Autumn 2022

Exploring health literacy need for antimicrobial resistance in India – A qualitative study

Master Thesis: Institute of Health & Society

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Abstract

Antibiotic resistance is one of the biggest threats to modern civilization. With low awareness about AMR in India and increasing antibiotic consumption in India, it is imperative to understand the health-seeking behavior to explore the health literacy needs of the community. Therefore, the main research question raised in the thesis is: 1. W*hat are the health-literacy needs for Antimicrobial resistance?* 2. *What is the role of medium & message in informed health behavior?*

The methodology involves qualitative research through in-depth interviews of householders in the villages surrounding the Primary Health Centre (PHC, Baroi-Chamunda Devi, Kangra, HP). Through the understanding of health-seeking practices, the research has analyzed the health literacy needs and the role of medium & messages for informed health behavior. Observations & key informant interviews have helped build an understanding of the context of the local healthcare system in the community which demonstrates itself as a complex pathway of care. The results are based on the thematic analysis with a constructionist perspective to help understand the health literacy needs of the community. The results are analyzed based on the framework of health literacy – understand, access, appraise and apply. First, the findings highlight the overview of the health-seeking journey in the community. Second, the findings present the six-health literacy needs mainly; i. Making medical concepts comprehensible ii. Creating awareness of risky behaviour and its consequences iii. Guidance in choosing the appropriate pathway of care iv. Enabling the flow of information from a source that is highly trusted v. Strengthening support for community organizations to encourage conversation vi. Addressing the needs of marginalized groups to reduce health information inequities.

Finally, the finding suggests the role of medium & message for informed health behaviour; i. Health information is validated through multiple mediums following the hierarchy of expertise ii. Actionable & simple information works for the community.

The study helps other researchers to conceptualize strategies for intervention and apply the insights to develop behaviour change communication for AMR. Further, the study allows the researcher to develop HLQs[1] to evaluate health literacy for AMR with a quantitative approach since now we know the core domains.

[1] Health literacy Questionnaire

Acknowledgement

I would like to express my heartfelt gratitude to all the people that have been involved in this research project.

Many thanks to my interviewees in the villages of Kangra, HP, who met me with generous hospitality and openness, took the time to share their stories and insights and provided me with answers to my questions. I could not have written this thesis without you.

A special thanks to all the ASHAs who introduced me to each of the houses amidst their busy schedule at work. They shared their life, sometimes food, and travelled alongside me. It was an honour to get a glimpse of their work during primary research. Needless to say, the WHO's global leader award which ASHAs collectively won in India is well deserved.

A special thanks to my two academic supervisors, Arunima Sehgal Mukherjee at IFI and Knut Reidar Wangen at HEPMA. This thesis would not have been the same without your support, experience, and ingenuity, and I am truly grateful for all the hours of supervision you have given me. Thanks to Yogita and Prof Sundeep Sahay for introducing me to this project.

A big thanks to all the staff at the Primary Healthcare Center, Baroi who briefed me about their work and also invited me to lunch.

A big thanks to Arvind & Neelu who hosted me in Kangra and make sure I could find my way to the villages by public transport.

Thanks to my fellow researcher Thea for sharing her feedback on the findings. A special mention to my friend Eduardo who has provided his comments on this thesis and shared with me his positivity.

A special thanks to my parents, Zafrullah and Rana, for their unconditional support and encouragement. Finally, heartfelt thanks to my partner, Gurdeep for standing by my side in this journey and being able to take time out to review and comment on this thesis.

Preface

Background of the project

The Master Thesis topic is part of the RELIGHT project for 2022-2024 “Building and Evaluating digital AMR literacy to Combat AMR: A case study from India” led by Arunima Sehgal Mukherjee from the Institute of informatikk at UiO.

“*DigitalAMR* will work with the assumption that co-production of health literacy content can help expand people’s agency to better navigate the structural inequities to mitigate the AMR risks and enhance health equity as the poor and disadvantaged are most badly affected by AMR. Health literacy entails people’s knowledge, motivation, and competence to access, understand, appraise, and apply health information to make judgments on their health-seeking behaviour to improve their quality of life. The project will also contribute to building systematic methodologies for evaluating the effectiveness of digital health promotion (DHP) as an intervention for strengthening health literacy in LMIC contexts. The empirical base will be in India, a global AMR hotspot, with compromised access to and understanding of key information about AMR use and extremely poor disease awareness, particularly in rural settings”.

My motivation for the Thesis

My master's thesis endeavoured to contribute to the first part of the DigitalAMR project by creating insights into the Health literacy needs of the community in rural India.

I intend to work in public health and the project fits my motivation. Having worked in the healthcare industry for a decade I wanted to shift to the other side of the healthcare industry and work on social & public health advocacy, policy, and communication. My experience as a brand manager with a multinational organization, interacting with stakeholders like medical representatives, pharmacist, doctors, and patients have enriched my understanding of the Indian health system. I have considerable socio-cultural exposure through the experience of travelling to 25 states (out of 28), living in 6 cities in India, and genuine interest in people and culture. I have done ethnography studies in 2009 and completed my MBA program in 2010 post that I started working in the healthcare industry.

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Introduction

The World Health Organisation (WHO) adopted the Global action plan for antimicrobial resistance[2] (AMR) in May 2015 at the world health assembly. This was a measure to address the growing global threat of drug resistance, increasing the burden of disease and risking human health (WHO, 2015).

In an article (Murray et al., 2022) published in Lancet, the number of deaths attributed to AMR in 204 countries & regions was estimated to be 4.95 million in 2019. This makes AMR the leading cause of death around the world, with the highest burden in low-resource settings. While AMR poses threat to all, young children are at a higher risk, with 1 in 5 deaths attributable to AMR occurring in children under the age of 5 (The Guardian, 2022).

Additionally, the existing literature suggests that AMR can affect incidence, deaths, length of hospital stay, and overall healthcare cost, especially at a time when antibiotic development is at a snail's pace. The overuse of antibiotics during the Covid-19 pandemic is fuelling drug resistance across the world (Pelfrene et al., 2021).

In this section, I will highlight the main causes of antimicrobial resistance, the role of antibiotics, the role of health literacy to address public health awareness, and the status of AMR in India. In the last section, I will describe the purpose of this study and the research questions related to the study along with an introduction to the empirical site of my primary research.

Antimicrobial resistance is a global threat

Antibiotics have transformed medicine and saved millions of lives worldwide since their discovery. However, the emergence of resistant bacteria is endangering its efficacy and with it lives of many. Bacterial infections have again become a threat once again (Spellberg & Gilbert, 2014; Ventola, 2015).

The main causes attributed to the antibiotic resistance crisis :

[2] According to (WHO, 2022), “Antimicrobial Resistance (AMR) occurs when bacteria, viruses, fungi and parasites change over time and no longer respond to medicines making infections harder to treat and increasing the risk of disease spread, severe illness and death”.

i. Overuse: It is well documented through epidemiological studies that the overuse of antibiotics drives the evolution of resistance. Studies have demonstrated a direct relationship between antibiotic consumption and the emergence and dissemination of resistant bacteria strains. Despite these warnings, antibiotics are overprescribed across the world, with unregulated use in many countries and availability over the counter without a prescription

ii. Inappropriate prescription: Incorrectly prescribed antibiotics also contribute to the promotion of resistant bacteria. Studies have shown that treatment indication, choice of agent, or duration of antibiotic therapy is incorrect in 30% to 50% of cases (CDC, 2013; Luyt et al., 2014). The inappropriate prescriptions of antibiotics have uncertain therapeutic benefits and expose patients to potential complications of antibiotic therapy (Lushniak, 2014).

iii. Use in agriculture: Antibiotics are extensively used as growth supplements in livestock not just in the developing world but also in the developed world. These antibiotics are ingested by humans when they consume food especially meat & dairy (Golkar et al., 2014). The use of antibiotics in agriculture also affects the microbiome of the environment, especially the soil & water (Bartlett et al., 2013; CDC, 2013)

iv. Scarcity of new Antibiotics: The development of new antibiotics had been an effective strategy to fight resistant bacteria in the past, but due to economic and regulatory obstacles the discovery of new antibiotics has been a slow process (Bartlett et al., 2013). The lack of incentives & regulatory impetus for the pharmaceutical industry for research & development slows down the continued development and availability of antibiotic medications (CDC, 2013; Gould & Bal, 2013; Michael et al., 2014; Piddock, 2012)

v. Environment & human mass gathering: The untreated hospital and industrial effluents received in sewage plants are often the repository of AMR and ARGs[3] (Fouz et al., 2020).

Role of antibiotics

The early twentieth century saw the discovery of antimicrobial[5] to protect population from microbial infection. The propensity of these compounds to kill pathogens influenced the discovery of novel antimicrobials. However the introduction of major antibiotics has

[3] ARGs - Antibiotic resistance genes

[5] "Antimicrobials – including antibiotics, antivirals, antifungals and antiparasitics – are medicines used to prevent and treat infections in humans, animals and plants" (WHO, 2022).

stagnated since the discovery of fluroquinolones in the 1970s (WHO, 2014). The WHO categorizes antibiotics as essential medicines and suggests their availability at affordable prices to meet the priority healthcare needs. In addition to that WHO has developed a process to monitor the usage of antibiotics called AWaRe i.e. Access, Watch, Reserve (AWaRe)classification of antibiotics. In this program, antibiotics usage is timely evaluated and monitored to reduce the spread of AMR pathogens (WHO, 2019).

Health literacy crucial for AMR

Health has biological, psychological, and social determinants. According to WHO, Social Determinants of Health (2022, para. 1)

"Conditions in which people are born, grow, work, live, and age, and the wider set of forces and systems shaping the conditions of daily life".

The broader factors include "economic policies and systems, development agendas, social norms, social policies, and political systems" (Social Determinants of Health - WHO, 2022, para 2).

Research suggests that social determinants of health account for 30-55% of health outcomes. Some of the social determinants of health as presented by WHO are as follows (Social Determinants of Health - WHO, 2022):

- *Income and social protection*
- *Education*
- *Unemployment and job insecurity*
- *Working life conditions*
- *Food insecurity*
- *Housing, basic amenities, and the environment*
- *Early childhood development*
- *Social inclusion and non-discrimination*
- *Structural conflict*
- *Access to affordable health services*

These conditions determine cognitive, behavioural, numerical, and social skills as well as financial resources which in turn affects access to health information & health care access, therefore determining health outcomes.

Since antibiotic usage and misuse, need awareness & education from different stakeholders, it is imperative to understand how social determinants affect the antibiotic crisis (Charani et al., 2021).

In the review (Nutbeam & Lloyd, 2021) the authors suggest that Health literacy is considered a social determinant of health or a part of public health response to address the inequities. The WHO describes Health literacy (HL) as "the cognitive and social skills that influence peoples' motivation and ability to gain access to, understand and use information in ways which promote and maintain good health" (Health Promotion-WHO, 2009, para. 2). HL and its construct are further discussed in the section "Theoretical perspective".

According to Batterham et al. (2016), Health literacy affects health equity and outcomes through four main causal pathways which are as follows;

i. Access and utilization of health
ii. Interacting with health service providers
iii. Caring for one's health and the health of others
iv. Participating in health debates and decision making

The first two pathways are most relevant to the healthcare sector while the other two are more relevant to the community sector (Nutbeam & Kickbusch, 1998; Paasche-Orlow & Wolf, 2007; Sørensen et al., 2012).

Antibiotic resistance also affects the marginalized population more than others. The burden of disease increases with antibiotic resistance as the health care expenditure increases in addition to the loss of income. Thereby, antibiotic resistance widens the gap of health inequity especially in developing economies.

One of the key challenges included in the Global action plan on AMR (WHO, 2015) is the misuse and overuse of antimicrobials medicine which leads to the development of drug-resistant pathogens. Awareness about the use/misuse of antibiotics is vital among the public & healthcare professionals (Mathew et al., 2019), especially in countries like India (with a dense population and high consumption of antibiotics).

As emphasized by one of the five objectives in the Global action plan for AMR (WHO, 2015, p. vii) "*to improve awareness and understanding of antimicrobial resistance through effective communication, education, and training*", the thesis endeavours to understand what constitutes "effective communication and education" under the health literacy framework.

Therefore, it can be hypothesized that the challenge of AMR can be addressed with health literacy at the community level.

Importance of literacy on antibiotics and why India is the focus

Antimicrobial resistance has grave consequences. It can prolong treatment with expensive & toxic drugs, with a longer period of sickness for the patient resulting in increased morbidity and mortality. The whole process puts a strain on the health system (WHO - SEARO, 2011).

Moreover, the success of surgery, cancer chemotherapy, etc would be jeopardized without effective antimicrobials for care and prevention of infections, increasing the threat of Hospital-acquired infection in vulnerable patients with resistant strains. The infection transmission to others in the hospitals and community will have a significant impact on the economy at the individual level and societal levels. Additionally, with a population of 1.3 billion and interconnection of global commerce & travel, the resistant microorganism is deemed to spread fast to distant countries and continents as demonstrated during the Covid-19 pandemic.

Public education came to the forefront with the Prime minister of India directly addressing the nation in his 2016 radio address highlighting the issue of antibiotic resistance and the launch of the "Red Line" campaign. A red line on antibiotic packaging is aimed to draw public attention to the dangers of its misuse and has been lauded internationally (Srivastava, 2016). However, the impact on public awareness is not documented.

Importantly, the need for health literacy came to the forefront with COVID-19 as policymakers and health authorities struggled to promote the COVID appropriate behaviour with low awareness and health literacy (Dr R Kumar, 2022; Kaushik et al., 2021).

Motivation for the Master Thesis

Antimicrobial resistance is a consider 'silent pandemic' by many and therefore needs to be acted upon. One of the strategic priorities in the global and national action plans is "*to improve awareness and understanding of antimicrobial resistance through effective communication, education, and training*" (WHO, 2015, p. vii). This needs an understanding of the barriers & drivers and the health literacy gaps to develop communication, education, and training. My thesis aims to understand these gaps through analysis of health-seeking behaviour within the framework of inductive analysis and socio-cultural paradigms.

How can this study bridge the information gap regarding antibiotics?

The first strategic objective of WHO's Global action plan on antimicrobial resistance suggests "improve awareness and understanding of antimicrobial resistance through effective communication, education, and training" (WHO, 2015, p. vii). Therefore, by understanding the current practices of the target group & highlighting the health literacy needs, policy makers & future researchers can develop a communication intervention optimized for community settings in India. As part of the RELIGHT project, further research intends to develop an intervention to check if awareness and education can change attitudes & behavior toward antibiotic usage & understanding in the community at Kangra, Himachal Pradesh.

