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Original articles

Perspectives of primary healthcare workers on primordial hypertension prevention messaging and health promotion capacity in rural South Africa

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Background

There is limited evidence regarding the capacity of primary healthcare (PHC) systems to deliver culturally responsive and multi-channel primordial hypertension prevention messaging in rural South Africa, particularly from the perspectives of frontline healthcare workers responsible for community-based prevention and health promotion. This study explored perspectives of PHC workers on health promotion capacity and multi-channel primordial hypertension prevention messaging in OR Tambo District of South Africa.

Methods

A qualitative interpretivist design using a purposive sample of 15 key informants was recruited across six PHC and community health centre facilities for semi-structured in-depth interviews between February and May 2025. Recruitment continued until thematic saturation was achieved. Recorded interviews were transcribed verbatim, and isiXhosa interviews were translated and back-translated into English. Data were analysed using Braun and Clarke's reflexive thematic analysis.

Results

Three interrelated themes emerged: conceptual awareness of primordial hypertension prevention; communication approaches and community engagement; and facility capacity, barriers, and recommendations for strengthening prevention systems. Participants demonstrated strong understanding of primordial hypertension prevention and identified multiple communication platforms, including clinic-based health education, community outreach, community health workers, traditional leadership structures, schools, churches, social media, and local radio stations. However, participants perceived prevention efforts to be constrained by shortages of healthcare personnel, inadequate outreach and technological health promotion infrastructure, poverty, food insecurity, low risk perception, culturally embedded misconceptions regarding hypertension, and limited local capacity for behavioural monitoring and contextually tailored message development. Commercial determinants of health, particularly widespread marketing and accessibility of unhealthy foods and alcohol products, were also perceived to undermine prevention efforts.

Conclusions

Although primordial hypertension prevention was widely understood and valued among PHC workers, its implementation in this rural setting was constrained by interconnected structural, socioeconomic, cultural, technological, and health-system challenges. Overcoming these barriers requires strengthening decentralised, culturally responsive health promotion infrastructure, enhancing behavioural monitoring capacity, and intersectoral engagement. Ultimately, addressing broader commercial and social

determinants of health is essential to improve the effectiveness and sustainability of primordial hypertension prevention in this rural South African setting.

INTRODUCTION

Hypertension remains one of the leading contributors to cardiovascular morbidity and premature mortality globally, with disproportionate impacts in low- and middle-income countries (LMICs), where health systems are often under-resourced and predominantly oriented toward curative rather than preventive care.[1-3] In South Africa, the burden of hypertension continues to rise along with rapid epidemiological transition, urbanization, unhealthy dietary patterns, sedentary lifestyles, alcohol consumption, and persistent socioeconomic inequalities.[4-6] Rural populations often face increased vulnerabilities linked to poverty, food insecurity, and limited healthcare access, leaving them disproportionately exposed to adverse social determinants of health and associated risk factors.[3,7]

Primordial prevention, which refers to actions that seek to prevent the emergence of behavioural, environmental and social risk factors before they become established within individuals or populations, is increasingly recognized as essential for reducing the long-term burden of hypertension and other non-communicable diseases (NCDs).[8,9] Unlike primary prevention, which seeks to prevent disease among individuals who already possess risk factors, primordial prevention aims to modify the broader social, commercial and environmental conditions that give rise to those risk factors. In the context of hypertension, primordial prevention includes promoting healthy food environments, physical activity, tobacco and alcohol control, supportive public policies, and healthy behaviours across the life course before elevated blood pressure develops.

Within primary healthcare (PHC) systems, effective primordial prevention requires cross-sectoral action, utilizing culturally responsive and contextually appropriate health promotion strategies that extend beyond clinical spaces into key settings such as communities, schools, households, and broader social environments.[6-9] Primary healthcare workers occupy a unique position within rural health systems because they not only provide clinical care but also coordinate health promotion, supervise community outreach, support community health workers, engage traditional and community leaders, and translate national health policies into local practice. Their experiences therefore provide valuable insights into the practical facilitators and barriers influencing implementation of primordial hypertension prevention within routine PHC services.

Evidence from the earlier phases of this broader study demonstrated that although normotensive community members in selected study communities of OR Tambo District generally expressed positive attitudes towards hypertension prevention, substantial gaps persisted between knowledge and actual preventive practices.[10] Reported engagement in preventive behaviours was influenced by factors such as age, media exposure, risk perception, family history of hypertension, perceived effectiveness of preventive practices, and access to communication channels.[10,11] These findings suggested that individual awareness alone is insufficient for effective primordial prevention when structural and contextual barriers remain unaddressed. Despite increasing recognition of the importance of primordial prevention, little evidence exists regarding how frontline PHC workers perceive the capacity of rural PHC systems to design, implement and sustain culturally appropriate primordial hypertension prevention messaging in rural South African and comparable LMIC settings.[12]

This study therefore explored the perspectives of primary healthcare workers on health promotion capacity and multi-channel primordial hypertension prevention messaging in the resource-constrained rural OR Tambo District of South Africa. Specifically, the study sought to examine healthcare workers' understanding of primordial prevention, the communication approaches and community engagement strategies currently utilised for hypertension prevention and messaging, and the perceived barriers and opportunities influencing the effectiveness of prevention messaging within rural PHC systems. By drawing on the experiences of frontline PHC workers, the study contributes contextually grounded evidence to inform district-level policy, health promotion practice and intersectoral strategies aimed at strengthening primordial hypertension prevention messaging in rural South African PHC systems.

