* or "United Arab Emirates" or Uruguay* or Uzbekistan* or Vanuatu* or Venezuela* or Vietnam* or "Virgin Is*" or "Wallis and Futuna" or Futuna or "West Bank" or Gaza or Yemen* or Zambia* or Zimbabw*).ti,ab,in. (176014)
49 exp Africa/ (184097)
50 west indies/ or "antigua and barbuda"/ or bahamas/ or barbados/ or "british virgin islands"/ or cuba/ or dominica/ or dominican republic/ or grenada/ or haiti/ or jamaica/ or saint lucia/ or "saint vincent and the grenadines"/ or "saint kitts and nevis"/ or "trinidad and tobago"/ (13988)
51 central america/ or costa rica/ or el salvador/ or guatemala/ or honduras/ or nicaragua/ or exp panama/ or mexico/ (25167)
52 exp south america/ (112789)
53 asia/ or exp asia, central/ or exp asia, southeastern/ or asia, western/ or bhutan/ or exp india/ or nepal/ or pakistan/ or sri lanka/ or far east/ or exp china/ or exp korea/ or Taiwan/ (509719)
54 exp Middle East/ (82217)
55 pacific islands/ or exp melanesia/ or micronesia/ or palau/ or polynesia/ or exp samoa/ or tonga/ or philippines/ (13708)
56 ext Europe, Eastern/ or Cyprus/ or Malta/ or Gibraltar/ (1450)
57 (Georgia not (Atlanta or US or USA)).ti,ab. (1354)
58 (Montserrat not (Spain or Espana)).ti,ab. (41)
59 or/30-58 [LMICs] (1535113)
60 59 and 24 [PA & PV in LMICs] (171)

Database: Ovid MEDLINE(R) and Epub Ahead of Print, In-Process & Other Non-Indexed Citations, and Daily <1946 to July 13, 2018>

Search Strategy:

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1 Community-Based Participatory Research/ (3515)
2 Community Participation/ (15817)
3 or/1-2 (19096)
4 Videotape Recording/ (11041)

5 Video Recording/ (22244)
6 motion pictures/ (7502)
7 or/4-6 (40611)
8 3 and 7 (57)
9 (participatory adj4 (video* or film* or documentar* or digital)).tw,kw. (47)
10 (community adj1 (video* or film* or documentar* or digital)).tw,kw. (30)
11 videovoice*.tw,kw. (2)
12 or/8-11 [1. participatory video] (128)
13 art therapy/ or dance therapy/ or music therapy/ (4516)
14 exp Art/ or literature/ or music/ (49168)
15 Drama/ (1883)
16 Photography/ (24234)
17 Poetry as topic/ (2864)
18 or/13-17 (79763)
19 3 and 18 (200)
20 (digital adj2 (story* or stories or narrative)).tw,kw. (92)
21 photovoice*.tw,kw. (484)
22 theatre of the oppressed.tw,kw. (9)
23 theater of the oppressed.tw,kw. (6)
24 (participatory adj4 (art* or theatre or theater or drama or drawing or painting or photograph* or music or poetry or singing or story* or stories or narrat* or writing)).tw,kw. (246)
25 or/19-24 [2 participatory arts] (923)
26 12 or 25 (1022)
27 evaluation studies as topic/ or program evaluation/ or validation studies as topic/ (178920)
28 evaluation studies/ or validation studies/ (314342)
29 exp "Outcome and Process Assessment (Health Care)"/ (969428)
30 ((pre- adj5 post-) or (pretest adj5 posttest) or (program* adj6 evaluat*)).ti,ab. (117866)
31 evaluat*.tw. (3027787)
32 or/27-31 [evaluations] (4045147)
33 26 and 32 [Evaluation of PV & PA projects] (238)
34 Developing Countries/ (70203)
35 (low* income* adj3 (countr* or nation* or economy or economies)).tw,kf. (5983)
36 (middle income* adj3 (countr* or nation* or economy or economies)).tw,kf. (12302)
37 (low* middle adj3 (countr* or nation* or economy or economies)).tw,kf. (1193)
38 (LMIC or LMICs).tw,kf. (2731)
39 ((LIC or LICs) adj3 (countr* or nation* or economy or economies)).tw,kf. (130)
40 "transition* countr*".tw,kf. (275)
41 ((underserved or "under served" or deprived or poor*) adj3 (country or countries or nation? or economy or economies)).tw,kf. (4723)
42 ((Developing or "under developed" or underdeveloped or "less* developed" or "third world") adj3 (country or countries or nation? or economy or economies)).tw,kf. (87861)
43 ((Developing or "under developed" or underdeveloped or "less* developed") adj2 world).tw,kf. (8147)