- The research will help understand the health literacy needs for antimicrobial resistance through the understanding of health-seeking practices
- It will help understand the role of the communication channel available and message in the informed health behaviour for AMR

I have followed the guideline from WHO (ACSM- WHO, 2008) and a discussion guide for in-depth household interviews employing the principles of qualitative methods (Busetto et al., 2020)

Research question and Objectives

Based on the rationale above, the purpose of this thesis ;

- To understand the health literacy needs of the community for Antimicrobial resistance

Therefore, the research questions are as follows;

- What are the healthcare-seeking practices and health literacy needs for AMR in the community?
- What is the role of the medium & the message in informed health behaviour ?

The research will seek to answer the above question and create knowledge for future research through primary research with the target group.

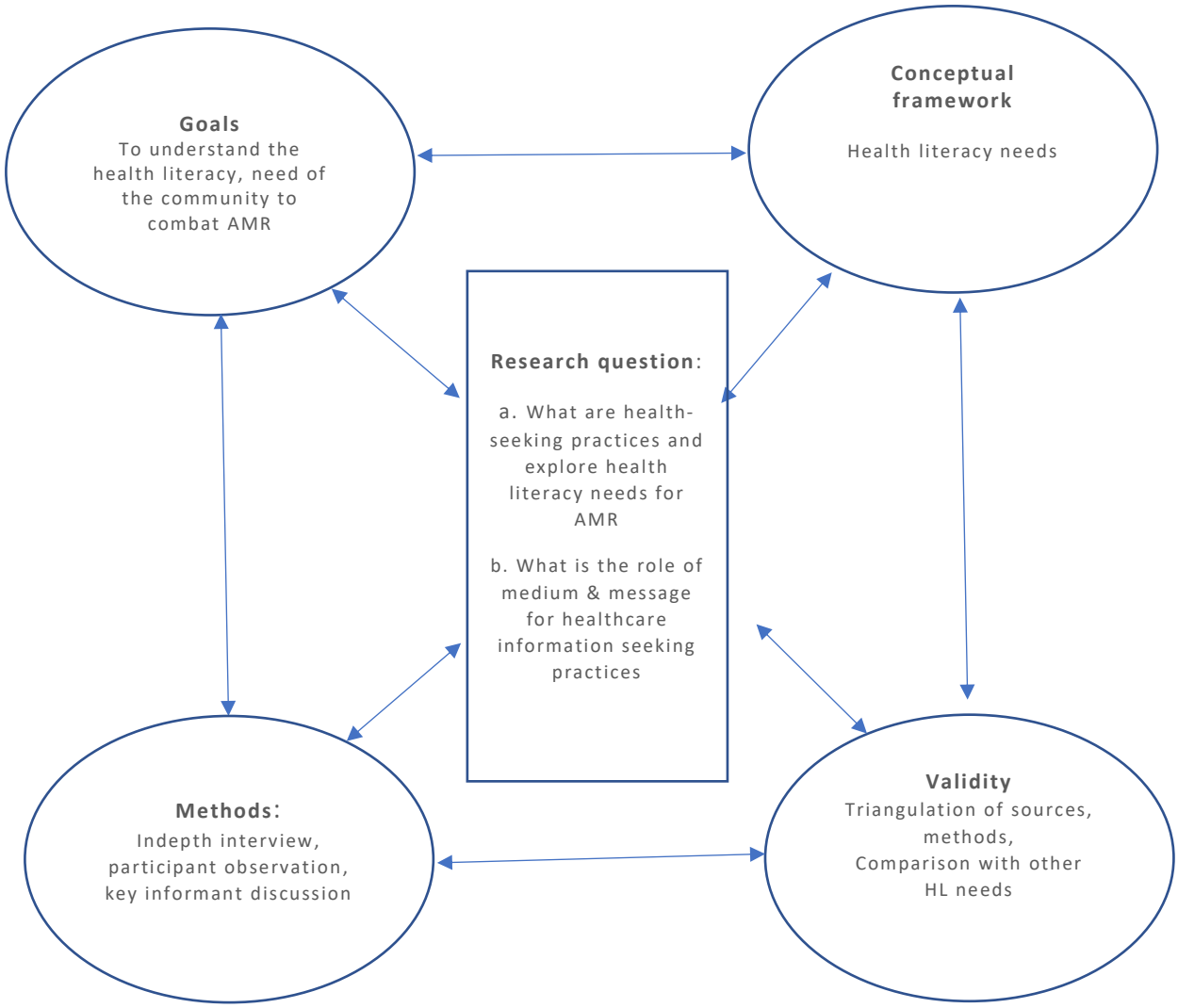
Kangra, Himachal Pradesh

The place of the study is in the district of Kangra, which is one of the biggest districts in the northern state (region) of India – "Himachal Pradesh" – 55,673 sq km in area (refer fig 2) with a population of 6.8 million. Himachal Pradesh shares an international border with Tibet to the east. It is popular for its snow-clad mountains (Himalayas), lakes, rivers, beautiful valleys, and the Dalai Lama (Tibetan teacher) in exile.

Around 90% of the state's population lives in rural areas (HP census data, 2011). Agriculture, horticulture, hydropower, and tourism are important constituents of the state's economy. Himachal Pradesh has been ranking with a high Human Development Index (0.76) among Indian states (India's HDI was 0.645 in 2019) consistently since 2011. It also has one of the highest literacy rates in India (82.8%) with a female literacy rate of 76% (India's average literacy rate is 74% & female literacy rate in 66%) (Literacy Rate - India, 2022 ;HDI - CEDA, 2021).

The site for the primary research is Baroi-Chamunda which is in the district of Kangra with a functional Primary health center. Kangra is one of the 12 districts in the state of Himachal Pradesh. Kangra is further divided into subdistricts called Tahsil and villages. The district of Kangra has 33 subdivisions, 7 towns, and 3906 villages. The literacy rate in Kangra is higher than the state literacy rate and stands at 85.67% with female literacy of 80%. (Demography - Kangra, HP). In terms of public health environment, Kangra has the reputed tertiary care hospital i.e. Rajendra Prasad Government Medical College (RPGMC) in Tanda (17km away from PHC- Baroi) . It also has two zonal hospitals, one in Dharamshala (15kms away from PHC). 5 Civil hospitals in the subdivision of Kangra, Palampur, Baijnath, Nurpur, and Dehra. It has 13 block health centers. (Health | Kangra, Himachal Pradesh | India, 2022). The Primary health center (Baroi-Chamunda) has 11 subcentres as well.

Research Design Map



Background

With a population of 1.4 billion people, India strictly needs an enormous healthcare infrastructure to keep its population healthy, and skilled and reduce the burden of diseases.

The density of doctors is 8.6 per 10 000 population, with nurses and midwives being 17.7 per 10 000 population (Selvaraj, Karan, Srivastava, & Bhan, 2022). The 'National Health Policy' highlights the "health for all" approach and provides affordable healthcare to all. The government has focused on universal health insurance over infrastructure & resource building. (MoHFW - Govt of India, 2017)

This chapter will describe the complex Indian public health system, its antibiotic policy & regulations, and the current awareness in the community as understood from the available literature. Finally, it will describe the theoretical framework of health literacy used in the study.

Understanding the context: public health systems in India

India has a mixed healthcare system, inclusive of public and private healthcare service providers (Sheikh et al., 2015). The total health expenditure is 3.01% of the GDP for the year 2019 with 55% as out-of-pocket expenditure and 45% as government expenditure. In comparison, the OECD average healthcare expenditure is 8.8% of the GDP in 2019 (World Bank, 2022).

Infrastructure: The public healthcare infrastructure is developed as a three-tier system – primary, secondary and tertiary care, based on the population norms (refer to Figure.1). But urban India has a greater concentration of private healthcare providers. Most of the primary care in the private healthcare sector in urban areas is provided by physicians (General physicians) with a standalone clinic.

The recommendation of the 3-tiered public healthcare system soon after India's independence in 1947, conceived a public healthcare system to provide preventive and curative healthcare in rural and urban areas placing health workers on government payrolls and limiting the need for private practitioners. This was done to ensure that access to primary care is independent of individual socioeconomic conditions. However, the lack of capacity to provide quality care resulted in a simultaneous evolution of the private healthcare systems with a constant and gradual expansion of private healthcare services (Peters et al., 2003).

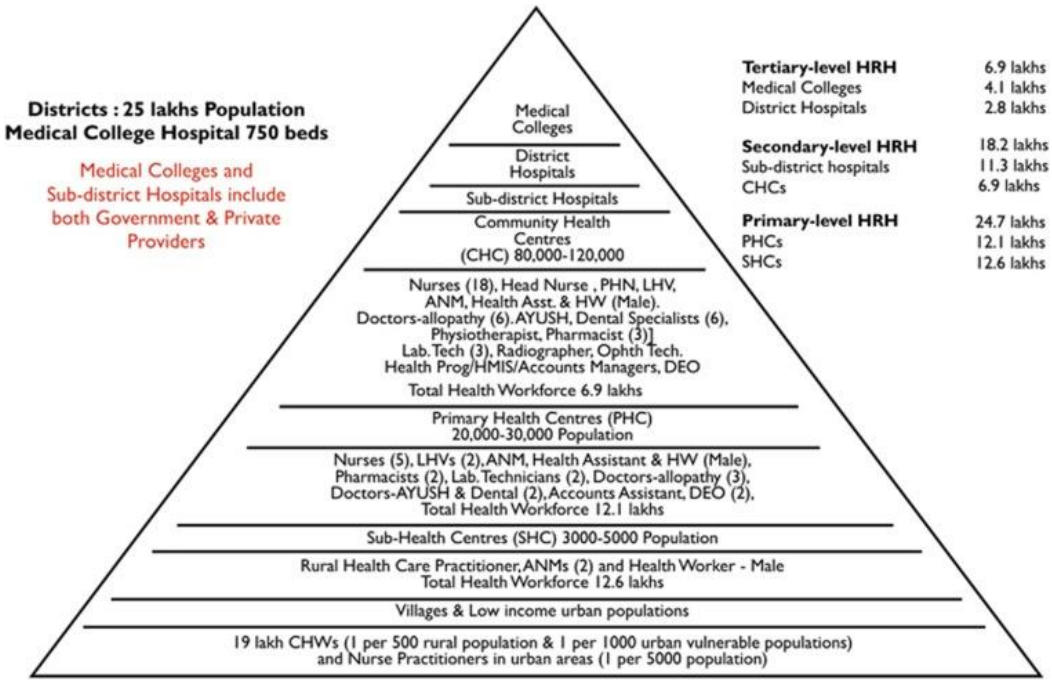


Figure 1- Norms at Primary, secondary, and tertiary levels in India; Reprinted from HLEG Secretariat (High-Level Expert Group Report on Universal Health Coverage for India, 2011, p. 153)

Governance: Due to India's federal system of government, the areas of governance and operations of the health system in India have been divided between the union and the state governments. The Union Ministry of Health & Family Welfare is responsible for the implementation of various national programs (National AIDS Control Program, Revised National Tuberculosis Program, to name a few) in the areas of health and family welfare, prevention and control of major communicable diseases, and promotion of traditional and indigenous systems of medicines and setting standards and guidelines, which state governments can adopt. The areas of public health, hospitals, sanitation, and so on come under the purview of the state, making health a state subject. However, areas having wider ramifications at the national level, such as family welfare and population control, medical education, prevention of food adulteration, and quality control in the manufacture of drugs, are governed jointly by the union and the state government.

Disease: India carries one of the largest burdens of drug-resistant pathogens worldwide, including the highest burden of multidrug-resistant tuberculosis (TB India, 2017), alarmingly high resistance among Gram-negative and Gram-positive bacteria even to newer antimicrobials such as Carbapenems, and Faropenem since its introduction in 2010 (Gandra et al., 2016). Infectious diseases remain a leading cause of mortality in India. Bacterial sepsis, acute respiratory illness, and acute diarrheal diseases are the leading killers of children under 5 years of age.

There are wide gaps in healthcare delivery, service, and resource in the Indian public health system. These gaps contribute to the inequity in healthcare both in the public & private health sectors and further marginalize the marginalized (poor & rural population) (MoHFW - Govt of India, 2017).

A history of rigorous public health programs to contain infectious disease: India has seen large public health awareness campaigns like the Immunization for Polio, the Tuberculosis treatment, and HIV awareness & prevention, which have been successful in their implementation. In 2014, India was declared polio-free by WHO after two decades of the rigorous implementation of public health program across the country (Selvaraj, Karan, Srivastava, Bhan, et al., 2022).

In 2014, the Government of India launched a public health awareness campaign - "Clean India Mission" which was in news about its goals & milestone. It spread awareness towards sanitation & hygiene intending to eradicate open defecation in India. The awareness campaign gained momentum across all media tools and was appreciated for the milestone achievement (UNICEF, 2019).

The overview of past public health campaign and communication channels used will help put into perspective the findings of the study. To spread the message across the diverse & huge population of India, varied communication channels are used e.g. TV, radio, Wall paintings, SMS, and Social media. In rural areas, the primary health centres and their health workers (ASHAs[6]/ ANMs[7]) together with Anganwadi[8] are the primary points of contact for health education & information.

With the advent of low-cost phones/smartphones and penetration of the internet in rural areas, the rural population is getting information from internet messaging platforms or social media. However, broadcast mediums like television and radio are popularly used in most households in rural areas.

[6] Accredited Social Health Activists - ASHAs are health activists who are expected to improve health awareness and mobilize the community in which they are based for health planning and increased utilization and accountability of existing health services (Selvaraj, Karan, Srivastava, Bhan, et al., 2022)
[7] Auxiliary Nurse Midwives
[8] Anganwadi centres offer nutrition education and supplementation, pre-school activities, immunization and antenatal services for care of rural mother and child, started by the Government of India in 1975 (Selvaraj, Karan, Srivastava, Bhan, et al., 2022)

Medical pluralism in India

To understand the health seeking practice in India, one need to get familiarise with the many medicines system practiced in India. India's diverse socio-cultural milieu lends to medical pluralism as many ancient systems of medicine co-exist together in different parts of the country. This system presents to the patient a wide variety of choices for the pathway of care. The multiple systems of medicine can be defined as Indian medicine (Ayurveda, Yoga, Unani, Siddha, Sowa-Rigpa) and others (Homeopathy, Naturopathy) (Ayush Systems,2022). This medical system is affiliated with & regulated by the Ministry of Ayush which has formed in 2014 after the elevation of the erstwhile Department of Ayush (formed in 2003). The medical practitioners and the educational institutes in this system are regulated by the National Commission for Indian System of Medicine & Central Council for Research in Homoeopathy. The medical practitioner of biomedicine is regulated by the National Medical Commission (erstwhile Medical Council of India). However, most of the primary & tertiary care in the public health system is dependent on the medical practitioner (Doctors, Nurses, diagnostic) of biomedicine (allopathy) due to various factors like evidence-based knowledge, colonial legacy, etc. It has been argued by Kumar & Pal (2018) that the medical practitioner of AYUSH medicine has allowed for increased healthcare access, especially in rural areas where the low doctor (biomedicine) to population ratio causes healthcare delivery challenges. The policy makers & government have allocated & appointed medical practitioners from the AYUSH system of medicine in tertiary & primary care of the public health system to increase the accessibility of healthcare. Nevertheless, there remains a lot of confusion and contradiction in the pathway of care for citizens, accountability of public health programs, and use/misuse of biomedicine by practitioners of the AYUSH system. Recently, the Indian medical association (one of the largest bodies of physicians of biomedicine) highlighted this ambiguity created by the changing laws, legal validity (due to the changing laws by the Central government), and the status of a medical practitioner of AYUSH medicine through an open letter to the Prime minister of India (Agarwal & Sharma, 2020)**.** The unauthorised prescription of antibiotics has implications on health-seeking practices and irrational use of antibiotics in the community.