METHODS

STUDY DESIGN

This study employed a qualitative interpretivist design using semi-structured key informant interviews with PHC workers involved in hypertension program planning, prevention and clinical management.

An interpretivist paradigm was considered appropriate because the study sought to understand how healthcare workers construct, interpret and experience primordial hypertension prevention within their routine practice. Rather than measuring objective outcomes, the study aimed to explore participants' meanings, perceptions and experiences regarding health promotion capacity and prevention messaging within their specific organisational and sociocultural contexts.

STUDY SETTING

The study was conducted in selected community health centres (CHCs) and primary healthcare (PHC) facilities within the OR Tambo District of the Eastern Cape Province, South Africa. The district serves a predominantly rural population characterised by widespread poverty, high unemployment, limited infrastructure, and substantial dependence on public healthcare services.[13,14] These contextual characteristics make the district an appropriate setting for examining implementation of primordial hypertension pre-

vention messaging within resource-constrained PHC systems.

Primary healthcare services in the district are primarily delivered through government-owned clinics, CHCs, and outreach services run by multidisciplinary teams that include professional nurses, health promotion practitioners, operational managers, and community health workers (CHWs).[14] Health promotion and non-communicable disease (NCD) prevention activities are implemented in collaboration with community stakeholders, including traditional leaders, councillors, churches, schools, and local civil society structures. Health information dissemination occurs through multiple formal and informal channels, including facility-based education sessions, outreach campaigns, community gatherings, community radio platforms, printed educational and informational materials, and social media platforms.

PARTICIPANT SELECTION AND RECRUITMENT

Participants were purposively selected because they possessed direct experience in hypertension prevention, health promotion, programme management and PHC service delivery. Eligible participants included professional nurses, program managers, health promotion practitioners, and representatives from relevant non-governmental and community-based organisations involved in NCD prevention and control activities. Participants were selected from PHC facilities previously included in earlier quantitative design phases of the broader study investigating primordial hypertension prevention in OR Tambo District.

Recruitment continued until thematic saturation (information power) was achieved. A total of fifteen information-rich PHC workers were recruited from six PHC and CHC facilities across the district, between February and May 2025. Recruitment was facilitated through engagement with facility managers and departmental heads, who assisted in identifying eligible personnel. Potential participants received verbal and written information regarding the study objectives, procedures, voluntary participation, confidentiality, and recording of interviews. Written informed consent was obtained from all participants prior to data collection.

DATA COLLECTION

Data were collected using a pretested semi-structured key informant interview guide developed in alignment with the study objectives and informed by relevant literature on primordial prevention, health promotion, and hypertension prevention.[15-18] The interview guide captured participant demographic characteristics, including age, sex, professional role, and years of work experience, as well as experiences and perceptions regarding hypertension prevention messaging, communication approaches, community engagement systems, facility preparedness, barriers to prevention, and recommendations for strengthening primordial hypertension prevention and messaging in their facilities and catchment community.

Interviews were conducted between February and May 2025 at venues and times convenient to participants to ensure privacy, confidentiality, and uninterrupted discussion. Interviews were facilitated primarily in English and isiXhosa, depending on participant preference. Each interview lasted approximately 45-60 minutes and was conducted by the principal interviewer, supported by a note-taker, recorder and field observer, who were all bilingual and experienced public health promotion researchers. All interviews were audio-recorded using two digital recorders to ensure data backup and completeness. Field notes and reflective observations were documented during and immediately after interviews to capture contextual information, non-verbal cues, and emerging analytical reflections.

Audio-recorded interviews conducted in isiXhosa were transcribed verbatim and translated into English by trained bilingual research personnel. Where necessary, translated transcripts were back-translated into isiXhosa to verify linguistic accuracy, contextual meaning, and consistency of interpretation. All transcripts were subsequently cross-checked against the original audio recordings to ensure completeness and fidelity to participants' accounts. Following each interview, the interviewer summarised key discussion points and reflected interpretations to the participant for immediate clarification, confirmation of meaning, and correction where necessary.

DATA MANAGEMENT AND ANALYSIS

All qualitative data, including audio recordings, transcripts, field notes, and interview summaries, were securely managed throughout the study process. Hard-copy materials were stored in locked cabinets accessible only to the principal investigator, while electronic data were stored in password-protected folders and encrypted cloud-based backup systems.