44 ((Africa* not "African American*") or (Asia* not "Asian American*")).ti,ab,in,kf. (331762)
45 (Afghanistan* or Albania* or Algeria* or Angola* or Anguilla* or Antigua or Barbuda or Argentin* or Armenia* or Aruba* or Azerbaijan* or Bahamas or Bahrain* or Bangladesh* or Barbados or Belarus* or Belize* or Benin* or Bermuda* or Bhutan* or Bolivia* or Bosnia* or Herzegovina or Borneo or Botswana* or Brazil* or Brunei* or Bulgaria* or "Burkina Faso" or Burundi*).ti,ab,in,kf. (460887)
46 (Cambodia* or Cameroon* or "Cape Verde*" or "Cabo Verde*" or Caribbean* or "Cayman Is*" or Chad or Chile* or China or Chinese or (Colombia* not "British Colombia*") or Comoros or Congo or "Cook Island*" or "Costa Rica*" or "ivory coast" or "cote d'ivoire" or Cuba* or Cyprus or Cypriot* or Czech* or Djibouti* or Dominica*).ti,ab,in,kf. (1577088)
47 (Ecuador* or Egypt* or "El Salvador" or Eritrea* or Estonia* or Ethiopia* or "Falklands Is*" or "Fiji* French Polynesia*" or Gabon* or Gambia* or Ghana* or Gibralta* or Grenada* or Guatemala* or Guinea* or Guyana* or Haiti* or "Hondura* Hong Kong*" or Hungary or Hungarian* or India or (Indian? not "American Indian?") or Indonesia* or Iran* or Iraq* or Israel*).ti,ab,in,kf. (1182739)
48 (Jamaica* or Jordan* or Kazakhstan* or Kenya* or Kiribati* or Korea* or DPRK or Kosovo* or Kuwait* or Kyrgyz* or "Lao PDR" or "Lao People*" or Laos or Laotian or Latvia* or Lebanon or Lebanese or Lesotho or Liberia* or Libya* or Lithuania*).ti,ab,in,kf. (466300)
49 (Macao* or Macedonia* or Madagasca* or Malawi* or Malaysia* or Maldives or Mali or Malta or Maltese or "Marshall Islands" or Mauritania* or Mauritius or Mayotte* or Melanesia* or Mexico or Mexican? or Micronesia* or Moldova* or Mongolia* or Montenegro* or Morocco or Moroccan? or Mozambique* or Myanmar*).ti,ab,in,kf. (251843)
50 (Namibia* or Nauru* or Niue* or Nepal* or "Netherlands Antilles*" or "New Caledonia*" or Nicaragua* or Niger or Nigeria* or Oman* or Pakistan* or Palau* or Palestin* or Panama or "Papua New Guinea*" or Paraguay or Peru* or Peruvian* or Philippines* or Pilipin* or Filipin* or Poland or Polish or Qatar* or Romania* or Russia* or Rwanda*).ti,ab,in,kf. (480584)
51 (Samoa* or "Sao Toms*" or Principe* or "Saudi Arabia*" or Senegal* or Serbia* or Seychelles or "Sierra Leone" or Singapor* or Slovak* or Slovenia* or "Solomon Islands" or Somalia* or "Sri Lanka*" or "S* Kitts and Nevis" or "S* Lucia" or "S* Helena" or "S* Vincent and the Grenadines" or "South America*" or Sudan* or Suriname* or Swaziland* or Syria*).ti,ab,in,kf. (286282)
52 (Taiwan* or Taipei* or Tajikistan* or Tanzania* or Thai* or Timor* or Tobago or Togo or Tokelau or Tonga or Tinidad or Tunisia* or Turkey or Turkish or Turkmenistan* or "Turks and Caicos" or Tuvalu* or Uganda* or Ukrain* or "United Arab Emirates" or Uruguay* or Uzbekistan* or Vanuatu* or Venezuela* or Vietnam* or "Virgin Is*" or "Wallis and Futuna" or Futuna or "West Bank" or Gaza or Yemen* or Zambia* or Zimbabw*).ti,ab,in,kf. (620317)
53 exp Africa/ (235641)
54 west indies/ or "antigua and barbuda"/ or bahamas/ or barbados/ or "british virgin islands"/ or cuba/ or dominica/ or dominican republic/ or grenada/ or haiti/ or jamaica/ or saint lucia/ or "saint vincent and the grenadines"/ or "saint kitts and nevis"/ or "trinidad and tobago"/ (18202)
55 central america/ or costa rica/ or el salvador/ or guatemala/ or honduras/ or nicaragua/ or exp panama/ or mexico/ (47128)
56 exp south america/ (138681)

57 exp Atlantic Islands/ (1456)
58 asia/ or exp asia, central/ or exp asia, southeastern/ or asia, western/ or bhutan/ or exp india/ or nepal/ or pakistan/ or sri lanka/ or far east/ or exp china/ or exp korea/ or Taiwan/ (438560)
59 exp Middle East/ (115974)
60 pacific islands/ or exp melanesia/ or micronesia/ or palau/ or polynesia/ or exp samoa/ or tonga/ or philippines/ (20328)
61 ext Europe, Eastern/ or Cyprus/ or Malta/ or Gibraltar/ (1896)
62 Georgia.ti,ab. not Georgia/ (4955)
63 (Montserrat not (Spain or Espana)).ti,ab. (114)
64 or/34-63 (5267364)
65 26 and 64 [Particatory video & Arts in LMICs] (262)