Antibiotic policy in India

India has one of the highest infectious disease burdens in the world which is further aggravated by the inappropriate and irrational use of antimicrobial agents leading to high antimicrobial resistance. Antimicrobial resistance is the best example of an iceberg

phenomenon of disease with superbugs the observable signs of our prolonged failure to preserve antibiotics (WHO, 2018).

With the growth of global trade and travel, resistant microorganisms can spread rapidly to distant countries and continents. Therefore, it is a global concern when the second most populated country in the world has a burden of disease with antimicrobial resistant bacteria.

According to Ventola (2015) a systematic follow-up in LMICs during 2000–2015 revealed a 114% rise in antibiotic consumption and a 77% increase in the rate of antibiotic consumption. India is among the highest consumers of antibiotics with increased retail sales of 23% when compared to other BRICS countries (Patel et al., 2017).

The controversy related to the discovery of bla_{NDM-1} (New Delhi Metallo-β-lactamase) in 2009 required the policymakers to start the development of AMR containment policies for India in 2011(World Health Organization-SEARO, 2011b; UK 5 Year Antimicrobial Resistance Strategy 2013 to 2018, 2020; Dahal et al., 2017).

Ever since the Indian Government has taken the initiative to tackle the overuse of antibiotics. A chronology of events for AMR policy is specified below (table 1) ;

Table 1- Timeline for AMR policy in India (Gandra et al., 2017).

Year	Policy implication	Objective
2010	Established a national task Force on AMR containment	Assessment of the AMR situation in India
2011	Jaipur Declaration	Amendments in planning and management of AMR containment
2012	Chennai Declaration	
2012	National centre for Disease Control (NCDC)	
2014	Implementation of schedule H1	Limit the over-the-counter availability of the certain antibiotics
2016	Launch of Red line Campaign on Antibiotics to create awareness regarding rational usage of antibiotics	Awareness program to educate the people for rational usage of antibiotics

A National Task Force on AMR Containment was established in 2010 followed by the adoption of the National Policy for Containment of AMR, and the inclusion of antimicrobial containment in the 12th 5-year plan in 2011 (Gandra et al., 2017).

A roadmap was shared in the "Chennai declaration" in August, 2012 to confront the issues of AMR from an Indian perspective which led to ICMR[9] establishing a national surveillance network of laboratories at tertiary medical academic centres (Ghafur et al., 2013a). Following this declaration, a five-year national plan was developed in 2012 under the governance of the National Centre for Disease Control (NCDC) with a primary focus on the establishment of nationwide AMR surveillance. In 2012, ICMR also launched Antimicrobial Stewardship, Prevention of Infection and Control (ASPIC) to educate and enhance awareness of the rational use of antibiotics (Government of India, 2017).

In 2014, there was a notification of Schedule H1 to regulate the purchase of certain categories of antibiotics without prescription. The ICMR, the All India Institute of Medical Sciences (AIIMS), and the U.S. Centers for Disease Control and Prevention (CDC) came together in 2015, through the Global Health Security Agenda (GHSA) platform to observe and alleviate the issues of AMR (ICMR,2016).

In 2017, the Government of India adopted a National Action Plan (NAP) on AMR (Government of India, 2017) and listed the strategic objectives that are aligned with the global action plan based on national needs and priorities (Dixit et al., 2019).

The National Action Plan for Containment of AMR (NAP-AMR) (Government of India, 2017, pp 20) aims "to improve awareness about AMR, strengthen knowledge & evidence through surveillance in various sectors, promote effective infection prevention & control, regulate for optimized use of antibiotics, promote research in this area, and strengthen India's leadership in AMR containment". Studies (Jani et al., 2021) suggest that there have been efforts to devise strategies to alleviate the increasing issue of AMR, but its effectiveness is unclear due to lack of measures to to monitor and investigate the effectiveness of the AMR containment policies. For example, antibiotics were still available without a medical prescription in spite of the Schedule H1 regulation (Satyanarayana et al., 2016).

Furthermore, the status of policy implementation and update on NAP-AMR or the Stewardship program on AMR are not mentioned in the Annual report (2020-21) by the

[9] The Indian Council of Medical Research (ICMR), New Delhi, the apex body in India for the formulation, coordination, and promotion of biomedical research

Ministry of Health & Family Welfare, Government of India published in 2022 under the National health policy section or any other.

The Government of India launched a campaign in 2016 – "Red Line" that warns the consumer about consuming schedule H drugs (with a red line on their packaging) and only after a doctor's consultation/prescription (Travasso, 2016). However, the implementation & outcome of antibiotics awareness under the Red Line Campaign remains unclear.

The implication of National policy on AMR has made several policy decisions since its inception in 2010, but much has to be seen in implementation to curb the rising resistance in the country.

Awareness about AMR in India

The World Health Organization (2015) conducted a multi-country public awareness survey on ABR in 12 Member States and looked at three key areas: self-reported use of antibiotics, knowledge of antibiotics, and knowledge of antibiotic resistance. The online survey with 1023 respondents from India is summarised as follows.

- 48% took antibiotics last month, 28% in the last 6 months, 7% in the last year, 8% more than a year ago, 3% never, 6% can't remember
- 90% report that they got their antibiotics (or a prescription) from a doctor or nurse
- 92% received advice on how to take antibiotics
- 95% got the medicine from a pharmacy or medical store, 2% from the internet 1% from friends & family
- 33% think it's okay to use antibiotics that were given to a friend or family member, as long as they were used to treat the same illness
- 52% of answered 'true' to the option "It's okay to buy the same antibiotics, or request these from a doctor if you're sick and they helped you get better when you had the same symptoms before"
- 58% feel one should take the full course as directed by a physician
- 75% are most likely to state that antibiotics can treat colds and flu
- 75% aware of the term Antibiotic resistance
- 72% say that "Medical experts will solve the problem of antibiotic resistance before it becomes too serious"

Furthermore, 67% of respondents were urban, 24% suburban and 9% rural. 85% had higher education (college and above) and 70% in the age group 16-44 (48% in the age group 16-34).

In the study by Desai et al.(2015) to measure public perception, knowledge, attitude, and behaviour on AMR in Davangere, Karnataka, India in 2016 among the outpatients (n=500), it was highlighted that 75% of the respondents were unaware of the bad effects of antibiotic resistance. 80.4% of patients were found to practice incomplete antibiotic courses and 86% of patients would take leftover antibiotics for similar indications without consulting doctors. This study also suggested the need for public awareness and education on antibiotic usage and resistance.

In the qualitative study by Kotwani et al. (2016) with high school students & their teachers (5 FGDs with 4-6 teachers & 15-20 students in each), the results suggested that students had poor knowledge regarding antibiotics and antibiotic resistance, while only some teachers had a basic understanding. The study also recommended a multipronged approach including public awareness campaigns involving schools, better doctor-patient relationships, and stronger regulations.

Another qualitative study by Barker et al. (2017) with community members in Haryana, India found that ;

i. The consequences of antibiotics misuse were inadequately understood by study participants, none of the participants were able to define the term antibiotics

ii. Moreover, when the participant don't have access to allopathic doctors they are willing to purchase medications directly from a pharmacy without a prescription

iii. Participants in the low-income group are more prone to stop antibiotics after symptoms subsided

However, the study 'Attitudes and awareness about antimicrobials usage and resistance in Delhi' in Suri et al. (2021) (n=916) found that 79.5% of the respondent has good awareness of antibiotic usage and 72.7% of respondents were aware of antibiotic resistance. In the study, 81% of the respondent were from urban areas, 79% were graduates, and had post-graduate education (8%). 86% of the respondent were also science graduates. The analysis further shows that people living in an urban area, with a bachelor's or higher education level have more knowledge about AMR.

In the study by Banerjee & Raghunathan (2018) with a select cohort (n=504) in urban India (66% from Maharashtra), post the "Red Line" initiative of the Government of India it was observed that 47% were unaware of the differences between over-the-counter drugs and

antibiotics. 1 in 4 believes that dose-skipping does not contribute to AMR. 1 in 10 tends to self-medicate. 1 in 5 bought medicines without a prescription or started an antibiotic treatment by calling a doctor. It also highlighted that 65.5% of respondents had consumed antibiotics in the last year similar to that reported by Chinnasami et al. (2016).

In a cross-sectional study by Trikha et al. (2020) among doctors (n=215) in the northern state of Haryana that it was a lacuna of training concerning antimicrobial resistance. It highlighted the deficiencies in knowledge and practice of surgical prophylaxis.

The above studies clearly show the lack of awareness level across the socio-economic levels in diverse groups. However, most of the studies were done in an urban setting and did not highlight health literacy needs from structural and sociocultural perspectives.

The challenges in accessing antibiotic information

The current challenge in accessing antibiotic information for the public is a lack of awareness about the consequence of overuse. Although promoting awareness is the foremost step in this objective, awareness does not always translate into behavioural change, and hence, behavioural change strategies optimized for cultural context need to be developed and implemented (Schreijer et al., 2014). The lack of formal education & awareness about infection amongst the public has been linked to Antibiotic resistance (Alividza et al., 2018; Jonas et al., 2017). Another challenge with AMR-related public health promotion and education is the inadequate discourse to tackle the inequalities in literacy and education which fail to reach the most vulnerable group where it is needed the most. Moreover, the evaluation of such a campaign is hardly done especially thereby leaving limited chances of learning from any possible impact (Redfern et al., 2020). These challenges are plausible in the Indian context where socio-economic disparities are high, coupled with power construct & hierarchies within public - healthcare providers' interaction, and vice versa or otherwise. As argued by Charani et al.(2021) the approach to look at ABR through the intersectionality of socio-cultural construct, power & hierarchies will facilitate sustainable means of addressing the threat of ABR.

Theoretical perspective: Health literacy (HL)

The WHO describes Health Literacy (HL) as "the cognitive and social skills that influence peoples' motivation and ability to gain access to, understand and use information in ways which promote and maintain good health" (Health Promotion-WHO, 2009, para. 2) . HL is a multi-dimensional concept that contains a variety of cognitive, affective, social, and personal skills and attributes (Jordan et al., 2010; Buchbinder et al., 2011). Therefore it suggests the possibility of a diversity of needs and strengths for individuals and groups, along the time and the dimensions of health literacy.

Three types of health literacy are mentioned in Nutbeam (2000);

- Basic or functional literacy entails basic reading and writing skills so that individuals can take care of their health by using the health information in everyday life
- Communicative or interactive literacy is the next level of understanding & comprehension of health literacy. In addition to social skills, this type of literacy is vital for everyday life, including interaction with health care providers, finding information, obtaining meaning from multiple sources of information, and applying new information to changing life situations.
- Critical literacy is the most complex of the three types of HL. It requires critical analysis of information by applying cognitive skills. It also involves the skills to participate in discourse about health and shared decision-making.

As substantiated by Nutbeam (2000) and Sørensen et al. (2012), functional health literacy increases participation in population health thereby providing community and social benefits whereas interactive health literacy enhances the capacity to influence social norms and interact with social groups. One could argue and analyse the type of health literacy is required at the current stage of awareness about antibiotic resistance in India.

Sørensen et al. (2012) published an integrated conceptual model based on the review of other models of HL. The model groups various conceptual views of HL into two dimensions: the core qualities of HL and its scope & area of application.
The process requires four types of competencies: (1) Access refers to the ability to seek, find and obtain health information; (2) Understand refers to the ability to comprehend the health information that is accessed; (3) Appraise describes the ability to interpret, judge and evaluate the health information that has been accessed; and (4) Apply refers to the ability to communicate and use the information to decide to maintain and improve health

This process generates knowledge and skills which enable a person to move through the three domains of the health continuum: as a patient in the healthcare scenario, as a person at risk of disease in the disease prevention system, and as a citizen concerning the health promotion efforts in the community, the workplace, the educational system, the political arena, and the marketplace. In addition to the two dimensions, the model also includes antecedents and consequences of HL. This means the factors which impact health literacy, including societal and environmental determinants (e.g., demographic situation, culture, language, political forces, societal systems), personal determinants (e.g., age, gender, race, socioeconomic status, education, occupation, employment, income, literacy) and situational determinants (e.g. social support, family and peer influences, media use and physical environment).
The consequences of Health literacy are the influences on health behaviour and the use of health services, thereby impacting health outcomes and health costs in society.
The frameworks associated with the three domains represent a progression from an individual toward a population perspective.

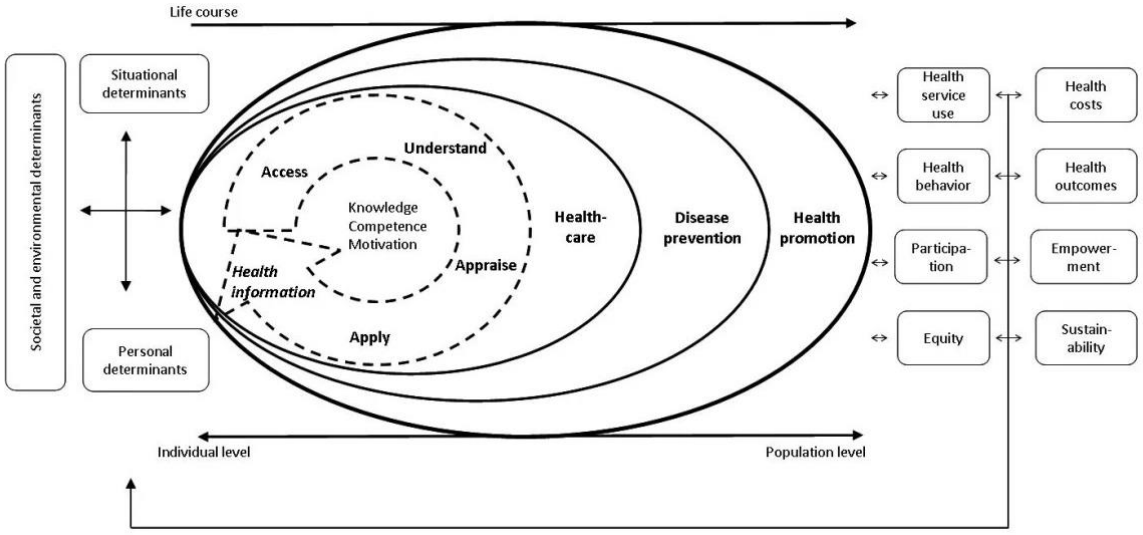


Figure 2- An integrated model of Health literacy; Source- (Sørensen et al., 2012), *reprinted under open access license*

The model developed by Sørensen et al. (2012) can present a conceptual basis for the development and validation of measurement tools, describing the different aspects of health literacy within the healthcare, disease prevention, and health promotion scenario. It can also provide the foundation for the development of health literacy interventions.
The study aimed to explore HL needs in the local community through the lens of access, understanding, appraising and applying in the context of AMR

Methods

Scope of the study

- This study will focus on
  - To understand health-seeking behavior and the explore health literacy needs of the community
  - Finally, understand the role of the medium and the message for the healthcare information-seeking journey
- This study will not focus on
  - Many factors contribute to antibiotic resistance in India, however, my study will not be able to check awareness & attitude toward antibiotic usage in animal husbandry or farming. Neither the study will explore the factors like contamination of drinking water through industrial effluents and its awareness among the target group.