Data were analysed using Braun and Clarke's reflexive thematic analysis framework,[19] supported by NVivo version 14. Analysis followed six iterative and recursive phases. The researchers first familiarised themselves with the data through repeated reading of transcripts, listening to audio recordings, and reviewing field notes to develop immersion and analytical sensitivity. Initial inductive codes were then generated systematically across the dataset to identify meaningful features relevant to participants' perceptions and experiences regarding primordial hypertension prevention and health promotion capacity. Coding was conducted line-by-line within NVivo 14 to enhance organisation and traceability of analytical decisions.

Following this, related codes were then grouped into preliminary categories and candidate themes through continuous comparison across transcripts and participant groups. The themes were then reviewed, refined, and reorganised to ensure internal coherence, conceptual consistency, and alignment with the overall dataset. During this phase, duplicate or overlapping themes were merged, while poorly supported themes were discarded or redefined. The themes were clearly defined, named, and contextualised in relation to the study objectives and broader literature on health promotion and NCD primordial prevention. Finally,

the analytic narrative and thematic report was developed through interpretive synthesis of themes, supported by representative verbatim quotations selected to preserve participants' voices and contextual meanings.

Trustworthiness was enhanced through prolonged engagement with the data, iterative reflexive discussions among a three-member research team, maintenance of field notes and analytic memos, triangulation of interview data with observational notes, and careful preservation of contextual meanings during translation and transcription processes.

RESULTS

CHARACTERISTICS OF STUDY PARTICIPANTS

Participants were recruited from six facilities until adequate information power was achieved. Recruitment ceased when successive interviews yielded no substantively new concepts or themes relevant to the study objectives, indicating that thematic saturation had been reached. A total of 15 participants were interviewed across 6 CHC and PHC facilities in the OR Tambo District. Participants comprised professional nurses, program managers, and health promotion personnel directly involved in hypertension prevention, chronic disease management, community outreach, and health promotion activities (**Table 1**). The age of participants ranged from 29 to 60 years, while professional experience within primary healthcare settings ranged from 7 years to 36 years.

Most participants reported responsibilities related to patient assessment, health education and promotion, management of chronic conditions, implementation of community and outreach programmes, supervision of community health workers, and coordination of community-based prevention initiatives.

EMERGING THEMES

Three major themes emerged from the analysis[1]: conceptual awareness of primordial hypertension prevention and its perceived importance[2]; primordial hypertension prevention and messaging approaches, communication channels, and community engagement; and[3] facility capacity for primordial hypertension prevention and messaging, barriers to prevention and messaging, and recommendations for strengthening hypertension prevention and health promotion messaging.

THEME 1: CONCEPTUAL AWARENESS OF PRIMORDIAL HYPERTENSION PREVENTION AND ITS PERCEIVED IMPORTANCE

Participants consistently demonstrated strong conceptual understanding of primordial hypertension prevention, describing it as a proactive, community-oriented approach to preventing risk factors from emerging. They highlighted key elements such as health education, dietary control, physical activity, smoking cessation, alcohol reduction, and weight management aimed at reducing behavioural and environmental risks well before the development of hypertension.

One participant explained:

> "The way I understand primordial prevention for hypertension is that it means we must prevent the emergence of hypertension risk factors before they develop by educating and helping people to adopt healthy lifestyle choices, ensuring their daily habits remain within protective limits. If people can follow the recommended lifestyles and preventive behaviours, our

Table 1. Summary of participant characteristics (n=15)

PARTICIPANT CHARACTERISTICS	FREQUENCY
1. **Age Group (years)**	
• 18 – 39	6
• 40 – 50	6
• 51- 65	3
2. **Sex**	
• Male	6
• Female	9
3. **Professional Role and Facility**	
Professional nurse	
• CHC	3
• PHC	2
Health promotion practitioner	
• CHC	2
• PHC	2
Facility/Operational Manager	
• CHC	1
• PHC	1
NGOs *(Health promotion practitioners)*	2
Community-based representatives *(community health workers/ Ward Committee Member)*	2
4. **Years of Work Experience**	
• 0 – 9	2
• 10 – 19	3
• 20 – 29	5
• 30 – 39	5
5. **Healthcare Facility/Organization Type**	
• Community health center	7
• Primary healthcare clinic	5
• District/sub-district health office	3

> clinics would be empty. People would just come for screening." (*Participant 10, Male, 38 years, Professional Nurse)*

Participants widely perceived primordial prevention as essential for reducing the growing burden of cardiovascular disease, chronic illness complications, disability, premature mortality, and socioeconomic hardship within rural communities. Several participants further highlighted that poor risk perception and widespread unhealthy lifestyle practices continued to undermine preventive efforts despite ongoing health education activities.

One participant reflected:

> "It is important because we are trying to curb the increase of cardiovascular issues, especially in our youth and young people. From our interaction with communities, I think people are generally aware of hypertension, but they do not adequately perceive the risk and implications regardless of the messages we disseminate. But people do not take prevention seriously, judging from the general unhealthy diet preferences, widespread smoking, and alcohol drinking behaviours we see around this community." *(Participant 13, Female, 60 years, Professional Nurse)*

Participants further emphasised the importance of initiating prevention efforts early in life and strengthening community awareness regarding modifiable risk factors for hypertension and other non-communicable diseases. Prevention messaging was frequently framed around promoting healthy lifestyles across the life course rather than focusing exclusively on hypertension management after diagnosis.