Database: Embase Classic+Embase <1947 to 2018 July 13>

Search Strategy:

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1 community participation/ (1008)
2 participatory research/ (4201)
3 1 or 2 (5161)
4 exp videorecording/ (69633)
5 film/ (18978)
6 movie/ (1018)
7 4 or 5 or 6 (89451)
8 3 and 7 (58)
9 (participatory adj4 (video* or film* or documentar* or digital)).tw,kw. (57)
10 (community adj1 (video* or film* or documentar* or digital)).tw,kw. (37)
11 videovoice*.tw,kw. (3)
12 or/8-11 [1 participatory video] (145)
13 exp art therapy/ or exp dance therapy/ or exp music therapy/ (9503)
14 exp art/ (64872)
15 literature/ (43362)
16 photography/ (37047)
17 storytelling/ (928)
18 or/13-17 (151046)
19 3 and 18 (190)
20 (digital adj2 (story* or stories or narrative*)).tw,kw. (122)
21 photovoice*.tw,kw. (545)
22 theatre of the oppressed.tw,kw. (15)
23 theater of the oppressed.tw,kw. (6)
24 (participatory adj4 (art* or theatre or theater or drama or drawing or painting or photograph* or music or poetry or singing or story* or stories or narrat* or writing)).tw,kw. (252)
25 or/19-24 [2. participatory arts] (1012)
26 12 or 25 (1129)

27 "evaluation and follow up"/ or exp evaluation study/ (54908)
28 validation study/ (71331)
29 pretest posttest design/ (2941)
30 outcome assessment/ (432813)
31 ((pre- adj5 post-) or (pretest adj5 posttest) or (program* adj6 evaluat*)).ti,ab. (192809)
32 evaluat*.tw. (4262848)
33 or/27-32 [evaluation] (4734181)
34 26 and 33 [1. Evaluation participatory arts & video] (263)
35 developing country/ or low income country/ (93167)
36 (Low* income* adj3 (countr* or nation* or economy or economies)).tw. (7168)
37 (LIC* adj3 (countr* or nation* or economy or economies)).tw. (1098)
38 ((Developing or underdeveloped or less-developed or "less* developed" or "third world") adj3 (countr* or nation* or economy or economies)).tw. (77237)
39 ((Underserved or "under served" or deprived or poor*) adj3 (countr* or nation* or economy or economies)).tw. (6197)
40 ((Developing or "less* developed" or less-developed or "under developed" or underdeveloped) adj2 world).tw. (9982)
41 ("Transitional country" or "transitional countries").tw. (204)
42 ((Africa* not "African American*") or (Asia* not "Asian American*")).ti,ab,in. (454743)
43 (Afghanistan* or Albania* or Algeria* or Angola* or Anguilla* or Antigua or Barbuda or Argentin* or Armenia* or Aruba* or Azerbaijan* or Bahamas or Bahrain* or Bangladesh* or Barbados or Belarus* or Belize* or Benin* or Bermuda* or Bhutan* or Bolivia* or Bosnia* or Herzegovina or Borneo or Botswana* or Brazil* or Brunei* or Bulgaria* or "Burkina Faso" or Burundi*).ti,ab,in. (744180)
44 (Cambodia* or Cameroon* or "Cape Verde*" or "Cabo Verde*" or Caribbean* or "Cayman Is*" or Chad or Chile* or China or Chinese or (Colombia* not "British Colombia*") or Comoros or Congo or "Cook Island*" or "Costa Rica*" or "ivory coast" or "cote d'ivoire" or Cuba* or Cyprus or Cypriot* or Czech* or Djibouti* or Dominica*).ti,ab,in. (2244212)
45 (Ecuador* or Egypt* or "El Salvador" or Eritrea* or Estonia* or Ethiopia* or "Falklands Is*" or "Fiji* French Polynesia*" or Gabon* or Gambia* or Ghana* or Gibralta* or Grenada* or Guatemala* or Guinea* or Guyana* or Haiti* or "Hondura* Hong Kong*" or Hungary or Hungarian* or India or (Indian? not "American Indian?") or Indonesia* or Iran* or Iraq* or Israel*).ti,ab,in. (1891820)
46 (Jamaica* or Jordan* or Kazakhstan* or Kenya* or Kiribati* or Korea* or DPRK or Kosovo* or Kuwait* or Kyrgyz* or "Lao PDR" or "Lao People*" or Laos or Laotian or Latvia* or Lebanon or Lebanese or Lesotho or Liberia* or Libya* or Lithuania*).ti,ab,in. (644358)
47 (Macau or Macao* or Macedonia* or Madagasca* or Malawi* or Malaysia* or Maldives or Mali or Malta or Maltese or "Marshall Islands" or Mauritania* or Mauritius or Mayotte* or Melanesia* or Mexico or Mexican? or Micronesia* or Moldova* or Mongolia* or Montenegro* or Morocco or Moroccan? or Mozambique* or Myanmar*).ti,ab,in. (380594)
48 (Namibia* or Nauru* or Niue* or Nepal* or "Netherlands Antilles*" or "New Caledonia*" or Nicaragua* or Niger or Nigeria* or Oman* or Pakistan* or Palau* or Palestin* or Panama or "Papua New Guinea*" or Paraguay or Peru* or Peruvian* or Philippines* or Pilipin* or Filipin* or Poland or Polish or Qatar* or Romania* or Russia* or Rwanda*).ti,ab,in. (1037833)