My Role in the Research

With the intent to contribute to public health and the understanding of policy evaluation, research design & qualitative methods at the current program (HEPMA, UiO) coupled with a decade of experience in the healthcare sector in India, I have worked with the RELIGHT project within the scope of my master thesis. In the later chapters, I will share the results and answer the research questions from the sociocultural perspective analyzing the in-depth interviews in the community.

Empirical setting

Villages surrounding the Primary Health Centre - Baroi in the District Kangra, Himachal Pradesh

Research design:

To understand the health-seeking practices of the people (community) and explore the health literacy needs for AMR. In the process also understand the role of medium and message for informed health behaviour.

- The villages surrounding the PHC- Baroi were selected as the empirical site for the study
- The research methodology will follow the guideline from WHO (ACSM- WHO, 2008) and a discussion guide for in-depth interviews employing the principles of qualitative methods (Busetto et al., 2020)

Sample design

The empirical site is selected in coordination with the department of community medicine (in consultation with HOD Dr. Sunil Raina) at the tertiary care Dr. Rajendra Prasad Govt. Medical College & Hospital, Kangra, HP.

Respondents: The primary respondent of the study is the community i.e. general population in the villages. Individuals in the village are selected for in-depth interviews (adults, inhabitants of the empirical site, and decision-makers in the household/family).
In-depth interviews with households will be the primary tool for data collection based on the discussion guide (Semi-structured interviews are characterized by open-ended questions) (Hijmans & Kuyper, 2007).

Discussion guide: (Please refer to the appendix for the complete file). The discussion guide was based on the WHO's definition of HL (Health Promotion-WHO, 2009, para. 2) as "cognitive and social skills which determine the motivation and ability of an individual to gain access to understand and use information in ways which promote and maintain good health". I also consulted comparative studies on HL needs e.g. (Borge et al., 2021), and looked into its discussion guide to validate. Further, to elaborate the aim, a vignette was written around the theme of 'HL in AMR' which was read in the interviews to get comments and reactions to the story. The vignette was based on a comparative study (Borge et al., 2021) and the health outcome of AMR.

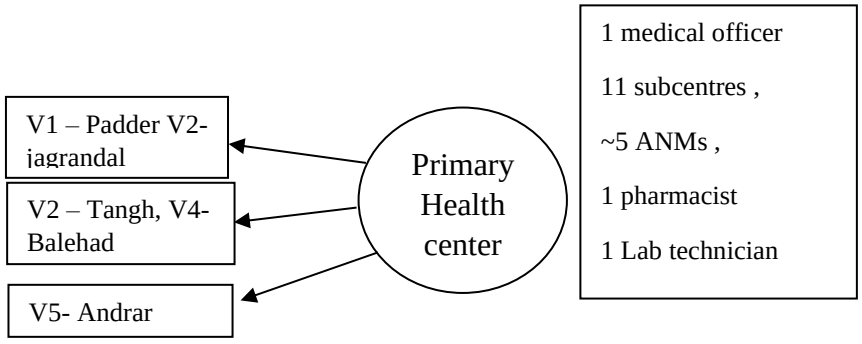
Additionally, the discussion guide had questions to probe about the communication channel (medium) and the type of messages that are used, preferred, and remembered by the community. The discussion guide was translated into Hindi (the local language) by the researcher for ease of discussion.

In addition to the in-depth interview, I have applied the methods of

- Observation
- Key informant interviews (Medical officer, ASHAs & supervisor, ANMs, pharmacist) not recorded

I have used **purposeful sampling**[10], to meet the households (five to seven) in the five villages - Jagrandal, Padder, Tangh, Balehad, Andrar, with the help of ASHAs. The household is representative of different kinds in terms of socio-economic status.

(Interview with 5-7 households in each village)



Feature of households:

Name	Gender	Age	Education	Occupation/ Employment	Phone used
1)					
2)					
etc.					

Sample size: 25 household interviews until Thematic saturation[11] (Kerr et al., 2010).

Data collection:

The interviews lasted for 25-45 mins depending on the content & keenness of the person to talk. All the interviews were conducted in the individual's home or shop (next to the home). The discussion guide was pilot-tested. The interviewer was introduced by the ASHAs to the household and then introduced the topic i.e. 'discussion about healthcare information". Demographics details like age, gender, and education were noted. Moreover, the type of phone used was noted to understand media habits.

Data Analysis :

The audio of the interviews are recorded and transcribed *verbatim*, with annotations for expression (e.g. laughing, crying, pausing) and phonetic transcription of dialects, as per relevance of the analysis (Boeije, 2005; Fossey et al., 2002; Introduction to Social Research, K F Punch).

[10] participants are selected in a directed way based on a criterion or rationale.(ACSM - WHO, 2008)
[11] refers to the point in data collection when no additional issues are identified, data begin to repeat, and further data collection becomes redundant

In the second step, the transcripts are *coded*, that is, tagged or labeled with one or more sub-theme to connect the raw data with theoretical terms to organise the date and make it interpretable as recommended by Jansen (2007).

The codes are then grouped, summarised, and/or categorized for the process of comprehension and insight generationThe coding process is performed using qualitative data management software NVivo12 (Busetto et al., 2020).

The data analysis process can be described as thematic analysis (Braun & Clarke, 2006). To understand the health literacy needs as applied in comparable research, I have applied thematic analysis and used the inductive approach to analyse the qualitative interviews through a constructionist perspective (Braun & Clarke, 2006).

In the constructionist perspective, meaning and experiences are socially produced and reproduced and do not seek to focus on motivation & individual behaviour. On the contrary, it seeks to theorize the socio-cultural context and structural conditions that enable the individual accounts that are provided (Braun & Clarke, 2006).

The themes that are identified are strongly linked to the data of the primary research. Finally, the latent themes are clustered together to form insights into health literacy needs.

Assessment of Qualitative data

- Checklist to ensure transparency: Followed the checklist(. Standards for Reporting Qualitative Research (SRQR)) to ensure all items that are relevant for the research are addressed, to establish transparency and quality of the research (Boeije, 2005; O'Brien et al., 2014).
- Reflexivity: It is important to check the relationship between the researcher and the researched (Busetto et al., 2020). So, I have included the process of establishing & maintaining contact with respondents, also detailed in the field work case study. I have travelled to Himachal Pradesh multiple times so I'm aware of the socio-cultural nuances of the region. I'm a Hindi speaker and was able to communicate in the language of the local community, though the people in the community speak a different dialect called 'pahadi'. As a woman, I might be able to relate more with the women respondents however, my urban upbringing might also pose a challenge to understanding the nuances of the rural community. I am conscious of the challenges of bias and have tried to be aware of them.

- Pilot interview: Qualitative research is an iterative process, so I conducted one pilot interview to help understand the wordings/questions that work best for the respondents and understand the length of the interview (Hijmans & Kuyper, 2007)
- Co-coding: The coding of the qualitative data was reviewed by colleagues (supervisor) to ensure consistency with research data and avoid blind spots (Boeije, 2005)
- Stakeholder involvement (Busetto et al., 2020): Discussion with healthcare providers in the empirical site has helped understand the ecosystem. I have done key informant interviews with the following stakeholders in the Primary health center, Baroi ;
    - Medical Officer (1)
    - ASHA workers (3)
    - Auxiliary midwives nurse (1)

Ethics :

The study is part of the RELIGHT project (PI – Arunima Sehgal) therefore the NSD approval for the RELIGHT project applies to this study.

The project is approved by NSD under the reference number 744615.

The interviews are anonymous data without any personal identifiers. I have practiced the tenets of informed consent with all interview participants.

Empirical case study

The study began on 3rd April 2022 with my travel from Oslo to India. I had to conduct primary research to understand the health-seeking practices in the community for the development of health literacy intervention to combat AMR.

After some acclimatization and understanding of the geography in the district of Kangra, I visited the Rajendra Prasad Govt Medical College (RPGMC) to meet a few stakeholders with my Supervisor (Arunima Sehgal) on the 14th of April, 2021. RGPMC is the biggest tertiary care & medical college in the district of Kangra. I met Dr. Sunil Raina (head of community medicine dept at RPGMC), Dr.Harsdeep, and Dr.Anuradha (microbiologist /pathologist) at RPGMC to understand the setting of the healthcare services in the area and the challenges of AMR in the area.

In the next week, I was scheduled to meet the ASHA (Accredited Social Health Activist) workers of the Primary Health Center (PHC) in the village (Chamunda-Baroi) – the empirical research site. Asha is a common name in India meaning hope and has become the de-facto

name for all the healthcare workers at this rank. Hence each one may be known by their name or simply ASHA didi (‘didi’ means big sister in Hindi)

Figure 3- The primary health center, Baroi, Kangra, HP-India; source: author's picture

The PHC in Baroi/Chamunda is about 18 km from RGPMC and caters to 11 sub-health centers, and 52 villages with a total population of 35,178. The PHC has a medical officer who was on leave for the long weekend (the 15th of April was a national holiday). However, we met the Nursing supervisor and the dentist at the PHC.

The nursing supervisor then put me in touch with the ASHA workers present at the PHC and we shared contact details so I could schedule a visit to one of the villages the next day.

I went to the village of Padder (one of the villages nearest to the PHC – 1 km away) after the ASHA workers took me to the homes of people along the village as I briefed her on my purpose and research tool. Padder is a quaint little village, across the main road from the PHC. I went to the first household and met a 50+ year woman, who is a widow and holds a widow pension and free healthcare due to her husband’s service in the Indian Army.

She spoke to me at length as I probed with the questions in my discussion guide. Most of the villagers were friendly and willing to talk. They often insisted on a cup of tea or water, and some snacks, if it was lunchtime they offered a meal.

I interviewed five participants on day 1, but due to the paucity of time for some respondents, I had to skip questions. The next day I finished a couple of more interviews and spoke to around 8 respondents in the village of Padder. As I walked away after one of the interviews a teenage girl ran to me and asked me about the intermittent pain in her lower abdomen during mensuration. She got the impression that I'm a doctor and she could ask me for a diagnosis of her problem. She told me that she couldn't ask me in front of her brother because it was linked to her periods (due to the stigma attached to mensuration). I told her that I won't be of any help since I'm not qualified to answer her query and requested to go to the PHC for a diagnosis. I did not understand why she has not consulted the doctor in the PHC since it was just a few meters away from her village. But then she said it was a weekend and the doctor was on leave the week before and she would only remember about the issue when she gets her periods. In the two days, most of the villagers could identify me as the woman doing the interview, some would shy away saying they are too busy but most of them would readily talk.

I scheduled an appointment with an ASHA worker from another village (Jadrandal). This village is also within the perimeter of the Primary Health Center, Baroi. (1.5 km from PHC). The next couple of days, I went with 2nd ASHA and the same processes of sampling ensured I walked into the household of willing respondents. However, I requested ASHA 'didi' (fondly called sister) to introduce me to men as well for some interviews. Since my last visit, I met more women and I saw that ASHAs are more friendly with women than men. There are sociocultural factors for the ease of interaction among ASHA (women) and men in the villages of India due to the gender divide. Also, ASHA have been reinstituted in India in 2005 mainly for childcare, maternity care & immunization, therefore, they have been actively interacting with women in most villages since childcare is primarily a mother's responsibility in most households, especially in rural India.

I completed a couple of interviews with the ASHA but then she had to leave for her personal work so she suggested I can go into the next house and start a conversation. In the last couple of weeks, I had become comfortable striking up a conversation with villagers, so I did not mind going into a new household all by myself. I went into the next household - it was a pucca house (brick & mortar house for Socio-economic classification of household by the Indian government and a dog was tied to the gate). I started the discussion with the respondent, who retired and recently widowed due to COVID-19. I had a long conversation as per the discussion guide but then when I discussed the difficulty to receive any health

information, he suggested that “they [ASHAs] will share information with people from their community (Caste)”. It took me a while to decipher the response and then I probed to clarify what he means. He then explained that they (ASHAs) visit, talk more, and therefore share information about programs, schemes, medicine, etc within their community (Caste). The respondent proudly also claimed that he was a member of the ‘upper’ (Savarna) caste and has a ‘connection’ (social network) to get information too. I was working with the ASHA worker who belonged to a Scheduled Tribe (ST) (Called ‘Gaddi’ – traditionally nomad, shepherd tribes in the Himalayan Mountain). Though the ST and upper caste are not very friendly, they also don't have animosity in the village. Nevertheless, this social inequity due to caste segregation led to the feeling of difficulty in information access which will be part of my analysis in the later chapters.

After this incident, I had some offline discussions regarding caste & gender discrimination with ASHAs while we walked through the villages. It was not surprising that caste & gender differences existed but I was pleased by the awareness & efforts of the women in both situations. One of the ASHA workers (from ST) is associated with a self-help group (Nishtha – NGO) for women empowerment that has been working with victims of domestic violence, gender/caste discrimination, and helping widows.

After garnering some interesting responses & interacting with the villages around the PHC, I requested the Supervisor in the PHC to allow me to visit some villages far away. She then suggested that I visit the subcenter in Tangh (4 km away from PHC) and then one of the five ASHA working there could take me to more villages. So the next day when I visited the subcenter in Tangh, I was greeted by some strong-willed women. I then went around with one ASHA in the village of Tangh and spoke to a couple of respondents, again due to the weekday and in the middle of the day – men were not at home. In the next couple of days, I went to the next village Balehad near the subcenter in Tangh. The ASHA who was accompanying me belonged to a Scheduled Caste and she introduced me to a couple of homes of the same caste. However, I did not notice any differences in the socio-economic class (type of house, phone used, and education of the family member) except for one respondent who belonged to the BPL (below the poverty line) group. In India,

Figure 4 - The wall painting on the outside wall of the house belonging to BPL

households are included in the BPL criteria based on deprivation ranking[12]. But as an outsider in the village, it is easy for me to identify which house is part of the BPL welfare program because the authorities paint a stencil on one of the walls of the house for counting purposes (Figure 4). The translation of the image – "house owner Name: NN; Family's BPL no.NN; Members in the house - N, Year of selection 2007".