As one participant noted:

> "Basically, most of our NCD health messages focus on encouraging lifestyle modification by community members, such as healthy diet, dietary control, reducing alcohol intake, undertaking physical activity, and smoking cessation. However, we do not focus on hypertension alone, but on NCDs in general or sometimes on selected NCDs including hypertension." *(Participant 9, Female, 38 years, Clinical Nurse Practitioner)*

THEME 2: PRIMORDIAL HYPERTENSION PREVENTION APPROACHES, COMMUNICATION CHANNELS, AND COMMUNITY ENGAGEMENT

Participants consistently described multiple facility- and community-based approaches used to support primordial hypertension prevention and broader non-communicable disease (NCD) prevention activities. These approaches included waiting-area health education sessions, one-on-one patient counselling, outreach campaigns, community health worker-led adherence clubs and household visits, community screening initiatives, and dissemination of information through pamphlets, posters, and local gatherings. There was a consensus across interview data that prevention programs and activities were commonly integrated into broader NCD and health promotion programmes rather than implemented as stand-alone hypertension interventions.

One participant explained:

> "We've got campaigns and every month we visit communities and including on health days... this week we are going to one community, next week another one. However, we do not focus on hypertension alone, but we address many other non-communicable diseases such as HIV, diabetes and so on" *(Participant 9, Female, 38 years, Clinical Nurse Practitioner)*

Health education delivered within clinic waiting areas and during consultations was consistently identified as the most routine and direct primordial prevention messaging. Participants further indicated that community health workers played a critical role in extending prevention messages beyond healthcare facilities into underserved rural communities through door-to-door household visits and other community gatherings.

As one participant stated:

> "We've got health education sessions by nurses or health promotion practitioners while people are waiting at the waiting area to get services at the clinic. We also have community health workers who sometimes go to these houses door-to-door, or address people at strategic community gatherings, and distribute information, hard copy or soft copy IEC *[educational and communication]* materials through community WhatsApp groups ... this way there are chances for closer access to health information and better understanding because they live together and know each other.... However, you can agree with me that it's not an easy task because beside just educating and sharing information, a healthcare worker cannot provide the things they encourage people to eat or use, such as healthy foods, and it's harder to stop someone from drinking *[alcohol]* just buy showing a picture or teaching them, unless if they have to do it for health reasons, maybe" *(Participant 9, Female, 38 years, Clinical Nurse Practitioner)*

Participants consistently identified community health workers as essential intermediaries linking health facilities with rural populations through household visits, community mobilisation, and culturally appropriate communication of health education and promotion information in local languages through various platforms and channels like community gatherings, community radio stations, and community WhatsApp groups. Community structures, including schools, churches, councillors, and traditional leaders, were also described as important platforms for disseminating prevention messages and improving community participation.

One operational manager explained:

> "We closely work with community structures in dissemination of health messages, such as traditional, religious and political leaders, councillors, community health workers, school principals and so on. When we have the resources, we usually use online or offline posters and pamphlets written in English and Xhosa because most of our people speak Xhosa, and these community structures play a key role in disseminating messages. Sometimes we put on calendars, disseminate

> through Facebook pages or WhatsApp groups or on the walls of shops, school or hospitals." *(Participant 11, Female, 44 years, Facility Manager, Operational Manager)*

Participants further highlighted the use of multiple communication platforms, including community radio stations, loud hailing during campaigns, social media platforms, WhatsApp groups, and local noticeboards. Radio stations were widely perceived as particularly effective in rural communities because of their accessibility and ability to communicate in local languages.

As one participant noted:

> "We do have radio sessions with local radio stations, but they cover all health-related issues, not specifically hypertension, although some sessions directly address primordial hypertension prevention." *(Participant 10, Male, 38 years, Community Health Worker)*

Another participant added:

> "We also use loud hailing sometimes, especially during community and school campaigns, roadshows or on health days. Here we record messages, put them in a car, and go around the area informing and sensitizing people, especially the day before the event." *(Participant 12, Female,43 years, Professional Nurse)*

THEMES 3: FACILITY CAPACITY FOR PRIMORDIAL HYPERTENSION PREVENTION, BARRIERS TO PREVENTION, AND RECOMMENDATIONS

Across interviews, participants expressed mixed perceptions regarding the preparedness of their facilities to deliver effective primordial hypertension prevention services. While participants described existing strengths, such as the availability of communication channel opportunities, most of them highlighted substantial structural, socioeconomic, cultural and health system barriers limiting effective primordial NCDs prevention efforts. Several participants reported limited technical expertise and infrastructure for developing locally tailored health promotion materials, behavioural surveillance systems, social media engagement, and rumour monitoring mechanisms.