49 (Samoa* or "Sao Toms*" or Principe* or "Saudi Arabia*" or Senegal* or Serbia* or Seychelles or "Sierra Leone" or Singapor* or Slovak* or Slovenia* or "Solomon Islands" or Somalia* or "Sri Lanka*" or "S* Kitts and Nevis" or "S* Lucia" or "S* Helena" or "S* Vincent and the Grenadines" or "South America*" or Sudan* or Suriname* or Swaziland* or Syria*).ti,ab,in. (432036)
50 (Samoa* or "Sao Toms*" or Principe* or "Saudi Arabia*" or Senegal* or Serbia* or Seychelles or "Sierra Leone" or Singapor* or Slovak* or Slovenia* or "Solomon Islands" or Somalia* or "Sri Lanka*" or "S* Kitts and Nevis" or "S* Lucia" or "S* Helena" or "S* Vincent and the Grenadines" or "South America*" or Sudan* or Suriname* or Swaziland* or Syria*).ti,ab,in. (432036)
51 (Taiwan* or Taipei* or Tajikistan* or Tanzania* or Thai* or Timor* or Tobago or Togo or Tokelau or Tonga or Tinidad or Tunisia* or Turkey or Turkish or Turkmenistan* or "Turks and Caicos" or Tuvalu* or Uganda* or Ukrain* or "United Arab Emirates" or Uruguay* or Uzbekistan* or Vanuatu* or Venezuela* or Vietnam* or "Virgin Is*" or "Wallis and Futuna" or Futuna or "West Bank" or Gaza or Yemen* or Zambia* or Zimbabw*).ti,ab,in. (960431)
52 exp Africa/ (308464)
53 exp Caribbean Islands/ (30296)
54 central america/ or belize/ or costa rica/ or el salvador/ or guatemala/ or honduras/ or nicaragua/ or panama/ (23362)
55 exp South America/ (180291)
56 exp atlantic islands/ (40603)
57 exp Asia/ (924861)
58 exp Middle East/ (161763)
59 exp Pacific islands/ (43408)
60 exp Eastern Europe/ (219001)
61 cyprus/ or gibralta/ or malta/ (3542)
62 or/35-61 [lmic] (8149297)
63 26 and 62 [PV & PA LMICs] (300)

Database: PsycINFO <1806 to July Week 2 2018>

Search Strategy:

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1 exp participation/ (15024)
2 exp community involvement/ (4561)
3 1 or 2 (19355)
4 exp digital video/ or exp films/ or exp videotapes/ (11600)
5 3 and 4 (37)
6 (participatory adj4 (video* or film* or documentar* or digital)).tw. (103)
7 (community adj1 (video* or film* or documentar* or digital)).tw. (40)
8 videovoice*.tw. (4)
9 or/5-8 [1 PARTICIPATORY VIDEO] (179)
10 creative arts therapy/ or exp art therapy/ or exp dance therapy/ or exp music therapy/ or exp poetry therapy/ (10261)
11 exp arts/ or exp literature/ or drama/ (55640)