One of the villagers told me that if a person (head of the BPL family) is an alcoholic or has an addiction to substances then the household is excluded from the BPL welfare program as a punishment. The paint on the wall seems very unusual to me because I have never seen it in any other state in India.

However, I went ahead with my primary research and requested the 3rd ASHA to take me to her village. She suggested that her village - Andrar is up in the hills. There is only one bus that goes at 9 am and comes back at 3 pm so I'll have to plan accordingly. The next day I packed my lunch and met the spirited ASHA in the village on the hills with a beautiful view (figure5).

Figure 5- view from the village Andrar; Author's picture

I went to a couple of houses and engaged in conversation with men & women about their healthcare practices. Here an unusual participant (who works as a commercial vehicle driver)

[12] Based on deprivation ranking of 7 criteria of Socio-economic and caste census of 2011 which is validated by gram sabhas (GAUR & RAO, 2020)

told me that he was concerned about the increasing no. of cancer in his village and other neighbouring villages. He attributed it to the popular use of pesticides & fertilizers in farming and as a responsible farmer he has stopped using them. Most of the households in the village have small land holdings but they grow enough vegetables, grains & fruits for personal use. Villagers suggested that they go for a barter system with neighbours in the community, so they rarely buy from the town down in the plain. They were proud to proclaim that they are self-sufficient with at least one cow & a flock of sheep for dairy & wool and land big enough to grow their food.

When I was meeting the last family for the interview, they introduce me to the eldest in the family (grandfather) who still practices the tradition of traveling with flocks of sheep & goats to the grasslands up in the hills every summer. He stays in the jungle with the sheep for months and then comes back in winter to the house in the village. (A short film on the life of gaddi shepherd - https://www.youtube.com/watch?v=kJB-twGLqvg). The family told me that this tradition is now lost and probably with the death of the grandfather there won't be anyone in the family who would keep practising the tradition. The grandfather claimed he was fit and ready to go on many more miles for a ‘walk’ up in the hills with his flock of sheep. The family also had a wooden handloom, so I curiously asked if they weave their garments, and they showed me blankets woven with handmade wool from the sheep in their households. They told me that many families have been doing the same in the village however it is losing prominence with the advent of other ‘time-consuming’ hobbies like social media and television.

It was an exhilarating experience to see how tradition, practices, and wisdom changes from one village to another within the perimeter of the primary health centre. I will elaborate more in the next sections of Results and Discussion.

Results

We understand from the earlier section (Background, Theoretical perspective), the definition of health literacy and the importance of evaluating the health literacy of the community for antimicrobial resistance. The participant characteristics are presented in the table below.

Table 2- characteristics of the participants.

Participants	Characteristics
Individuals in 5 villages (Jagrandal, Padder, Tangh, Balehad, Andrar)	Total, n = 31; Female, n = 17; Male, n = 14 Age (years) range = 21-71; median 33 yrs Education: under high school, n =8 ; high school & above, n =17 ; college, n = 6 Phone used: smartphone 55%, feature phone 45%

By tracing the health-seeking practices through the interviews in the community, I tried to understand the various drivers & barriers, to group them into themes of Health literacy needs.

Following the steps of thematic analysis given by Braun & Clarke (2006), the transcribed scripts are read and searched to form meaning & patterns for health-seeking practices & experiences (i.e., self-medication, compliance, traditional practices, etc) towards access, understanding, appraisal, and application of health information (based on the competencies of HL by Sørensen et al. (2012)). In addition, determinants like social norms and 'community participation' are coded since they were repeated occurrences in the interviews. In the second step, the codes were discussed with colleagues to validate. Finally, the coded themes were distilled into main themes to share insights for HL needs.

Health seeking practice - > thematic analysis - > HL needs

The thematic analysis require the methodical organisation of the data into a structured format to enable a richer understanding of the interviewee's experiences of HL. The analysis of health-seeking practice, coupled with the deep intertwining of the individual and community, almost necessitates the use of a constructionist approach to thematic analysis (rather than a contextualist or an essentialist approach) as recommended by Braun & Clarke (2006).

The below table illustrates the analytical process of finding the themes for HL needs.

Table 3: examples of the analytic process, including citation, initial code, and themes (not exhaustive)

Citation/raw data	Initial code	Files (Reference)	Theme
"when I get cough or fever. I usually ask the shop keeper. The pharmacist asks what kind of cough it is, is it dry or wet? Sometimes it's a holiday so I ask the pharmacist to give medicine"	Self-medication	**12 (22)**	Health-seeking journey is a complex multi-pathway of care
"I leave the medicine when I'm well... sometimes you get more medicine than required. If it's not expired, then we keep it"	Compliance	**12(15)**	
"My husband is an ex-serviceman. So, we have an ECHS card. We usually go to the military hospital but yes when it is normal flu or cough, we go to the nearby dispensary [PHC] or if it's closed then we go to the private doctor"	Healthcare services	**9 (12)**	
"Desi doctor (Ayurveda) just gives medicine…He told me about the problem and gave me the medicine. He gave a course for 4-5 days"	Traditional practices	**10 (21)**	Definition of 'doctor'? Guidance in choosing the appropriate pathway of care
"Usually they (doctors) tell us less. Pharmacists tell you information regarding taking medicine"	Access to health information	**12 (21)**	
"I will keep working and my body will stay healthy. If you have a disease then you don't feel like doing anything, and you cannot work. If one keeps working, then the body is healthy."	Definition of Health	**18 (21)**	How the community understands 'health'
"We are having flu or cold and we are taking our normal medicines so along with it we need to take anti-biotics too because they are more effective. So, doctors always give anti-biotics along with medicines"	Understanding of antibiotics, AMR, and health services	**15 (22)**	Making medical concepts comprehensible
"I check its expiry date. My husband always checks and gives. But I usually check the name and all for my knowledge." "We refer to home remedies such as herbal leaves. We all avoid medicines"	Knowledge & attitude	**9 (14)**	
"A few days back one such camp was held in a nearby village, we went there. We go there to listen to what doctors say. I am also part of a woman's organisation here in Rakkar"	Community participation	**11 (13)**	Strengthening community participation

Findings

The insight from the thematic analysis is organized into three categories to demonstrate the findings comprehensively. The first category shares the overview of the health-seeking behaviour of the community and has three sub-themes. The second category answers the 1st research question i.e., the Key health literacy needs of the community, and the third category answers the 2nd research question i.e., what is the role of medium & message for informed health behaviour?

Building an understanding of the health-seeking practices in the community

1. The health-seeking journey is a complex multi-pathway of care

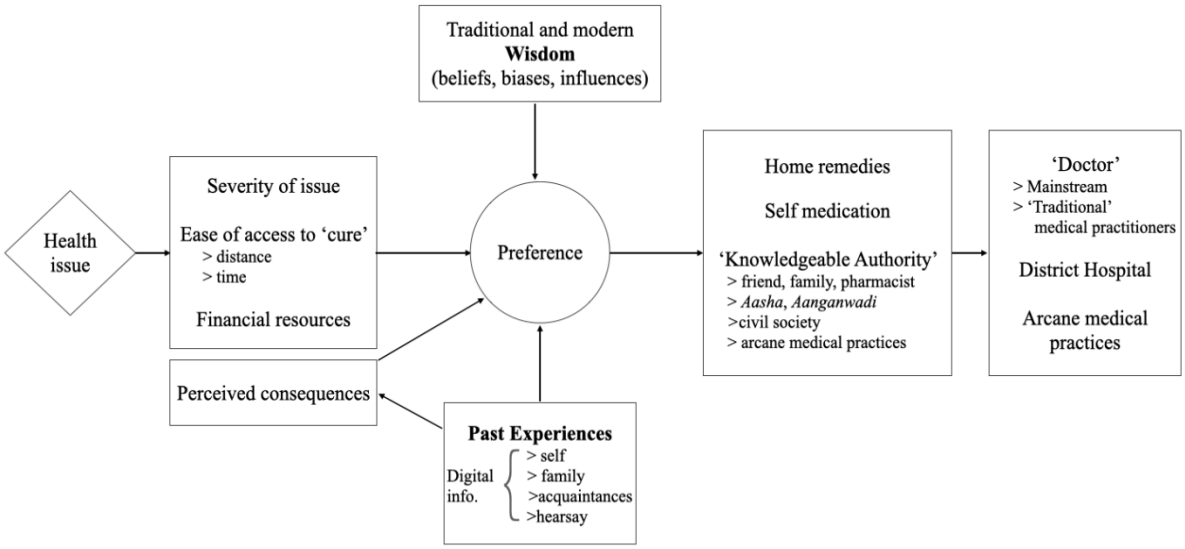


Figure 6- Health seeking journey in the community

***The complexities of this map with its multiple possible pathways and how even during a journey, remain in flux*.**

The people living around the primary health centre (PHC) seek consultation with the doctor, but if the facility is closed on weekends or due to holidays then they go to the pharmacy stores mushrooming along the PHCs and ask for medicine for usual problems Choti-moti [trivial] like cough, cold, or fever.

The PHC in Baroi effectively works most of the time for the first line of treatment. The medical officer refers people to tertiary care in Tanda or the district hospital in Dharamshala for diagnostics or specialist doctors on a case-to-case basis.

The primary care for most of the community depends on the 'ease of access, 'severity of diseases, and financial resources.

The villagers (in Jagrandal & Padder) around the PHC would readily go to the health center so their health problems. However, others in villages like Andrar or Balehad would go to the 'doctors' in the private clinic mostly quacks with a degree that doesn't allow them to prescribe biomedicine. Respondents from the villages (Andrar, Balehad) situated far from the PHC prefer to go to the nearest doctor, but most are not very conscious of choosing the appropriate (allopathy/Ayurveda) doctor.

Respondent in Jagrandal: *"PHC is nearby, so we don't have to travel a long way, but some people can't go long way for medical facilities"*
Respondent in Andrar: "*I prefer to go to the doctor near to my house. It is a private doctor's clinic"*
Moreover, other reasons like the availability of doctors, services in the evening/night, and waiting time can deter an individual from visiting the PHC

"... Yes, I visit the private clinic only if the doctor is not there"

"...we have to be in the queue for a long time, so we prefer going to the private hospital "Some people walk for 10-15 km." "There are no facilities at night"

"if the kid is sick on Saturday night so we go to Private Hospital because the Health center is closed on Sundays"

However, few respondents (not necessarily because of education or age) suggest that they go to government institutions because they don't trust private clinics and quacks.

"We trust the hospital, doctor. We don't trust the desi doctors... They charge a lot but don't have any benefit"

The respondent who is educated & has regular job with better financial resources goes for the convenience & care of the private hospital (Garg clinic/Balaji Fortis/Kaydee hospital that has come up in the district even when they have to pay more.

> *"Now my mother takes her medicines for BP[13] and diabetes and we get her examined by a private doctor because they don't care much at Government Hospitals, there's one Doctor who cares otherwise we have to be in the queue for a long time, so we prefer going to the private hospital"*

[13] Blood pressure

Most respondents also suggested that they prefer to keep the unused medicine from prescription and use it later. However, most of the respondents were aware that they should not consume medicine that is expired. Almost everyone I spoke to unequivocally said they check the expiry date before consuming the medicine. This shows that this learned behaviour has become a habit in the community.

"I will keep it [leftover medicine] for the future. It can be used till the expiry date"

"..I stop the medicine when I'm well.. sometimes you get more medicine than required. If it's not expired then we keep it"

Compliance is a challenge with most of the respondents across the five villages, they stop taking the medicine as soon as they get well. As mentioned earlier that the perception of health is the absence of disease, not relying on medicine. So, when one feels better, they try to avoid the medicine because now they are healthy. Moreover, the idea of consuming something foreign to the body is unnecessary (the idea of 'do no harm'), especially in rural society (the same goes for prophylactic treatments, etc).

"No, I don't take any medicine. I take medicine only when I feel sick. Otherwise, I avoid medicine. And if I feel sick, I prefer to take medicines for two to three days only. I generally don't complete the course prescribed by the doctor"

"The doctor gives us medicine for 5 days but if I get well in 3 days then I stop eating medicine"

2. How the community understands 'health'

Health is an individual prerogative and a marker of one's personality (traits/habits). People in the community do not attribute or relate health to government policy or the public health system

The respondents expressed that the "absence of disease" is good health for them. In the community the cost of ill health is loss of work and livelihood, therefore, most of the respondents also stressed being able-bodied is good health.

"If a person is healthy and they are not often sick... that is good health according to me"

Also, they mention that if one is working one will continue to enjoy good health. In Indian societies, hard work is a virtue that is taught to every child and most of the problem within the society is attributed to the lack of 'one's ability and hard work.

"good health for me is without the support of medication. I'm able to do all work…there shouldn't be any disease"

Some of the respondents said that the meaning of good health for them is not having to take medicine. Some of them mention that they don't like to take medicine but also reasons like "*it makes the body hot, especially the angrezi (modern) medicine*"

Therefore, if a person is not healthy, then it might be construed that he/she has not taken care of or just being lazy. In addition, good health is also considered a blessing by the god/goddess who has shown its grace.

When probed to share a health lesson they would like to give out, respondents replied with dos and don't of staying healthy e.g.
"Don't eat outside food. I eat home-made food"
"To consume homemade food only that's all my perspective towards good health."

The importance of cleanliness and hygiene is also highlighted as a factor that contributes to good health as respondents chimed *"keep the environment neat and clean. Because that is good for our health & hygiene, we won't get any disease"*

One of the respondents gave a conscientious response to health when they said if we do the 'right thing one can sleep better (at peace)' and hence keeps good health. In the same vein, another respondent said that 'stay happy and you are automatically healthy' as they equated that if the mind is happy body follows too.

3. Who is a 'doctor'

A doctor is anyone who claims to be a doctor, professes expertise through years of practice, proven record of healing, or familial apprenticeship.

Initially, a lot of respondents would agree that "one needs to take medicine only after the consultation of the doctor". When I probed further about how and where they visited the doctor it became clearer that individuals would mention that it was the 'private doctor' or the 'desi' doctor (mostly ayurvedic) or the pharmacist in the local shop. The idea of a doctor is someone who has claimed himself/herself as a doctor. For example, near the subcentre in Tangh, there was at least two 'private clinic' of Doctors who had no qualification & registration number on the board outside the clinic. (as shown in the picture below)

Figure 7: Private 'doctor' clinic near the subcenter – Tangh; Source: Author's own picture

"The doctor - in the medical store [gave the tetanus shot]"

"The one who gives the medicine is considered a doctor. If I know medicine, I will also give the medicine so that's why we know them as a doctor only."

Moreover, the help of a professional felt when the health issue passed a certain threshold for others there is the friendly pharmacist or home remedy as highlighted in the health-seeking journey in the community.

There are many kinds of health "professionals" and there is a hierarchy in which they are consulted. Some respondents preferred an ayurvedic doctor or the desi doctor saying that they have a proven record of healing while some said the academic qualification & years of training of a biomedicine doctor is more trustworthy.