One participant explained:

> "In terms of competences for undertaking health education to the community, all our staff working in the relevant departments have the knowledge about primordial hypertension prevention since they are either professional nurses or health promotion practitioners. We always keep each other updated with in-service trainings on a regular basis, just to share lessons and refreshing each other. However, resources are key. Without equipment like blood pressure machines and scales, vehicles, graphic designers, and local printing equipment, it becomes difficult to adequately and effectively support primordial hypertension prevention at local level." *(Participant 15, Male, 48 years, Facility Manager)*

Another participant noted:

> "We also rely on community radio stations for sharing health education and information messages because people here listen to the radio, and they use our local isiXhosa language. Everything must be in isiXhosa because people understand and prefer isiXhosa." (*Participant 12, Female, 43 Years, Community Health Worker)*

The findings show that primordial prevention on hypertension, like for any other NCDs, depends not only on conceptual professional knowledge, but is also influenced by several structural determinants and resource availability. Participants consistently highlighted severe shortages of healthcare workers, health promotion practitioners, outreach resources, educational materials, transport, and blood pressure screening equipment. High workloads and large catchment populations were perceived as major barriers limiting the reach, timely dissemination and sustainability of prevention programmes and IEC materials, particularly in remote rural communities.

One participant noted:

> The straight answer is we need resources. The government takes time to recruit nurses and health promotion practitioners, yet our catchment area is too large. We are overloaded with work, and there are places we cannot reach because of transport shortages and poor roads." *(Participant 12, Female, 43 Years, Health Promotion Practitioner)*

Participants further described important technological and communication infrastructure limitations affecting prevention messaging. Several participants reported inadequate local capacity for behavioural data generation, social media engagement and monitoring, message design, and behaviour change programme evaluation. There were strong shared sentiments across all interviews that there is no locally co-created messaging driven by local behavioural data. Prevention messaging was often described as centrally produced at provincial or national level without sufficient adaptation to local cultural contexts, behavioural realities, and community communication preferences.

One participant reflected:

> "With recent changes in technology and social media use especially among the youth, health promotion now heavily relies on internet and technological skills, both in designing messages, disseminating them and social listening. Here, most of the time, the IEC *[information, educational and communication]* materials come too late and may not be exactly aligned with local knowledge, culture and lifestyles. We do not have people specialised in social media, graphic design, or communication down here. We do not have IEC material design and message printing equipment here, so the materials are designed for us, and not informed by our lifestyle and our knowledge about local people's behaviours. You cannot say all the information from national and province applies to us because it is too centralised. So here we mainly focus on offline social listening and dissemination of materials coming to us from the province or national, but they may have already seen the same on social media." (*Participant 12, Female, 43 Years, Health Promotion Practitioner)*

Poverty, unemployment, food insecurity, and limited affordability of healthy diets were widely perceived as major barriers constraining community uptake of recommended lifestyle modifications. Participants reported that many households depended on social grants and inexpensive carbohydrate-based diets, making sustained healthy lifestyle practices difficult to achieve despite ongoing health education efforts.

One operational manager explained:

> "The community we are living in is poor and mainly depends on social grants. Mostly the foods they are getting are carbohydrates. There is a perception that healthy diets are expensive, ...those fruits, grains and vegetables.....not everyone can afford them on a regular basis. So you can educate people, but behaviour change also needs money, which most people do not have, because most of them are unemployed." *(Participant 11, Female, 44 years, Facility Manager, Operational Manager).*

However, most participants further reported that despite health education, behaviour change remained difficult because of low-risk perception, unemployment, psychosocial stress, and widespread alcohol and tobacco use within communities.

As one participant noted:

> "I think behaviour change is practically not that easy, especially here. People seem to know about hypertension and some of its risk factors, but it seems like they are more ready to take medication than to prevent it. Many people are unemployed and stressed. They say healthy foods are expensive, but they still buy cigarettes and alcohol. So, I don't think it's just about money, but it's about perception too" *(Participant 12, Female,43 years, Professional Nurse).*

Some participants described how deeply ingrained cultural stereotypes and spiritual etiologies complicate the reception of primordial prevention strategies in rural environments. Because primordial prevention relies on early adoption of healthy lifestyle default behaviors, belief systems that conceptualise hypertension as an exclusively Western or spiritual affliction undermine public health communication. Some culturally embedded misconceptions and counterproductive beliefs regarding hypertension and other NCDs consistently emerged across interview discussions. These include perceptions that hypertension is a "white person's disease," attribution of stroke to witchcraft, low trust in biomedical treatment, and reliance pluralistic sources of health care information, including biomedicine, traditional and faith-based. This pluralism may suggest that for primordial prevention messages to be effective and trusted, they must be locally co-designed with traditional and religious leaders rather than centrally designed and delivered solely through a modern medical framework.

One Health promotion practitioner said:

> "Some people I once talked to have stereotypes; they still believe that NCDs such as hypertension and diabetes are diseases of white people, and some also believe that the conditions are spiritual symptoms requiring spiritual intervention. This mindset can shape how they pay attention to primordial prevention messages, and how and where they will seek help when needed. It seems some people have little trust or are confused about what really works, so they rely on a mix of traditional medicine... religious approaches and then modern medicine approach." *(Participant 7, Females, 29 years, Facility Community Liaison/Health Promotion Officer)*

Commercial determinants of health were also perceived as undermining prevention efforts. Participants highlighted the widespread availability, affordability, and aggressive marketing of unhealthy and obesogenic foods, alcohol, and tobacco products, which they believed weakened community motivation and capacity to adopt healthier lifestyles.