12 photographs/ or animation/ (3685)
13 10 or 11 or 12 (67273)
14 3 and 13 (295)
15 (digital adj2 (story* or stories or narrative)).tw. (357)
16 photovoice*.tw. (596)
17 theater of the oppressed.tw. (15)
18 theatre of the oppressed.tw. (35)
19 (participatory adj4 (art* or theatre or theater or drama or drawing or painting or photograph* or music or poetry or singing or story* or stories or narrat* or writing)).tw,kw. (499)
20 or/14-19 [2 participatory arts] (1732)
21 9 or 20 (1883)
22 evaluation/ or exp program evaluation/ (37576)
23 ((pre- adj5 post-) or (pretest adj5 posttest) or (program* adj6 evaluat*)).tw. (62550)
24 evaluat*.tw. (487787)
25 or/22-24 [evaluation] (518753)
26 21 and 25 [1 evaluation of PA & PV] (256)
27 developing countries/ (5097)
28 (low* income* adj3 (countr* or nation* or economy or economies)).tw. (1423)
29 (middle income* adj3 (countr* or nation* or economy or economies)).tw. (2743)
30 (low* middle adj3 (countr* or nation* or economy or economies)).tw. (293)
31 (LMIC or LMICs).tw. (589)
32 ((LIC or LICs) adj3 (countr* or nation* or economy or economies)).tw. (22)
33 "transition* countr*".tw. (124)
34 ((underserved or "under served" or deprived or poor*) adj3 (country or countries or nation? or economy or economies)).tw. (1193)
35 ((Developing or "under developed" or underdeveloped or "less* developed" or "third world") adj3 (country or countries or nation? or economy or economies)).tw. (10394)
36 ((Developing or "under developed" or underdeveloped or "less* developed") adj2 world).tw. (1568)
37 ((Africa* not "African American*") or (Asia* not "Asian American*")).ti,ab,in,lo. (65365)
38 (Afghanistan* or Albania* or Algeria* or Angola* or Anguilla* or Antigua or Barbuda or Argentin* or Armenia* or Aruba* or Azerbaijan* or Bahamas or Bahrain* or Bangladesh* or Barbados or Belarus* or Belize* or Benin* or Bermuda* or Bhutan* or Bolivia* or Bosnia* or Herzegovina or Borneo or Botswana* or Brazil* or Brunei* or Bulgaria* or "Burkina Faso" or Burundi*).ti,ab,in,lo. (75394)
39 (Cambodia* or Cameroon* or "Cape Verde*" or "Cabo Verde*" or Caribbean* or "Cayman Is*" or Chad or Chile* or China or Chinese or (Colombia* not "British Colombia*") or Comoros or Congo or "Cook Island*" or "Costa Rica*" or "ivory coast" or "cote d'ivoire" or Cuba* or Cyprus or Cypriot* or Czech* or Djibouti* or Dominica*).ti,ab,in,lo. (148783)
40 (Ecuador* or Egypt* or "El Salvador" or Eritrea* or Estonia* or Ethiopia* or "Falklands Is*" or "Fiji* French Polynesia*" or Gabon* or Gambia* or Ghana* or Gibralta* or Grenada* or Guatemala* or Guinea* or Guyana* or Haiti* or "Hondura* Hong Kong*" or Hungary or

Hungarian* or India or (Indian? not "American Indian?") or Indonesia* or Iran* or Iraq* or Israel*).ti,ab,in,lo. (183470)
41 (Jamaica* or Jordan* or Kazakhstan* or Kenya* or Kiribati* or Korea* or DPRK or Kosovo* or Kuwait* or Kyrgyz* or "Lao PDR" or "Lao People*" or Laos or Laotian or Latvia* or Lebanon or Lebanese or Lesotho or Liberia* or Libya* or Lithuania*).ti,ab,in,lo. (54115)
42 (Macao* or Macedonia* or Madagasca* or Malawi* or Malaysia* or Maldives or Mali or Malta or Maltese or "Marshall Islands" or Mauritania* or Mauritius or Mayotte* or Melanesia* or Mexico or Mexican? or Micronesia* or Moldova* or Mongolia* or Montenegro* or Morocco or Moroccan? or Mozambique* or Myanmar*).ti,ab,in,lo. (56884)
43 (Namibia* or Nauru* or Niue* or Nepal* or "Netherlands Antilles*" or "New Caledonia*" or Nicaragua* or Niger or Nigeria* or Oman* or Pakistan* or Palau* or Palestin* or Panama or "Papua New Guinea*" or Paraguay or Peru* or Peruvian* or Philippines* or Pilipin* or Filipin* or Poland or Polish or Qatar* or Romania* or Russia* or Rwanda*).ti,ab,in,lo. (84095)
44 (Samoa* or "Sao Toms*" or Principe* or "Saudi Arabia*" or Senegal* or Serbia* or Seychelles or "Sierra Leone" or Singapor* or Slovak* or Slovenia* or "Solomon Islands" or Somalia* or "Sri Lanka*" or "S* Kitts and Nevis" or "S* Lucia" or "S* Helena" or "S* Vincent and the Grenadines" or "South America*" or Sudan* or Suriname* or Swaziland* or Syria*).ti,ab,in,lo. (42667)
45 (Taiwan* or Taipei* or Tajikistan* or Tanzania* or Thai* or Timor* or Tobago or Togo or Tokelau or Tonga or Tinidad or Tunisia* or Turkey or Turkish or Turkmenistan* or "Turks and Caicos" or Tuvalu* or Uganda* or Ukrain* or "United Arab Emirates" or Uruguay* or Uzbekistan* or Vanuatu* or Venezuela* or Vietnam* or "Virgin Is*" or "Wallis and Futuna" or Futuna or "West Bank" or Gaza or Yemen* or Zambia* or Zimbabw*).ti,ab,in,lo. (87779)
46 (Montserrat not (Spain or Espana)).ti,ab,in,lo. (48)
47 Georgia.ti,ab,in,lo. not (Atlanta or US or USA).in,lo. (6789)
48 or/27-47 (678954)
49 21 and 48 [PV & PA in LMICs] (393)
50 exp health/ (140201)
51 (health* or medical or clinical or therap* or disease*).tw. (1415982)
52 50 or 51 (1423745)
53 49 and 52 (134)
54 26 and 52 (111)