However, the prescribing authority of Ayush doctors and biomedicine doctors put them at a similar level of credibility depending on the ability to treat infection faster. The doctor (biomedicine) restricts themselves in writing a 3rd generation antibiotic for bacterial infection, they lose trust when it takes longer for them to treat an infection that is treated faster by the Ayush doctor who is prescribing 3rd /4th generation antibiotic directly.

Key health literacy needs in the community

After defining the healthcare ecosystem, I would like to highlight the key insights that determine the health literacy needs of the community as evaluated from the thematic analysis.

Theme 1: Making medical concepts comprehensible

Imparting a basic conceptual understanding of AMR is a necessary foundation on which other desirable types of messaging (behaviour change, risk awareness, trust building, etc.) can be delivered. Conceptual understanding can improve compliance and reduce the acceptance of misinformation.

The awareness in the community about AMR is negligible. The basic knowledge of antibiotics as a formulation, their uses, benefit, dosage, and caution to be used is very low. This correlates to the results from other studies across India on antibiotic usage and AMR. Respondents have heard the term antibiotic during the prescription by the healthcare practitioner and some of them also rightly understand that it helps in 'infection control', it is usually a 'stronger' medicine that helps in quick relief and is 'more effective'. However, most don't understand that there can be problems with the incomplete course or too many of the 'stronger' tablets.

"when have flu or cold, we take our normal medicines so along with it we need to take antibiotics too because they are more effective. So doctors always give antibiotics along with medicines"

People in the community have been prescribed an antibiotic by a dentist for toothache or during tooth extraction. Some of them also mention the need for an antibiotic for their symptoms like upset stomach and cough when the doctor 'should' prescribe antibiotics.

Only one respondent who use to work in animal husbandry showed some scientific understanding of antibiotics. The same respondent had a faint idea about antimicrobial resistance though he was not clear about the consequences of resistance for patients.

"….only treat a viral infection for symptoms and bacterial infection with antibiotics".

"yes, I have some idea.. earlier the medicine that was used are not effective anymore"

When asked 'how the healthcare workers can spread information' he replied that 'they have to first find out for how long a person is taking medicines, they need to see the report and if it has stopped working on them and based on that healthcare professional can tell". This fact correlates to my observation of healthcare practitioners who think patients do not want to wait until the lab shares the 'culture report' so that they can get the right antibiotic if required.

This demonstrates that given the right counselling & awareness of the consequences of the irrational use of antibiotic patient can be flexible with waiting time to manage their symptoms. The terminologies of 'antibiotic resistance', and 'culture report' were difficult to explain since the concept is difficult to translate into the local language. However, people are readily using words from the English language like 'infection', and applying them in the necessary situation. Moreover, the diseases like tuberculosis, HIV, and covid-19 are understood possibly due to their effective health communication campaigns.

"Ads started coming on TV about HIV/AIDs I learned from that advertisement"

"Health workers are trained to help and they work in a good way. If they know you have TB problem they will advise you to go and get checked. Through tests, they will know if it is TB and at what stage it is. So they will diagnose accordingly"

"Recently the topic of Covid that was going on. Getting information about it, what to do and what not, and how to be protected from it was important to me."

It has been observed that the people in the community can understand and appraise healthcare information shared in a socially relevant context.

Theme 2: Creating awareness of risky behaviour and its consequences

Constraints on finances and accessibility lead to behaviour that enables AMR. Communication that informs regarding such behaviour as risky and highlights its consequences is necessary.

The community is well versed with 'paracetamol' as the go-to medicine for colds, fever, and pain. They know the medicine as an abbreviated version of the name 'PCM'. However, if the doctor prescribes a paracetamol, people are disappointed since they were expecting a medicine of higher efficacy that is worth the visit.

As one of the respondents said in a frowning tone *"if the doctor just gives paracetamol for fever, it's not helpful unless they prescribe it with antibiotics"*

While talking to respondents, I realized that 5 out of 31 respondents were directly related to a pharmacist (husband, son, or brother). So in addition to being friendly shopkeepers and neighbors who dispense medicine in the situation of need, they are also given prescription medicine for 'infection control' by a 'knowledgeable' family.

"My husband is a pharmacist, he gave me medicine for urine infection"

Another respondent said *"I have no idea [about the medicine] my son [pharmacist in Ayurveda] gave me some medicine since I was slightly warm too"*
However, the concept of self-medication stems from the urgency to get well quickly and be able to start the 'daily routine' i.e. work.

"Generally, we take any medicines locally to get well for time being"

Due to the agrarian society individual labour is valued at home or in the field. So any downtime is loss of work which means not just loss of money but not being able to fend for the family, farm, or domesticated animal. So in the hurry to get well soon, the people in the village prefer to pop a pill i.e. paracetamol, if not well enough after a day or two they would go to the first available & nearest 'doctor' - PHC for the villages like Jagrandal & Padder or the private clinic Dr.SS in Tangh/Rakkar for villages like Balehad, Tangh or Andrar.

A respondent in Tangh said, *"When I'm ill, we can go to this local doctor (ayurvedic) he's available and one gets recovered."*
A respondent in Padder said, *"if the hospital is closed on Saturday and Sunday then people go to the medical store and ask him for medicine for fever, so for these small issues like fever, cold, cough, stomach ache."*

The people living in the villages far from the PHC, readily go to the doctor (ayurvedic/ quack) who has a proven record of effectiveness as he's known in the village but has the wisdom to know that *"…we shouldn't ask for a medicine from the pharmacy on our own until the doctor prescribes you."*
This college-educated respondent is aware of the dos and don't of medicine consumption, but he believes in the credibility of a doctor whose qualifications he's not sure about. Probably, the respondent has experiences to back his belief or trust in the abilities of the 'private doctor'. …as stated in the book (Social lives of medicine) we learned most of our behaviour from friends, and family.

Figure 8-3 Pharmacist store adjacent to the PHC; Source: Author's own picture

Therefore, these pharmacists & 'private doctors' become the go-to people in case they need to consult about their condition. The pharmacist then readily gives them a medicine that is the most effective.

Intrigued by this phenomenon, I wanted to check how a pharmacy next to PHC will dispense antibiotics without a prescription to an outsider, so I went to two stores on two separate occasions and narrated my condition to get some medicine. On the 1st occasion I requested 'something to cure my cough &

sore throat', the pharmacist gave me a branded medicine called Solvin (Chlorpheniramine Maleate (2mg) + Paracetamol (500mg) + Phenylephrine (10mg)) and in the 2nd case, another pharmacy gave me Norfloxacin for 'upset stomach' and diarrhoea. The pharmacist probably did not realize that they are not supposed to give out antibiotics without a prescription.

Theme 3: Guidance in choosing the appropriate pathway of care

Health-seeking pathways and associated behaviours are complex. Hence, it is important to enable the community to not only recognize the events relevant to AMR but also to guide them toward appropriate and safe (from an AMR perspective) solutions

As mentioned in chapter 1, the empirical site is in the district of Kangra which also has one of the largest settlements of Tibetan refugees in India. In addition to the usual Indian system of medicine (Unani, Ayurveda), people in the community also seek primary care in the Tibetan hospital (18 km from the PHC) which charges minimal fees for consultation.

As stated in the healthcare-seeking journey of the community the co-existence of different healing traditions within the same community in complex societies like India is well documented by an anthropologist (Gesler,1992).

One of the college-educated respondents mentioned that he visits the 'desi' doctor who readily prescribes medicine for cold & fever which is effective, but he was not sure of his qualification.

"I had a fever, burning sensation in my chest that was due to heat…. The local doctor just gives medicine…. he doesn't say anything extra. He told me about the problem and gave me the medicine. He gave a course for 4-5 days"

Respondents suggest that biomedicine makes the body hot 'often identified by coloured urine' therefore they prefer ayurvedic medicine, especially for pain relief like arthritis where they realize the doctors in biomedicine have been giving them just painkillers.

There is also an ayurvedic hospital/college in the nearby town of Palampur and one respondent referred that her sister-in-law painstakingly visits every time to get her medicine.

A college-educated respondent mentioned that she & her mother were diagnosed with kidney stones and after diagnosis, the doctor at the Tanda medical college suggested an Ayurvedic medicine that helps in the dilution of kidney stones through the urinary passage.

"A year back I went to the hospital for the kidney stone… [tertiary care hospital in Tanda]

It was very painful and there was the tendency of vomiting also.
They did the ultrasonography and then I came to know about that.
The doctor also prescribed me some Ayurvedic medicine for this disease... It helps to release the stones from the body."

The doctor at the tertiary care prescribing or suggesting ayurvedic medicine for chronic diseases like arthritis or Kidney stones is a known practice in India.

Another respondent spoke about his mother who is a faith healer and has learned the proceedings & herbs from his grandmother.

"..I just use the broom made of a certain plant and there is a mantra that has been taught to us by my mother-in-law so I say that.

.. people come to our house, then it is worshipped (puja) since the disease is given by god & goddesses, so they have to take shower till 7 days. Doctors also tell the same thing - show it to someone elder in the village and they will give you the solution."

The respondent (mother) went on to narrate the story of when the doctor's daughter was sent to her for this ceremony. The son smiled and said *"They prescribe us and we then help them"*

The validation of these traditional practices & Indian medicine system by the biomedicine doctor also suggests how the health-seeking practices are intertwined. Though understanding of the prescription practice authorized to only biomedicine doctors for an antibiotic is completely missing in the community.

Theme 4: Enabling the flow of information from a source that is highly trusted

Health information received directly from a 'biomedical' doctor holds a very high trust and impact value. However, such interactions are limited owing to limitations of time and accessibility. This also leads to an increased reliance on alternate, questionable sources.

Most of the respondents would readily say that their most trusted source is a doctor. They also suggest that they have high faith in what the doctor says in the governmental institution they have visited in their experiences. In case of any doubts, they would most often check with the Doctor.

"Whatever doctor gives that only we follow". "I believe in doctor's consultation. They will test and then suggest"

"They [the doctor] have experience, education, and expertise"
"Once the doctor prescribes there is no need to ask anyone about it and we trust and think he is our God and so we blindly follow him."

"I always trust doctors. They are all MBBS doctors". "I take advice only from a doctor… the trusted way is from the health department through Doctors".

However, people lament over the fact that Doctors do not share information outside the general *Dos & Don'ts*, and they cannot engage in discussion about medicine or health.

"How will they [Doctor] say all that [antibiotics].. they will just inform you to have this in the morning, afternoon and night … and things like that but will not mention what medicine it is".

"Usually they (doctors) tell us less. Pharmacists tell you information regarding taking medicine"

Furthermore, the Doctors at the PHC or in the tertiary care do not spare time to inform and discuss therapy, medicine, or scientific knowledge but the people in the community would like to get more information from their trusted source

"I think the doctors should tell when they give medicine because the health workers cannot explain properly. When we get information from the doctor with the medicine then it is good".

However, if the doctor in the PHC is not available, in that case, the people in the community would seek a 'knowledgeable' alternative.

However, when I wanted to check if health information can flow from peer networks most of the respondents were sceptical. *"People don't trust you..."*

Though the definition of a doctor is not often clear in the mind of the community, they are aggrieved by the nexus of private hospitals and are cynical about going to one. However, often they end up in such places due to emergency services. The people are aware of the fact that most private hospital charge more and sometimes write unnecessary diagnostics. The scepticism & distrust is quite high for a private hospital, and it can be detrimental to the patient.

"[Private] hospital people scared her by saying that her kid is not well and they have to do an operation but her kid was well and his BP and other reports were normal"

"We trust the hospital, doctor. We don't trust the desi doctors... They charge a lot but don't have any benefit"

"... But I will not go to the private doctor again. In the govt hospitals, the charges are also less".

Theme 5: **Strengthening support for community organizations to encourage conversation**

Based on the way the healthcare system is structured, community organisations are an important link in fulfilling literacy needs, both in terms of access and trustworthiness. They can become the voice of the doctor in matters related to AMR information.

The state of Himachal Pradesh has a history of successful implementation of the health & welfare program across its rural population, so most people are aware of the Anganwadi programs. They check and consult the doctors in the camps organised at Anganwadi.

The community participation of individuals is promising. There are functional government-funded Anganwadi, civil society organizations like Nisthaa, Tapovan, and the ASHA workers who have supported the dissemination of healthcare information even during COVID.
The people in the community find information from "camps in Anganwadi" where young mothers bring their children for immunization and other food programs.
"The camp is organized once in 6 months or sometimes it was organized by Gram Panchayat. Everyone including men & women would participate in the Camps"

They also have a panchayat meeting where important health issues are discussed.
"one can spread information during Panchayat meetings."
However, the respondent also expressed pessimism that these days (post covid) and with the advent of social media people prefer to stay at home.
The respondent also laments *"people are educated …. They know so they figure out information."*
However, some middle-aged women mention their involvement with Mahila Mandal (translates to 'women's group') organized by Nishtha. The organization works with widows under the banner "Ek Nari" to support them financially through skill-based training among other things.
"Yes. Some camps should be organized. A few days back one such camp was held in a nearby village, we went there. We go there to listen to what doctors say. I am also part of a woman's organisation (ek nari saanstha) here in Rakkar. So with their help, I organized 2 camps at my house. Good doctors came to the camp to give information on Health."

Similarly, another organization called 'Tapovan' which is part of the Chinmaya trust (A faith-based organization) works on health & education in certain states of India.

"Meetings happen and everyone talks about challenges in the society, Tapovan does a good job...it is a rich body and for the empowerment of women, they do bring awareness"

However, none of these organizations has spoken about antimicrobial resistance or the irrational use of antibiotics during any awareness campaign over the years.

People in the community are amenable to these organisations and they are effective in imparting skills and education, which makes them a suitable tool for health literacy.

Theme 6: Addressing the needs of marginalized groups to reduce health information inequities

Different sub-groups within the community have specific challenges that prevent one or the other channel from delivering its message to them. These should be recognised to fulfil the needs of an inclusive health literacy

Most women in the household will complain about lack of time when asked about their healthcare routine. It is a known phenomenon, especially in India where self-care for women is not appreciated, women in the household are seen as sacrificing mothers who disproportionately give time to their household, family, and children.

"I don't get time for myself. Only if it's for children"

Another persistent social norm that influences healthcare information access is the caste system. Though in my interview it came up only once, during my discussion with ASHAs (off the record) they mention that they don't visit a colleague of upper caste (even when invited) nor reciprocate the invite for their events. However, I observed that they would share their food at the place of work with all their colleagues. Though the caste system is dwindling there are many remnants of this past (3000 years). Moreover, one respondent who claimed to be from the upper caste said;

"The thing about Asha workers is that they give priority to their known people first. They don't care much about people from other communities."

The above quote demonstrated that caste segregation is an evident social inequity that hinders access to healthcare information in this community.

