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**Original Article**

# Finding the missing men with tuberculosis: a participatory approach to identify priority interventions in Uganda

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## Abstract

Gender impacts exposure and vulnerability to tuberculosis (TB) evidenced by a higher prevalence of both TB disease and missed TB diagnoses among men, who significantly contribute to new TB infections. We present the formative research phase of a study, which used participatory methods to identify gender-specific interventions for systematic screening of TB among men in Uganda. Health facility-level data were collected at four Ugandan general hospitals (Kawolo, Gombe, Mityana and Nakaseke) among 70 TB stakeholders, including healthcare workers, TB survivors, policymakers and researchers. Using health-seeking pathways, they delineated and compared men's ideal and actual step-by-step TB health-seeking processes to identify barriers to TB care. The stepping stones method, depicting barriers as a 'river' and each 'steppingstone' as a solution, was employed to identify interventions which would help link men with TB symptoms to care. These insights were then synthesized in a co-analysis meeting with 17 participants, including representatives from each health facility to develop a consensus on proposed interventions. Data across locations revealed the actual TB care pathway diverted from the ideal pathway due to health system, community, health worker and individual-level barriers such as delayed health seeking, unfavourable facility operating hours and long waiting times that conflicted with men's work schedules. Stakeholders proposed to address these barriers through the introduction of male-specific services; integrated TB services that prioritize X-ray screening for men with cough; healthcare worker training modules on integrated male-friendly services; training and supporting TB champions to deliver health education to people seeking care; and engagement of private practitioners to screen for TB. In conclusion, our participatory co-design approach facilitated dialogue, learning and consensus between different health actors on context-specific, person-centred TB interventions for men in Uganda. The acceptability, effectiveness and cost effectiveness of the package will now be evaluated in a pilot study.

**Keywords:** Tuberculosis, participatory research, gender, healthcare-seeking behaviour

## Introduction

Tuberculosis (TB) remains a formidable global health challenge, particularly impacting economically marginalized populations and those living in resource constrained settings (World Health Organization, 2023). Considerable progress has been made in understanding the epidemiological disparities in TB burden (Lönnroth *et al*., 2009). Historically, TB has been associated with higher prevalence among men in many parts of the world (Law and Floyd, 2020), including in Uganda where this study is located. Furthermore, two-thirds of TB cases which go undiagnosed or undetected are among men and models highlighting social interactions underscore the role of adult men in driving new TB infections (Dodd *et al*., 2016; Shaweno *et al*., 2020). As a social construct, gender plays a pivotal role in shaping individuals' behaviours, expectations and interactions within societies (Courtenay, 2000), and these influence exposure and vulnerability to TB in unique ways (Nhamoyebonde and Leslie, 2014; Miller *et al*., 2021). The complex interplay between gender norms and the pathways through which people navigate TB care is a critical issue that needs to be addressed to end TB (Horton *et al*., 2016; 2018a; Chikovore *et al*., 2020; Ringwald *et al*., 2023).

Gender disparities in TB can be attributed to various factors, including occupational exposure and socio-behavioural

**Key messages**

- The intersection of TB, masculinity and the barriers that arise from societal expectations highlights a critical need for gender-specific interventions in TB care.
- Traditional masculine norms, which often discourage men from acknowledging vulnerability or seeking medical assistance, significantly contribute to delayed TB diagnosis and treatment.
- These norms are further exacerbated by practical barriers such as long waiting times at health facilities and a lack of services tailored to men's needs.
- To effectively combat TB, it is essential to develop and implement interventions that address these specific barriers.