One participant explained:

> "Fast foods are sold everywhere at cheaper prices, and people love junk food because it tastes good and is affordable. These products are marketed extensively with attractive weekly promotions and price cuts. Then you go and tell people to live healthy lives, but the environment and their financial situation cannot support that. Perhaps promo updates on junk food and alcohol travel faster and are better received than our healthy lifestyle campaign recommendations and IEC materials." *(Participant 1, female, 52 years, Operational manager)*

Another participant also explained:

> Sometimes you see that we are avoiding the elephant in the room. People talk of prevention of NCDs, primordial hypertension prevention, mental health, and so on. But you see that most unhealthy lifestyles like eating junk foods, smocking, excessive alcohol intake and misuse of dangerous substances are perpetuated by a conducive environment. These things are found almost everywhere and are very cheap, even cheaper than healthy foods..... and people here particularly love junk food because it has good taste in addition to cheaper prices. Think of the fast foods and alcohol promos of various kinds. Then you just disseminate NCD primordial prevention messages to the same communities? They can hear you, but the environment and their financial situation cannot support that. *(Participant 8, Female, 39 years, Professional nurse and Health Promoter)*

Recommendations for strengthening primordial hypertension prevention and messaging included expanding the community health workforce, increasing transport and outreach resources, strengthening multilingual and community-centred communication strategies, decentralising IEC material development and social media engagement, improving local capacity for behavioural monitoring and programme evaluation, and increasing utilisation of radio and other media platforms.

One participant explained:

> "To me primordial prevention of NCDs is a complex issue. It seems knowledge alone is not enough alone. There are several important resources involved, especially at this local level: we need more skilled personnel, especially in multimedia communication and

> design, and graphic design; we also need health promotion infrastructure at [the] local level - printers, computers, and software; we need vehicles too. Everything needs to be decentralised so that we can be able to monitor people's health information needs both online and offline, and co-design relevant educational and informational materials to address these needs locally, including collaborating with these other informal health providers such as religious and spiritual providers, because they are trusted sources of health information here."*(Participant 3, Female, 35 years, Operational manager)*

Participants also recommended strengthening intersectoral collaboration between health services, research institutions, civil society organisations, agriculture sectors, and community structures to improve healthy food access, community food production initiatives, and broader social determinants of health.

As one participant reflected:

> "The government needs to regulate alcohol, tobacco products, and unhealthy foods because people buy what they can easily access and afford. There is also a need for partnerships with sectors like agriculture and water and sanitation to strengthen community gardens and local healthy food production." (*Participant 2, Female,50 years, Community Health Worker)*

Several participants further emphasised the importance of strengthening monitoring and evaluation systems for health promotion activities through behavioural data systems, technological infrastructure, and research partnerships.

A health promotion practitioner expressed his concern and suggestions:

> "The main challenge with primordial prevention is that you work a lot and have to convince people and yourself that it works, but you do not easily see, neither can you measure, the impact of your work. We just share messages, but do not get to know how its received, interpreted and utilised. We need ways to monitor and evaluate the impact of health promotion activities including this primordial hypertension prevention, but that requires behavioural data, technological resources, technical personnel, and partnerships with research institutions and other organisations." *(Participant 2, Female, 42 years, Professional Nurse)*

DISCUSSION

This study explored perspectives of primary healthcare (PHC) workers on health promotion capacity and multichannel primordial hypertension prevention messaging in selected resource-constrained rural communities of OR Tambo District. Three interconnected findings emerged[1]: participants demonstrated substantial conceptual understanding and appreciation of primordial hypertension prevention as a proactive and life-course-oriented strategy focused on preventing risk factors from emerging in healthy populations thereby reducing the growing burden of hypertension and other NCDs[2]; participants identified multiple communication platforms used to disseminate prevention messages; and[3] despite the high conceptual awareness and the existence of several communication pathways, participants consistently perceived the implementation of primordial prevention strategies to be constrained by interconnected structural, socioeconomic, cultural, technological, and health-system barriers that limited the reach, contextual relevance, and sustainability of prevention efforts. These findings are best understood through a socio-ecological perspective, which recognises that primordial hypertension prevention is influenced by interacting factors operating at the individual, community, health-system, district, and policy levels rather than by individual behaviours alone.