The role of message and medium in the healthcare information seeking journey

Theme 1: Health information is validated through multiple mediums following the hierarchy of expertise

In the efforts to tackle AMR within the empirical site, the same message, if moulded specific to the delivery medium (whether a doctor or an SMS), can participate in creating a

holistic understanding of AMR. The message must be cognizant of the advantages and disadvantages of the medium as they appear to the members of the community

The people in the community suggest that they are usually aware of the health services – and every householder has traversed through primary health care. Most of them access healthcare information via. the network of social workers, and healthcare workers, e.g. ASHA, Anganwadi, civil society organisations (Nishtha, Tapovan), and via. digital media, or broadcast media, e.g. Facebook, Youtube, Television, or radio.

"Ashas, Anganwadi, and doctors tell people about the health & medicine"

"Ashas, doctor, TV, phone". "…see on my phone, search on YouTube"
As stated in table 2 – characteristic of the participant, 55% of the respondent have a smartphone. During the pandemic, they have been using the phone for the exchange of information, receiving an update, and even instruction for treatment for its convenience & speed but it is often not the preferred & trusted source of information. Even younger respondents suggested that they use their phones to look for information but expressed distrust of the credibility of the information.

"We search [on the internet] but the level of confidence comes from the doctor only"

"if the doctor gives the wrong medicine, we can ask them why they gave the wrong medicine" ***"YouTube?*** *No, that is not believable".*
The people in the community have experienced camps by the health department or civil organisation where experts (doctors) are invited to discuss pressing issues in health for the community intermittently. However, they are dissatisfied with the fact that the number of camps has reduced over the years. The in-person interaction has a more lasting impression as expressed by one respondent

"the best ways are camps, where people come and give them information in an appropriate way so that it will make people think that they have gained some knowledge and they can follow it"

"… in Anganwadi they come and tell, so they tell us about the precautions like checking BP, and sugar[Diabetes], doctors are coming, so there are camps in the village for health check-ups."

The idea that someone with expertise visiting the village to spread information adds to the gravity of the event and people pay more heed.

However, the respondents share the limitation of in-person interaction in the camps which cannot be watched if missed in real-time.

"If I miss the programs or camps from Anganwadi and then hear the information from others... I don't believe/understand it. So, I'm confused [listening to information through untrusted sources]"

The credibility of health information follows a hierarchy based on expertise, so people in the community agreed that Doctor has the highest credibility, due to their expertise.
"Doctors are the right person to give information"
"doctors should tell when they give medicine because the health workers cannot explain everything"

However, the people in the community expressed their reliability on ASHA workers for healthcare information.

"Health worker spreads awareness when they go to give Polio and share information about child health."

"During Corona, they (ASHAs) gave information…They work in the village"

In the close-knit society in the village, the people also feel the obligation to listen to ASHAs when they visit their house as compared to other mediums where they have the choice to visit as per their needs & wishes as a respondent articulated during our conversation.

"If I don't put on the TV, I don't get the information, if I don't put on the radio I don't get information so I think the best way is sharing information in person".

However, when I requested to suggest their ideas about the appropriate medium to share & receive health information, most respondents agreed that phones are the medium of choice for ease of access. Highlighting the experiences, they had with phones as a medium to receive health information during the pandemic. They also expressed how ASHAs were able to check on patients and instruct people on Dos & don't with regular phone calls & messages.

"phone is a better medium, it is faster"

"get the message on phone or get a call from health workers."

"Phones are good I feel. Because nowadays no one has time so you can share health information on Whatsapp"

Theme 2: Actionable & simple information works for the community

The messaging should help identify AMR-specific situations using demarcated observations and respond to them with specific behaviour. Past campaigns can inform on the efficacy of various mediums that fulfil different needs *(quick impact, conceptual understanding, compliance improvement, etc.)*

It was reassuring to observe that the preventive measures for COVID-19 were well articulated by the majority of respondents. I also probed for the reason the people in the community followed the instruction. Respondents suggested that the information to them during COVID-19 was persuasive coming from an authority with a clear actionable.

"Keep 2 arms distance. Wear a mask, and wash your hands...I remember it because Modi said it"

"….we followed all the rules…….Because govt was telling us, also we wanted to be safe and save our lives"

The people in the community expressed their liking for *Dos and Don'ts* even during their interaction with healthcare professionals because they don't question the authority & expertise of the profession & position.

"Update people about Dos and Don'ts…it helps build awareness. But we don't listen to just somebody but someone who can convince and make ppl understand"

"As we go to the doctor she tells us what to eat, how to eat, and when to it"

The people in the community remember some of the public campaigns that were broadcasted on television e.g. Clean India movement and the AIDs awareness program.

"There is Swachata Abhiyan.. from the govt the message is being shared. It is doing a very good job and they did a good job too"

"Ads started coming on TV about HIV/AIDS I learned from that advertisement"

Respondents also appreciated the reminder SMS for vaccines and considered them effective healthcare communication.

"…we have taken the first dose and the second dose of the vaccine, so now we get the information that I am eligible for a booster dose as I am above 60 years old"

These observations highlight that effective messages are memorable, followed, and appreciated by the community.

However, the tone, temperament, and context of the message determine the effectiveness of its application. When probed further to understand the reason to follow all the COVID prevention measures, respondents suggested

"Because the disease was dangerous for us….Everyone was scared of the disease"
"…the death in our village was a scary thing."

"We followed them (all rules) because we feared Covid. We didn't want any deaths around. We are all poor, if something happens from where we will bring money for treatment, or who will give us money."

Applying this outcome to diseases in the case of AMR would require certain consideration since people in the community do not understand the concept of antibiotic resistance (translated to Hindi 'pratirodh') therefore during the narration of the vignette (from the discussion guide) they would relate it to addiction

"If one consumes medicine regularly then it becomes a habit, obviously then the doctor has to give a heavier dose.."

Though most of the respondents did not relate to the consequences of AMR (as narrated in the vignette) saying they haven't heard of any such cases in their neighbourhood or family.

Discussion

The themes in the previous section were generated through in-depth interviews with individuals in households from different villages and socio-economic statuses. Through purposeful sampling I considered a varied range of individuals to qualitatively identify the understanding of potential constructs of health literacy. A study in rural India on HL needs for AMR is rare.

Importantly, the findings explored concepts that are often not amenable to quantitative research in health literacy especially due to the 'invisibility' of AMR. The invisibility of AMR constitutes the gap in the understanding of the consequence of risk behaviour, the difficulty in defining it, and in being able to count it (often stated as the missing count in National/Global reports for AMR-attributed deaths) (Chandler, 2019).

Moreover, the insights highlighted in the study could not have been measured in the self-reported questionnaire which is often the case in assessing health literacy.

For example, in the cultural context of India, though people in the community understand that one should go to the doctor at the PHC (for all the rational & emotional reasons) however, the individual may choose the nearby private doctor (who might not be adequately qualified) and mostly has to improvise based on the situation at hand.

The finding of this study i.e. HL needs for AMR compares with the previous literature and has certain commonalities in concept.

For example, the study Jordan et al. (2010) states that health literacy from a patient perspective highlights key abilities like accessing & navigating the healthcare system and engaging in information exchange. Similarly, this study also highlights key abilities and gaps in the community while seeking the healthcare journey. Health literacy needs critical to access & understanding are highlighted for example 'Making medical concepts comprehensible'.

Another study by Stømer et al. (2020) highlights the perspective of the patient and identified three main themes as different dimensions of HL i.e. "variation in people's attitude and behaviour as health information seekers", the problem of fragmented healthcare, and the importance of a good relationship with healthcare providers. These needs are similar to the

needs highlighted in this study e.g. ‘Guidance for the appropriate pathway of care’ and the need to “Strengthen the support of the community organizations to encourage conversation”.

The article by Borge et al. (2021) about patients with chronic disease for HL needs mentions the following: i. burden of insufficient knowledge, ii. strengthening the feeling of insecurity, iii. strengthening dignity. These findings correlate to the insights for “Strengthening social support to enhance dignity for marginalized groups” and “Making medical concepts comprehensible” to reduce the burden of insufficient knowledge.

Nutbeam’s model incorporates hierarchical levels of health literacy—functional literacy (reading and writing), communicative literacy (refers to more advanced cognitive and literacy skills), and critical literacy (skills to exert greater control over life events and situations) (Nutbeam, 2000). These descriptions partially identify with the empirically derived abilities in the study. Health literacy is conceptualized as a set of individual capabilities namely cultural and conceptual knowledge, speaking and listening skills, and numeracy that is influenced by broader social, educational, and cultural factors (Nielsen-Bohlman et al., 2004). These are reflective of several factors identified in this study.

The section below consists of my reflection on the findings highlighted in the last chapter. As a researcher living the experience and drawing references from the work of other researchers, these reflections intend to share the context with which to look at the findings.

i. **Health-seeking practice**: It was evident in the schematic map of the Health seeking practice (Figure 6) that people in the community do not have a clear flowchart for health care services that they opt for. It is similar to many aspects of life in India and has become a distinct feature of Indianism (Kakar & Poggendorf-Kakar, 2009). The public health system in India however becomes confusing with the inclusion of AYUSH doctors and their ambiguous status to prescribe biomedicine. Since the policymakers have not made a clear distinction between the prescription practices of biomedicine doctors vs AYUSH doctors, the people in the community are unaware. Meanwhile, the market force comes into play and has led to irrational use & prescription of antibiotics.
ii. **Risk behaviour:** As expressed in my findings the practice of self-medication on the advice of an ‘expert’ is quite rampant in the community. However, the individuals are just following a behaviour they have normalized over the years to ‘get to work’, to be more productive and efficient. Antibiotics have long been considered a boon to cure the infection and create healthy lives (from dreaded diarrhoea, lung infection, or urinary tract

infection) but repeated use could be problematic is an unfathomable consequence in the rural community. The understanding of the usage does not seem to fit into the logical flow of learning. However, individuals are obedient citizens who are happy to follow 'instructions' just like in Covid to keep themselves & their families safe from any infection and provide good health.

iii. **Incomprehensible medical concepts**: Most people learn through the lived experiences of success & failure, disease & health, so it is interesting to note that during my conversation in the community, people could not relate to the consequences of AMR, therefore the perceived severity of AMR is negligible. This is possibly attributed to the fact that they have never actually experienced someone who has been diagnosed or told about the condition as a consequence of MDR[14] or AMR. This is a new challenge for the healthcare system around the world since drug resistance is not always the primary cause so it's not counted or documented in medical reports as a cause for death or hospitalization making it invisible. In the community, the concept of AMR is as vague as the concept of the antibiotic itself. Therefore 'invisibility' of AMR and its consequences make it a worse threat to explain. This calls for an innovative & contextualized role of communication to create awareness of severity to limit risk behavior.

iv. **Guidance to choose the formal pathway of care:** Doctors are considered the most trusted health professionals. However, the definition of a doctor could be different for different people, as specified in my findings. Individuals would also go to an ayurvedic doctor (based on preference, access & ease). The AYUSH doctors are a part of the community, often from the same village. They talk the same language and listen thoroughly before giving the medicine. As highlighted in the finding these 'desi doctors' give the medicine as part of their consultation fees. In contrast to this, the doctor in the PHC is busy throughout the day and hardly spares 2 minutes to write a prescription. The mere practice of writing a prescription which will be deciphered by the pharmacist at the PHC or the store outside is an impersonal process and doesn't involve any conversation between the doctor and patient. Furthermore, the doctor in the PHC (practising biomedicine) is an outsider to the village /community. (e.g. in the empirical site the medical officer was posted in the location but came from a different state). Most often the PHCs are understaffed, and the doctor must consult 50-60 patients on a usual day.

[14] Multidrug resistant

(Usually after a long weekend – the one I observed on 18th April 2022). These factors make it challenging for the doctor at PHC to follow the tenets of health literacy for the rational use of antibiotics.

v. **Strengthening support for community organization:** The collective role of the community in strengthening healthcare practices & literacy has been demonstrated in the most recent example of the vaccination for COVID-19. The state of Himachal Pradesh is the first state in India to complete 100% vaccination (in December 2021) of its eligible population (Sharma, 2022). Though the villages and town are in one of the most remote places in geography, the community with its belief system (local gods) the group of healthcare workers was successfully able to convince local leaders to go for vaccination. Similarly, the Dalai Lama (in Dharamshala, Distt-Kangra) got vaccinated first to curb vaccine hesitancy in the remote village of Spiti where Buddhism is the prime belief system. Similarly, with the collective participation of the community and the help of zealous healthcare workers, one can hope to curb the irrational use of antibiotics and limit AMR.

vi. **Empowering marginalized groups:** India is a predominantly patriarchal society, therefore, the role of women is confined to the household, and childcare, especially in the rural community. Inequality in the health and social status of women are a long-standing bane (Zodpey & Negandhi, 2020). Moreover, as expressed by Charani et al. (2021) women are more vulnerable to AMR since they are prone to infections. But the employment of ASHAs (primarily women) has been a boon, initially commissioned for maternal & child care and immunization programs. The ASHAs have helped empower women through healthcare information and strengthen the role of women as decision-makers with the power of information (Saprii et al., 2015; Ved et al., 2019).

   It has been long established that ingrained social inequities like caste have hindered access to health services. In the Findings, it has become clear how caste segregation can cause animosity in information sharing/seeking with healthcare workers, also mention in studies like Balarajan et al. (2011)

Communication can affect the awareness, understanding, attitudes, self-efficacy, and behavioural change skills of an individual. The following reflections elaborate on the findings presented in the earlier section to answer the role of medium and message for informed health behaviour.

i. **Health information is validated through multiple media**

We understand from the findings in the demographics that most young people (less than 30) have smartphones. They use their phones frequently to search on the internet. The cost of data/internet is very low in India and it also is ubiquitous, even in the remote villages of Himachal Pradesh. However, the internet or phone is not the preferred medium to engage in conversation about health although the COVID pandemic has made a lot of people comfortable with the idea. They received a reminder for vaccines and advice from ASHAs on phone. The villagers also have a WhatsApp group where they get regular updates from the gram Pradhaan (village leader).

But when asked for the suggestion of a medium that could help promote health awareness most requested camps with experts (doctors) once a month. This could be attributed to the desire of the villagers to hear from the expert due to their absolute trust. Moreover, they feel obligated (therefore perceive the topic to be important) if the doctor or health department is making an effort. However, these camps could be followed up with reminders by ASHA workers and SMS or Whatsapp messages to make it a holistic communication.

However, the critical part of communication is the message and how it can be contextualized for the community to make it adaptable. In that regard, language plays an important role.

ii. Actionable & simple information works for the community

Language can be a barrier or a link in healthcare when people are trying to communicate about their problems. Highlighting the case of AMR, the native language (pahadi/Hindi) cannot explain ‘antibiotic’ or antimicrobial resistance. Moreover, the word for infection is available in Hindi i.e. ‘Sankramad’ but it may have a different understanding within different contexts. However, the people in the community are readily using the English word ‘antibiotic’ and ‘infection’ as they have learned during the prescription or usage by biomedicine doctors and healthcare workers. The medicine prescribed by biomedicine doctors is called ‘angrezi dawai’ (translated to ‘english medicine’). Therefore, the problem with the irrational use of “angrezi dawai” could also be termed in English like AMR. We have observed this phenomenon during the recent pandemic where people in the remotest village know about COVID just like other names for diseases like malaria, dengue, or tuberculosis and with the right impetus they know what risk behaviour to avoid.