Web of science 16-07-18

Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI Timespan=All years

18 52 #16 AND #11 AND #9

17 106 #16 AND #9

16 212,927 #15 OR #14 OR #13

15 85,686 TOPIC: (((program* or project) NEAR/6 evaluat*))

14 103,623 TOPIC: (((pre- NEAR/5 post-) or (pretest NEAR/5 posttest)))

13 27,437 TOPIC: ("evaluation stud*" or "validation stud*")

12 289 #11 AND #10

11 9,032,266 TS=(health* or medical or clinical or therap* or disease*)

10 882 #9 AND #1

9 3,492 #8 OR #7 OR #6 OR #5 OR #4 OR #3 OR #2

8 980 TS=(participatory NEAR/2 (art* or theatre or theater or drama or drawing or painting or photograph* or music or poetry or singing or story* or stories or narrat* or writing))

7 104 TOPIC: ("theatre of the oppressed" OR "theater of the oppressed")

6 1,148 TS=((digital NEAR/2 (story* or stories or narrative)))

5 992 TS=(photovoice*)

4 4 TS=(videovoice*)

3 13 TOPIC: ("community film*")

2 369 TOPIC: (participatory NEAR/4 (video* or film* or documentar* or digital))

1 4,881,248 TOPIC: ((Afghanistan* OR Albania* OR Algeria* OR Angola* OR Antigua* OR Barbuda* OR Argentin* OR Armenia* OR Aruba* OR Azerbaijan* OR Bahrain* OR Bangladesh* OR Barbad* OR bajan* OR Benin OR Byelarus* OR Belarus* OR Belorus* OR Beliz* OR Bhutan* OR Bolivia* OR Bosnia* OR Herzegovin* OR Hercegovin* OR Botswan* OR Brasil* OR Brazil* OR Bulgaria* OR "Burkina Faso" OR "Burkina Fasso" OR "Upper Volta*" OR Burundi* OR Urundi* OR Cambodia* OR Khmer Republic OR Kampuchea OR Cameroon* OR Cameron* OR "Cape Verde" OR "Central African Republic*" OR Chad* OR Chile* OR China OR Chinese OR Colombia* OR Comoros OR "Comoro Island*" OR Comores OR Mayotte OR Congo* OR Zaire* OR "Costa Rica*" OR "Cote d'Ivoire" OR "Ivory Coast" OR "Croatia*" OR Cuba* OR Cyprus OR Cypriot* of Czechoslovakia* OR Czech* OR Slovak* OR Djibouti* OR "French Somaliland*" OR Dominica* OR "East Timor*" OR "East Timur" OR "Timor Leste" OR Ecuador* OR Egypt* OR "United Arab Republic*" OR Salvador* OR Eritrea* OR Estonia* OR Ethiopia* OR Fiji* OR Gabon* OR Gambia* OR Gaza* OR palestin* OR Georgia* OR Ghana* OR "Gold Coast" OR Greece OR greek* OR Grenada OR Grenadian* OR Guatemala* OR Guinea* OR Guam OR Guiana OR Guyana OR Guyanese OR Haiti* OR Honduras OR Hungar* OR (india* NOT "american indian*") OR Maldives OR Indonesia* OR Iran* OR Iraq* OR Jamaica* OR Jordan* OR Kazakhstan OR Kazakh* OR Kenya* OR Kiribati* OR Korea* OR Kosovo OR Kosovan* OR Kyrgyzstan OR Kirghizia OR "Kyrgyz Republic" OR Kirghiz OR Kirgizstan OR "Lao PDR" OR Laos OR Lao* OR Latvia* OR Lebanon OR Lebanese OR Lesotho OR Basutoland OR Liberia* OR Libya* OR Lithuania* OR Macedonia* OR Madagascar OR "Malagasy Republic" OR Malaysia* OR Malaya* OR Malay* OR Sabah OR Sarawak OR Malawi* OR Nyasaland OR Mali OR Malta OR Maltese OR "Marshall Islands" OR Mauritania* OR Mauritius OR "Agalega Island*" OR Mexico OR Mexican* OR Micronesia* OR "Middle East*" OR Moldova* OR Moldovia OR Moldovian OR Mongolia* OR Montenegr* OR Morocc* OR Ifni OR Mozambique OR Myanmar OR Myanmar OR Burma OR Burmese)) OR TOPIC: ((Namibia* OR Nepal* OR "Netherlands Antilles" OR "New Caledonia*" OR Nicaragua* OR Niger* OR Nigeria* OR "Northern Mariana Islands" OR Oman OR Muscat OR