At the individual level, participants demonstrated strong conceptual understanding of primordial hypertension prevention and recognised its importance as a proactive, life-course approach to preventing behavioural risk factors before the onset of hypertension. However, they perceived that implementation is constrained less by inadequate professional knowledge than by limited institutional capacity to translate prevention knowledge into sustained community-level behaviour change.[15,17,18,20] Participants consistently distinguished primordial prevention from clinical hypertension management by describing it as extending beyond screening and treatment to encompass health promotion, behavioural risk reduction, and community mobilisation. This distinction emphasises the upstream focus of primordial prevention and highlights the need to address the social, environmental, and commercial determinants of health before behavioural risk factors become established.[18,20-22]

However, participants perceived primordial NCDs prevention systems to remain under-resourced, insufficiently decentralised, and weakly institutionalised within routine PHC practice. These findings complement findings from earlier phases of this broader study, which concluded that that although normotensive community members generally possessed positive attitudes towards hypertension prevention, preventive behaviours remained inconsistent and strongly influenced by structural and psychosocial factors such as poverty, risk perception, age, and media exposure.[16,17] These findings indicate that strengthening individual knowledge alone is unlikely to achieve sustained primordial prevention in this rural South African setting without simultaneous improvements in health-system capacity and supportive community environments.

At the community level, participants consistently highlighted trusted community structures as key to successful primordial hypertension prevention. Community health workers, churches, schools, councillors, traditional leaders and community radio stations were viewed as culturally legitimate and accessible platforms for promoting healthy behaviours and reinforcing prevention messages. Participants further emphasised the importance of local language communication, particularly isiXhosa-centred communication and messaging, and the need for locally co-designed communication strategies that recognise pluralistic sources of health information, including traditional and faith-based

systems. These findings suggest that effective primordial prevention messaging depends not only on message dissemination, but also on contextual adaptation, trust, cultural relevance, and social embeddedness.[18,23] These findings demonstrate that effective primordial prevention depends on community ownership, cultural congruence, and trusted interpersonal relationships rather than one-way dissemination of health information. They also reinforce the important bridging role of community health workers between PHC facilities and households.

At the same time, participants identified substantial limitations in local technological and communication infrastructure to support contemporary health promotion approaches, including inadequate local capacity for behavioural data generation and surveillance, social media engagement, rumour monitoring, multimedia content production, message tailoring, and evaluation of behaviour change programmes.[17] Prevention materials were frequently perceived as centrally designed and insufficiently responsive to local behavioural realities and communication preferences. These findings have important implications for strengthening decentralised health communication systems, behavioural intelligence capacity, and digital health promotion competencies within PHC services in the context of rapidly evolving digital communication ecosystems and increasing reliance on social media platforms for public health information dissemination.[15,17]

Study findings also highlight the influence of structural and commercial determinants of health in shaping the effectiveness of primordial NCDs prevention efforts. At the facility level, participants perceived that implementation of primordial hypertension prevention was constrained by shortages of health promotion personnel, inadequate outreach resources, limited locally appropriate IEC materials, insufficient transport, and weak behavioural monitoring systems. Participants consistently described poverty, unemployment, food insecurity, psychosocial stress, and limited affordability of healthy diets as major barriers to sustained lifestyle modification. Simultaneously, unhealthy foods, alcohol, and tobacco products were perceived as widely available, aggressively marketed, sensory attractive, socially normalised, and economically affordable within communities, thereby undermining prevention messaging.

Primordial prevention was therefore viewed as occurring within environments that often structurally undermine healthy behavioural choices. These findings align with broader global concerns regarding the commercial determinants of NCDs, where powerful food, alcohol, and tobacco industries may shape consumption environments through pricing, accessibility, advertising, and product promotion.[21,22,24] These operational constraints suggest that routine PHC services remain predominantly oriented towards curative care, leaving relatively limited institutional capacity for sustained upstream prevention activities.

Beyond the facility level, participants highlighted district-level and broader policy challenges that limit the effectiveness of primordial prevention. They described culturally embedded misconceptions regarding hypertension and other non-communicable diseases, including perceptions that hypertension is a "white person's disease" and beliefs linking chronic illness to spiritual or supernatural causes. These findings suggest that health education alone may have limited effectiveness especially when prevention efforts operate within environments characterised by structural deprivation, commercially reinforced unhealthy lifestyles, and competing explanatory models of illness.[21, 23] Participants also highlighted the need for district-level investment in locally generated behavioural surveillance, multilingual IEC development, multimedia production, social media engagement, and message evaluation so that prevention strategies can be adapted to local communication preferences and behavioural realities rather than relying solely on centrally produced materials.

At the policy level, the findings indicate that primordial hypertension prevention is fundamentally a systems issue requiring coordinated action across the health sector and other sectors influencing the social determinants of health.[24,25] The interrelationship between poverty, food environments, cultural beliefs, communication infrastructure, workforce shortages, and behavioural risk perception demonstrates that effective primordial prevention cannot be achieved through isolated health education campaigns alone. Instead, the findings support calls for integrated "Health in All Policies" (HiAP) approaches that strengthen prevention-supportive environments while simultaneously improving local health promotion capacity.[17,20,26] Strengthening primordial prevention and messaging may therefore require integrated HiAP approaches that combine community-responsive health promotion with broader interventions targeting food systems, regulation of harmful products, local food production, education, and social protection.[17,20,21,26]

The findings have several implications for policy and practice. The socio-ecological nature of the identified barriers suggests that strengthening primordial hypertension prevention requires coordinated interventions operating simultaneously at individual, community, facility, district and policy levels.[16,17,20] Also, expanding the community health workforce and improving outreach infrastructure may strengthen continuity of prevention messaging in geographically dispersed rural populations.[16,17,20] PHC systems may also benefit from stronger integration of behavioural science, communication specialists, graphic design expertise, and digital health promotion competencies into routine health promotion structures.[16,17,20,25] Strengthening intersectoral collaboration between health services, agriculture, education, civil society organisations, and local governance structures may improve the broader environmental conditions necessary for sustainable behaviour change.