Drawing inspiration from the social & cultural anthropology perspective as highlighted in Whyte et al. (2002) the individuals in the community are often conveniently given the

responsibility for their healthcare behaviour or irrational use of medicine when they are just the consumers of antibiotics/ medicine acting on market forces/policy changes. As the citizens of a democratic country, the consumers also have the right to demand a better policy/health care service/ medicine but the rapid privatization and commodification of medicine/healthcare even in the rural community, with many actors working to make profits has disrupted the organic evolution of the society. They are now standing on the brink of modernization & globalization, forced to adopt the remedies of modern medicine to become productive individuals and hence grapple with the unwanted outcomes of AMR.

When argued in a populist position as highlighted in Whyte et al. (2002), antimicrobial resistance is brought onto the quaint villages with the use of antibiotics as a lifesaver. But if one imagined life in the village without antibiotics surely there would be no antimicrobial resistance. E.g. as mentioned in the earlier section: in an empirical case study, the Gaddi shepherd (75+ years old) in the village goes on for long hike for a month in the mountain and fends for himself, he has never fallen sick (seriously) nor visited the hospital and most probably not taken any antibiotic. The village is close to the ideals of sustainability, growing their food, water, textile, oil, and cloth albeit they get electricity from government grids. However, in the connectedness of a globalized world, antibiotics have helped save millions of babies from infant mortality and made surgery possible without fear of infection.

So that brings us to the argument inspired by Chandler, (2019) that the challenge of antimicrobial resistance is not a problem of an individual or health care professional but a systematic challenge that needs to move the focus from individual behaviour to an inversion approach where the health system, policymakers, and the individual need to see antibiotics as infrastructure.

In LMIC with an increasing burden of infectious disease, regulated access to antibiotics is a tightrope to balance. Too little access to an antibiotic could lead to a fatal infection. In remote villages, antibiotics are a lifesaver for neonatal sepsis, diarrhoea, etc, where adding a regulatory layer may widen the gap in healthcare access, especially for the already marginalized. Nonetheless**,** I would strongly argue to create an infrastructure & policy to strengthen the health literacy needs of the community so that people can dispel the market forces and rein with free choice to go for the healthcare they want.

Conclusion: In conclusion, the healthcare setting in the empirical site is complicated, to say the least. The insights can be replicated for most communities in India. However, with

consideration of different medicine system, the policymakers need to pay heed to the rising problem of AMR and the unregulated market which facilitate rampant sale and usage. Therefore, a health literacy campaign for public awareness fulfilling the needs highlighted in the study is an urgent necessity.

Strength: This is a unique study that talks about the health literacy need for AMR with primary research in the rural community in an LMIC. Future researchers can validate the HL needs through quantitative analysis with the help of HLQs. The study helps other researchers to conceptualize strategies for intervention and apply the insights to develop behaviour change communication for AMR.

Limitation: The researcher's bias can be projected into the findings. The sampling design dictated that the researcher is accompanied by ASHAs and is present during the interview might have influenced responses.

Implication for future research:

It will be interesting to see how the HL needs from the study are measured through the HLQs. The study will help strengthen health literacy intervention in community settings.

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Appendix

Glossary of terms

Anganwadi centres: "Anganwadi centres refer to rural mother and child care centres started by the Government of India in 1975 under its Integrated Child Development Services (ICDS) programme to combat child hunger and malnutrition. A typical Anganwadi centre provides nutrition education and supplementation, pre-school activities, immunization, and antenatal services"(Selvaraj, Karan, Srivastava, Bhan, et al., 2022, p. xxiii).

ASHA – Accredited Social Health Activists: "ASHAs refer to the workforce of community health workers created under the NRHM. ASHAs are health activists who are expected to improve health awareness and mobilize the community in which they are based for health planning and increased utilization and accountability of existing health services" (Selvaraj, Karan, Srivastava, Bhan, et al., 2022, p. xxii).

Caste: "Caste is a hereditary marker of social hierarchy and status that influences access to resources, behaviours and the nature of social interactions in the Indian context. Caste often guides access to education, employment and other economic opportunities and overlaps with class and discrimination. Lower castes often suffer stigma and discrimination across a range of economic and social activities" (Selvaraj, Karan, Srivastava, Bhan, et al., 2022, p. xx).

SC – Schedule caste. "The Constitution (Scheduled Castes) Order, 1950 listed more than 1000 castes as SCs, groups that had historically faced discrimination and now benefit from affirmative action (reservations) in educational and employment opportunities" (Selvaraj, Karan, Srivastava, Bhan, et al., 2022, p. xx).

ST – Schedule Tribe: "Tribal membership represents ethnic and cultural aspects of identity, including kinship and regional characteristics. In the Indian context, tribal populations are often considered as being connected to forest ecologies and systems. Tribal affiliations, such as caste, determine access to resources and opportunities, but can also relate to specific practices. The Constitution (Scheduled Tribes) Order, 1950 listed more than 700 tribes in its First Schedule who were identified to benefit from affirmative action"(Selvaraj, Karan, Srivastava, Bhan, et al., 2022, p. xx). The Census found SCs and STs as comprising 16% and 8% of the Indian population, respectively (Office of the Registrar General and Census Commissioner, 2008)

List of household interview

Age	Education	Gender	Location	Occupation	Phone used
40	School	female	Jagrandal	Farmer	feature phone
50	School	male	Jagrandal	Farmer	feature phone
33	secondary school	Female	Jagrandal	Home maker	smart phone
71	Bachelor	Male	Jagrandal	Service	feature phone
21	ITI	Female	Jagrandal	Home maker	smart phone
26	Bachelor	Female	Jagrandal	Home maker	smart phone
44	School	Female	Jagrandal	Home maker	feature phone
28	Bachelor	Male	Jagrandal	Service	smart phone
23	Bachelor	Male	Tangh	student	smart phone
31	high school	Female	Tangh	Home maker	feature phone
61	secondary school	male	Balehad	Service	feature phone
27	secondary school	female	Balehad	Home maker	smart phone
47	secondary school	Male	Balehad	Shopkeeper/Insurance agent	smart phone
30	ITI	male	Balehad	Mechanic	smart phone
25	secondary school	female	Balehad	Homemaker	smart phone
29	high school	Female	Balehad	Home maker	smart phone
31	high school	Male	Andrar	Shopkeeper	feature phone
40	School	Male	Andrar	Driver	feature phone
31	high school	Female	Andrar	Home maker	feature phone
55	secondary school	Male	Andrar	Clerk	feature phone
26	secondary school	Male	Andrar	Student	smart phone
22	Bachelor	Female	Andrar	Student	smart phone
27	School	Female	Padder	Home maker	smart phone
31	bachelors	male	Padder	Service	smart phone
50	school	female	Padder	Home maker	feature phone
65	secondary school	Male	Padder	Service	feature phone
57	high school	female	Padder	Home maker	smart phone
61	high school	male	Padder	Service	smart phone
45	School	Female	Padder	Home maker	feature phone
70	School	Female	Padder	Home maker	feature phone
38	secondary school	Female	Padder	Home maker	smart phone

List of key informant interview

Designation (Number of interviews)
Medical officer (1)
ASHA 1 (1)
ASHA 2 (1)
ASHA 3 (1)
ANM (1)

Discussion guide :

i. Demographics details: Age, Gender, Residence, Education, Occupation, Languages are known & Primary language, Type of mobile phone
[demographics details will help put in perspective the observation and insights from in-depth interview]

- [Warm-up question] What is your usual day like? (din charya)
- What makes you happy (anand/Khushi) ? What are your concerns (chinta) & aspiration (mahatwakansha) ? [warm up ques to build rapport]

ii. Understanding the terminology

a. What do you think of as "health information" (swastha sambandhi sujna)?
b. What do you think of as "antibiotic resistance" or "antimicrobial resistance" - pratijeev pratirodh ?

2. Definition of health in people

- What is the health lesson (swasth ki siksha) you pass on to your family or children? [what they consider valuable as health information and what they remember, a lot of colloquial lessons and idioms are used in India]
- What do you think (vichaar) is good health (acha/ bhala swastha) for you and your family ?

3. Health information understanding needs:
[instead of leading questions to understand the need "What kind of health information do you need" we can understand the practices to anticipate the need]

- How often do you take medicine? (biomedicine/allopathic) why ? [to validate the previous questions, understand the usage pattern for medicine – if it's casual, serious only with prescription & consultation] (kitne baar)
- When was the last time you took medicine? Do you remember the name? [validate the previous questions, check if people read the name, expiry date, notice the red line in Schedule H1 drugs]
- Who prescribed it? how did you get the medicine (pharmacy shop or health center etc) Kaun parchi likhi ? kaise aapko dawa mili ?
- Do you complete the course of the medicine as prescribed by the doctor/healthcare provider? [understand the prescription compliance]

- What do you know about antibiotics (jiwadu nashak dawai) ? [important to understand what antibiotic are]
- When was the last time you were prescribed antibiotics? what was the indication for prescription? How many days did you take the medicine? [validate the previous questions about compliance] antim baar aapne kab dawai khayi ? kis
- Did you continue taking the medicine after your symptoms improve? why? Rog ke lakshan theek hone par [understand if respondent understand the importance of completing a course]
- Do you use the leftover medicine? [check if they use leftover medicine for similar indication, how they store the medicine] awshesh dawai ? bacha hua dai
- When was somebody in your household last hospitalised ?why & how ?

4. Trust in health workers and support/understanding from health workers:

- How often do you go to the health service provider (swasth karmi) (doctor/nurse/healthcare workers) ? Why ? what happened ? [to understand the primary contact, what is the hierarchy of influence among the diff providers, explains the health seeking behaviour of a person] [indication, symptom/disease]
- When was the last time (antim bar) you went to a health center/ provider (incl pharmacist) ?
  What happened ? kya hua tha [To validate the previous question with a time /date]
- Do you check with anyone before taking a medicine /antibiotic? why ? [check if they consult with doctor or do self medication] kiski salah lete ho dawai khane se pehle ?

5. Measures of health knowledge and health information:

a) Is there any kind of health information and health knowledge people with AMR do not get?

- How do you differentiate between antibiotics & other medicine? [to check if they are told by doctor or they have inherent knowledge about antibiotics, also to check the recall of red line campaign] jeevanu nashak aur dusri dawai mei kya antar hai ?
- Have you heard about antibiotic resistance, drug resistance, or Superbug? [it was a popular in media across India about the Delhi superbug so lot of people might be aware of this term, its important to check how people comprehend information about drug resistance – to determine the type of health literacy viz functional, interactive or critical]

- What do you know about it? How do you think it affects you? [to understand risk perception and fatality of the issue, therefore threat to public & personal health] Jevaanu nashak pratirodh apko kaise prabhawit karta hai
- How did you learn about AMR/ health related information (swastha sambandhit sujna) ? [to understand the preferred modes of learning for health education]
- Is there anyone in your family (Parivar) or neighborhood (padoos) who have condition affected (prabhavit) by AMR

6. Active participation by community :
   - How do you think AMR can be avoided or prevented ? what kind of health information/ knowledge a person need ?
   - How is a person with AMR included in the follow-up of their own health?
   - How does a person with AMR manage to take an active part in maintaining their own health in their daily lives? Aapko kya lagta hai AMR sankramit insaan dainik Jeevan mei swastha banai rakhne ke liye kya kar sakta hai
   - How can healthcare professionals help community (samaj) to understand (suchit) the AMR ?
7. Navigation in the health system [understanding media usage & practices]
   - How do you get the latest (Naveen tam) (swastha sujna) health information? [open ended question to understand media habits related to healthcare] [understand if there is a need for health information]
   - If you have any doubts (sandeh) whom do you get in touch with? [check how they authenticate the information, who are the influencers for information]
   - (Aap ki ray mei)In your opinion what is the best way to learn/teach (seekhna/seekhana) citizens about health & disease? (Swastha aur bimari) [check what is considered best methods for learning]
   - What do you consider the most trustworthy (viswasniya) source (sadhan) for health information? [understand the influence of medium]
   - What is the most important (bahumulya) health information you remember? Why ? how did you receive it? what is special (vishes) about it? [to understand what kind of health information has stickiness & recall value]
   - What information (sujna) do you remember (yaad) from the COVID-19 pandemic? what are the rules (niyam) you follow about COVID-19? Why? [to validate the previous question]

8. Ability to find health information:

- In your opinion what is the best medium (madhyam) for you to get health information? Why ? [to understand the medium for the information sought]
- What is the latest health information you have received? what do you like about it? what do you don't like about it? [understand the emotional cues, liking & disliking about health information]
- What do you think are the limitation (kathinayi) for a people to find health information ? why
- What is needed for people to find information about AMR ?

9. Vignette

I will now read a story and want you to answer questions to the story:

Prakash is a 40-year-old man/woman who has recently been hospitalized for tubercolocis. He/She lives in a village in the district of Kangra. The family has farm land and they grow apples in their land. He has two children 17 (girl) and 15 (boy) .

He has been smoking for several years and has tried to quit. He is struggling with breathlessness and coughing. He has little energy and therefore cannot work full time in the farm.

He has visited the doctor and he's on Tb medicine but now the doctor says the current dose is not working on him due to multidrug resistant.

Since his younger days he has been taking medicine from pharmacist for throat infection or stomach upset for quick recovery. He has also sometimes used his leftover medicine for throat infection later. He has been buying 10 tablets of (arithromycin) from the pharmacist (who's is a friend) and takes them for a 2-3 (one pill a day) until he is relieved and then shares the medicine with other who had similar symptoms if required.

He visited the doctor in the healthcenter after serious lung infection (sankraman) and was detected with tubercolocis. After few months of treatment when his condition did not improve this blood was sent for lab testing to check for drug resistance and that when they found out about the AMR condition. He now had to stay in the hospital for 6 months while the doctors figured out which medicine can work on him.

These instances have increased in the village and therefore healthcare workers urge people to take antibiotic only with doctor's prescription.

9a. Do you recognize yourself or a patient's situation in the story, and how do you recognize yourself or a patient's situation?
9b. How can the health service work with the person described in the story to improve his health in the best possible way?
9c. How should we organize the health services in the community to solve the challenges set out in the story in the best possible way?
9d. How should the health services in specialist health care (i.e., the hospital) be organized to solve the challenges set out in the history in the best possible way for people with AMR?
9e. How should the health services in society be organized so that they ensure the best possible health for people with AMR?
9f. How can community health care, specialist health care, and society work together to ensure the best possible health for people with AMR ?