Pakistan* OR Palau OR Panama OR Paraguay* OR Peru* OR Philippin* OR Philipin* OR Phillipin* OR Phillippin* OR Poland OR poles OR polish OR Portug* OR "Puerto Ric*" OR Romania* OR Rumania OR Roumania OR Russia OR Russian OR Rwanda* OR Ruanda* OR "Saint Kitts" OR "St Kitts" OR Nevis OR "Saint Lucia*" OR "St Lucia" OR "Saint Vincent" OR "St Vincent" OR Grenadines OR Samoa* OR "Samoan Islands" OR "Navigator Island" OR "Navigator Island*" OR "Sao Tome" OR "Saudi Arabia*" OR Saudi* OR Senegal* OR Serbia* OR Seychelles OR "Sierra Leone*" OR Slovenia* OR "Sri Lanka*" OR "Ceylon*" OR "Solomon Island*" OR Somalia* OR Sudan* OR Suriname OR Surinam OR Swaziland OR Syria* OR Tajik* OR Tadzhik* OR Tadjik* OR Tadzhik* OR Tanzania* OR Thailand OR Thai* OR Togo* OR Tonga* OR Trinidad* OR Tobago OR Tunisia* OR Turkey OR Turkish OR Turk OR Turks OR Turkmenistan OR Turkmen OR Uganda* OR Ukrain* OR Uruguay* OR USSR OR "Soviet Union" OR "Union of Soviet Socialist Republics" OR Uzbekistan OR Uzbek* OR Vanuatu OR "New Hebrides" OR Venezuela* OR Vietnam* OR "Viet Nam" OR "West Bank" OR Yemen* OR Yugoslavia* OR Zambia* OR Zimbabwe* OR Rhodesia*)) OR TOPIC: ((Africa* OR Asia* OR Caribbean OR "West Indies" OR "South America*" OR "Latin America*" OR "Central America*")) OR TOPIC: ((((developing OR "less* developed" OR "under developed" OR underdeveloped OR "middle income" OR "low* income") NEAR/6 (economy OR economies)) OR (low* NEAR/6 (gdp OR gnp OR "gross domestic" OR "gross national")) OR (low NEAR/4 middle NEAR/4 countr*) OR (lmic OR lmics OR "third world" OR "lami countr*") OR ((developing OR "less* developed" OR "under developed" OR underdeveloped OR "middle income" OR "low* income" OR underserved OR "under served" OR deprived OR poor*) NEAR/6 (countr* OR nation? OR population? OR world)) OR "transitional countr*"))

Appendix 2: Excerpt from Themes in PV articles table

For Full table, see Abstracts

Participants	ARTICLE	PV with other interventions	skills building
A, women, South Africa	**What can a woman do with a camera? Turning the female gaze on poverty and HIV and AIDS in rural South Africa**		
Y, HIV , Zimbabwe	**"My story"- HIV positive adolescents tell their story through film**	Six created stories about their lives and six created stories related to specific themes	All storytellers gained new skills in photography, film making and storytelling. They explained that this gave them new confidence and belief in themselves. Many described how they had struggled to achieve in school but were proud they had been able to produce their own film

Y, Women, Uganda	**Creating a space for young women's voices: using 'participatory video drama' in Uganda**		
A, Detroit USA	**A Bridge Between Communities: Video-making using principles of community-based participatory research**		Working with new partners means mutual learning and sharing resources, all essential aspects of CBPR. Video editors, for example, are experts in design and form. Their skills can enhance the capacity of health educators, who have content knowledge, and community members who are experts in their own communities.

Appendix 3: FGD guide for Workshop participants

Community Arts for Resistant Antibiotics in Nepal (CARAN)

Guide for FGD with workshop participants

S.N.	Questions	Further Probes
1.	Please can you tell me about your experience of participating in the filmmaking workshops on antibiotic use?	How were you invited to participate in the workshops? How did you find about your presence in the series of workshops, their participative activities and film making? (Fruitful/unfruitful)
2.	What aspects did you enjoy? What do you think were the strengths of the workshops? Can you please elaborate?	Which parts did you enjoy/like the most and why?
	Please can you tell me which parts of the workshop were most participatory in your view	(Probe each activity)
3.	Please can you tell me which parts of the workshop were most useful in terms of your learning (on antibiotics, and on film-making)	(Probe for each activity) Ask for key activities (where do I stand, storytelling, hotseating, playing corners/quiz, critical reflection on WHO guidance, overall filming making i.e. learning and practicality- such as mock interview, interviewing the community using new techniques, developing script or scriptwriting/film treatment, shooting script, shot division, logline+ story)
4.	Which aspects did you not enjoy? Can you please elaborate?	Why did you feel uncomfortable? Anything specific about specific aspect of workshop and filmmaking?
5.	How has participating in these workshops impacted you on a personal level? Probe: New knowledge received? New skills received?	Filmmaking: Did you have same level of knowledge and skills regarding filmmaking prior to the workshops? What things did you learn\ where you not aware about filmmaking? Are there any recent changes that you might have adopted after partaking in the workshops? If so, what? What will you probably do in future?
6.	Before the workshop, how familiar were you with antibiotic use and antibiotic resistance? How has this changed post the	Antibiotic resistance: Did you have same level of knowledge regarding antibiotic resistance prior to the workshops? What things did you