With regards to implications for research, further research is needed to examine how culturally responsive and digitally integrated primordial prevention systems can be operationalised within resource-constrained rural PHC settings. Longitudinal and implementation-focused studies may help evaluate the effectiveness of decentralised behavioural monitoring systems, community-based communication interventions, and integrated health promotion mod-

els. Additional research exploring community perceptions of message credibility, digital health communication uptake, and the influence of commercial determinants on behavioural decision-making may further strengthen primordial prevention strategies in rural African contexts.

STUDY STRENGTHS AND LIMITATIONS

This study has several strengths and limitations. By exploring perspectives of frontline PHC workers directly involved in health promotion and hypertension prevention, the study provides contextually grounded insights into the operational realities of primordial prevention within rural PHC systems. The use of reflexive thematic analysis enabled in-depth exploration of both structural and sociocultural dimensions shaping prevention efforts. However, the findings should be interpreted within the context of several limitations.

The study was conducted within selected facilities in one predominantly rural district and may therefore not fully represent experiences in other settings. As with most qualitative studies, findings reflect participants' perspectives and experiences rather than objective measures of health promotion effectiveness or behavioural outcomes. The study also focused primarily on healthcare worker perspectives and did not directly include community members, policymakers, media practitioners, or commercial sector stakeholders who may influence primordial prevention systems. Nevertheless, the findings provide important preliminary insights into the complex interplay between communication systems, workforce capacity, socio-commercial determinants, and cultural contexts shaping primordial hypertension prevention in rural South Africa.

Discuss your results here and address their importance, as well as limitations. You can use the subheadings as in the Methods and Results sections

CONCLUSIONS

Although primordial hypertension prevention and messaging was widely understood and valued among PHC workers in rural OR Tambo District, its implementation was perceived to be constrained by interconnected structural, socioeconomic, technological, cultural, and health-system barriers. While PHC workers described multiple community-based and multi-channel communication opportunities for prevention messaging, these efforts were reportedly undermined by workforce shortages, limited outreach and communication infrastructure, inadequate local behavioural monitoring capacity, poverty, food insecurity, low risk perception, and commercially driven unhealthy food and alcohol environments. The findings suggest that strengthening primordial hypertension prevention in rural South Africa requires more than individual-level health education alone. Sustainable progress may require decentralized and culturally responsive health promotion/communication systems, strengthened community-based communication infrastructure, strong local behavioral monitoring capacity or behavioral intelligence systems, stronger intersectoral collaboration, and broader policy responses addressing the commercial and social determinants of NCDs. These findings provide important insights for strengthening rural PHC-based primordial prevention systems in South Africa and similar low-resource settings.

Consistent with a Health in All Policies (HiAP) approach, district health services should strengthen partnerships with education, agriculture, local government, traditional leadership structures, community organisations and community radio to create supportive environments that enable healthy lifestyle choices.[26] Operational priorities include strengthening health promotion staffing, developing district-level IEC and multimedia production capacity, formalising community radio partnerships, and integrating behavioural monitoring into routine PHC outreach programmes.

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DISCLAIMER

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

ETHICS STATEMENT

The study was conducted in accordance with the Declaration of Helsinki and was approved the Walter Sisulu University Health Sciences Research Ethics Committee (WSU HREC 016/2025). All methods were carried out in accordance with relevant guidelines and regulations for research involving human participants, including the ethical principles of the Declaration of Helsinki and applicable national and institutional research ethics standards. All personal identifiers were removed prior to data extraction and analysis. Anonymized data were stored in secure, password-protected databases accessible only to authorized study personnel to ensure confidentiality and data protection.

DATA AVAILABILITY

The data that supports the findings of this study are available on request from the corresponding author. The data is not publicly available due to privacy or ethical restrictions imposed by the authorizing bodies.

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AUTHORSHIP CONTRIBUTIONS

MF: Conceptualization, Methodology; Investigation, Validation, Writing - original draft, Resources, Project Administration, Funding Acquisition. SCN: Conceptualization, Methodology; Writing - review and editing, Funding Acquisition, Supervision LG: Conceptualization, Methodology; Investigation; Visualization; Validation; Writing - original draft; Writing - review and editing, Ph.D. Supervision. All authors read and approved the final manuscript.

DISCLOSURE OF INTEREST

The authors completed the ICMJE Disclosure of Interest Form (available upon request from the corresponding author and disclose no relevant interests.

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