	workshops?	learn\ where you not aware about antibiotic resistance? Are there any recent changes that you might have adopted after partaking in the workshops? If so, what? What will you probably do in future?
7.	What difference, if any, is there in your practice of using antibiotics after the workshops?	Note: Q 6 and 7 could give similar information
8.	What did you think of the film-making aspect of the workshops? (including Video interviews) Probe: Did you enjoy it or found it uncomfortable? What was your role(s) in the film-making process? Do you think film-making was helpful in understanding about antibiotics use and resistance? How?	
9.	How is it replicable and why? (ask for each workshop and activity)	To what extent is the Participatory approach replicable / do you think the approach is appropriate for longer run?
10.	What are your suggestions on how we can improve the workshops? • Any activities you think are inappropriate for your community? Could you please elaborate? • Any activities that you think we can modify or add in the workshops?	What could have been done to improvise it?
11.	What, in your observation/experience, are challenges to conducting these workshops?	Which ones and why?
12.	What, in your observation/experience, are facilitators to conducting these workshops?	
13.	Would you like to add anything to the discussion?	

Thank you for your time ☺

Appendix 4: FGD guide for showcasing participants

Community Arts for Resistant Antibiotics in Nepal (CARAN)

Guide for FGD with community members attending film-screening

S.N.	Questions	Further Probes
1.	Tell us about your experience of attending the film-screening on antibiotic resistance? Probe: Who invited you to the screening?	How did you find about your presence in the film screening/showcasing? (Fruitful/unfruitful)
2.	What did you like about the film? Probe: Did you find it interesting? Informative?	Video/documentary
3.	What did you think of the information that was provided in the film? Do you think the message was clear? Were you confused at any point?	What messages did you receive? If messages were not clear, do you remember what was it/were they about or which one? What were you confused about? Why?
4.	What did you feel after watching the film? Probe: What message did you receive from the film?	Why? (if not answered)
5.	What are your views on antibiotic resistance after watching the film? Probe: How has the film impacted your knowledge on the issue? How has the film impacted your practice/ will impact practice in future?	Did you have same level of knowledge regarding antibiotic resistance prior to watching the film? What things did you learn\ where you not aware about antibiotic resistance? Are there any recent changes that you might have adopted after watching the film? What will you probably do in future?
	To what extend was/were the video/s effective? What were the factors/things that might bring positive changes with regards to AB use?	
6.	What do you think can be improved in the film? Probe: Anything in the film you thought was inappropriate (culturally or otherwise)? Any information that was inaccurate?	What could have been done to improvise the film to be screened?
7.	We are trying to spread awareness about antibiotic resistance in communities by screening this documentary. Do you have any suggestions as to how we can do this more effectively? Probe: Time of screening, venue, which	To what extent is the Participatory approach replicable / do you think the approach is appropriate for longer run? How is it replicable and why?

	community members to involve, etc.	
8.	Would you like to add anything to the discussion?	

Thank you for your time ☺

Appendix 5: Excerpt from PV evaluation matrix – To guide future PV projects

Evaluation element		Aim	Key objectives/ messages	Who?	When?	Example Questions	Example observation points	Example prompts for workshop conversations	How could we use the info? (Who does it serve?)
	Knowledge								
KAP		Information held by participants relating to the particular health topic in question as well as information relating to the process of creating a video.	what do Workshop participants understand about key AMR issues?	Workshop Participants	During workshops & immediately after (FGDs)	What do you understand about AMR?		Probe around common terms for ABs and uses	resersch papers. Policy documents

			OH reflections	Workshop Participants	During workshops & immediately after (FGDs)	How are human, animal, and environmental health issues connected?	How do P's speak about and consider wider OH elements at community level?	Prompts towards all 3 OH sectors in doscussions	stakeholder engagement materials. Research papers.
			How has knowledge of AMR improved over project period?	Workshop Participants	During workshops & immediately after (FGDs)	What have you learned about AMR/Abs durin this project?	What are the differences in conversations between participants?		Measurable outputs for evaluation?
			OH reflections	Workshop Participants	During workshops & immediately after (FGDs)	How are human, animal, and environmental health issues connected?	How do P's speak about and consider wider OH elements at community level?	Prompts towards all 3 OH sectors in doscussions	stakeholder engagement materials. Research papers.
			Have worskhop participants shared knowledge?	Workshop Participants	During workshops & immediately after (FGDs)	Have you told anyone about what you have learned here? What have you told them? Why? Who have you chosen to speak to (e.g.	Who are P's prioritising in discussions?	Prompts towards all 3 OH sectors in doscussions	

						farmers)			
			Are there gendered differnces in knowledge among workshop participants?	Workshop Participants	During workshops & immediately after (FGDs)		Who is contributing most to AMR conversations?		Research paper. Stakeholder engagement.
			What have workshop participants learned about film making?	Workshop Participants	During workshops & immediately after (FGDs)	Can you tell me about the film making process? What's the biggest lesson you have learned?	Skill level in workshop participants		