habits. Men often work in crowded environments with poor ventilation which carries a higher risk of TB exposure, such as mining (Stuckler *et al.*, 2011) or construction (Tiwari *et al.*, 2007), and more men than women live in congregate settings such as prisons (Baussano *et al.*, 2010). Furthermore, behaviours such as smoking and alcohol consumption, which are usually more prevalent among men, increase susceptibility to TB infection and adverse outcomes including post-TB lung disease (Manji *et al.*, 2016; Simou *et al.*, 2018; Thomas *et al.*, 2019; Wessels *et al.*, 2019). Societal expectations of masculinity often discourage men from expressing vulnerability or seeking medical help, leading them to downplay symptoms or avoid seeking care altogether (Chikovore *et al.*, 2017). The fear of being perceived as weak or unable to fulfil traditional gender roles may deter men from discussing their TB status (Chikovore *et al.*, 2015; 2017). The stigma surrounding TB and its association with HIV infection also affects men's willingness to disclose their illness and seek support (Chikovore *et al.*, 2015). Men's societal roles as providers and primary breadwinners can inadvertently lead to a lack of prioritization of their own healthcare needs, as they often perceive themselves as too busy to seek medical attention, thereby contributing to increased communal transmission and delayed diagnosis and treatment for TB (Chikovore *et al.*, 2014; 2015). Hence, person-centred, gender-specific policies and initiatives that improve men's access to TB care services can lower TB-related illness and death rates, cut down on the spread of TB within the community, and lessen the financial strain on those affected and their families, making them of interest to TB programmes, policymakers and researchers (Chikovore *et al.*, 2020; Ringwald *et al.*, 2023). Gender-specific interventions analyse and address the impact of societal gender norms, roles and relationships on health, take into account the specific needs of men or women, and intentionally target and benefit a particular group to meet distinct needs (World Health Organization, 2011; Gough and Novikova, 2020). They further strive to facilitate the fulfilment of gender-assigned duties by creating environments that make it easier for individuals to meet societal expectations associated with their gender roles. Although gender disparities in Uganda are markedly pronounced with the burden of TB among men being four times higher than that among women (Uganda Ministry of Health, 2015), there are no specific guidelines on male-specific TB services and policy recommendations for gender-specific interventions for TB are geared towards women (Horton *et al.*, 2018b). Recognizing this critical gap, we utilized a participatory researcher led collaborative approach to better understand the barriers and challenges that men face in accessing TB services in peri-urban Uganda and to collectively develop gender-specific interventions that are tailored to their needs.

Participatory research has emerged as a transformative approach in the realm of health and social well-being, redefining traditional research paradigms by prioritizing community engagement and collaboration (Pyett, 2002; Creswell *et al.*, 2007; Chowdhury *et al.*, 2021). It recognizes that communities possess invaluable insights and expertize concerning their own health challenges and social contexts. While participatory methods have been extensively applied in responding to other diseases like neglected tropical diseases (Chowdhury *et al.*, 2021) and HIV (Welbourn, 1995), their potential remains underexplored in the context of TB despite calls for a more synergistic approach to addressing both diseases (Daftary *et al.*, 2015). Since participatory research can help understand and address health disparities, we applied participatory research methods to engage stakeholders to collectively identify and address unique challenges faced by men in accessing TB diagnostic and treatment services. We present the formative research phase of a study that explored community- and facility-level challenges to TB care access for men in Uganda and identified gender-specific interventions for systematic TB screening. This phase employed participatory methods within a phased codesign approach.

## Methods

### Study setting

This work is part of the wider IGNITE (Improving TB case detection using a GeNder-specific TB screening InTErvention in urban public health facilities in Uganda) study under the LIGHT consortium (Leaving no-one behInd; transforming Gendered pathways to health for HIV & TB). The primary goal of LIGHT is to aid policy development and practical interventions that bring about changes in the gender-based routes to health for individuals affected by TB. Uganda is a high TB and TB/HIV burdened country with a TB incidence rate of 198/100 000 population (World Health Organization, 2022). With a focus on finding people with TB missed by the health system, the IGNITE research project aims to develop and pilot a gender-specific TB screening intervention targeting men attending public health facilities in Uganda to increase the number of people with TB who are diagnosed and initiated on treatment.

### Study design

This study adopted the UK's Medical Research Council framework for developing complex interventions (Skivington *et al.*, 2021), wherein involving stakeholders is a critical step. This approach ensures that interventions are well-informed, effective and aligned with the needs and perspectives of the recipients intended to benefit. This framework allows for complexity in the intervention components and further acknowledges the role of the local context in shaping the intervention's implementation and evaluation. A phased codesign approach with stakeholders was adopted to develop an intervention that would subsequently be piloted (Figure 1). Facility-level data collection was done at the study sites followed by a

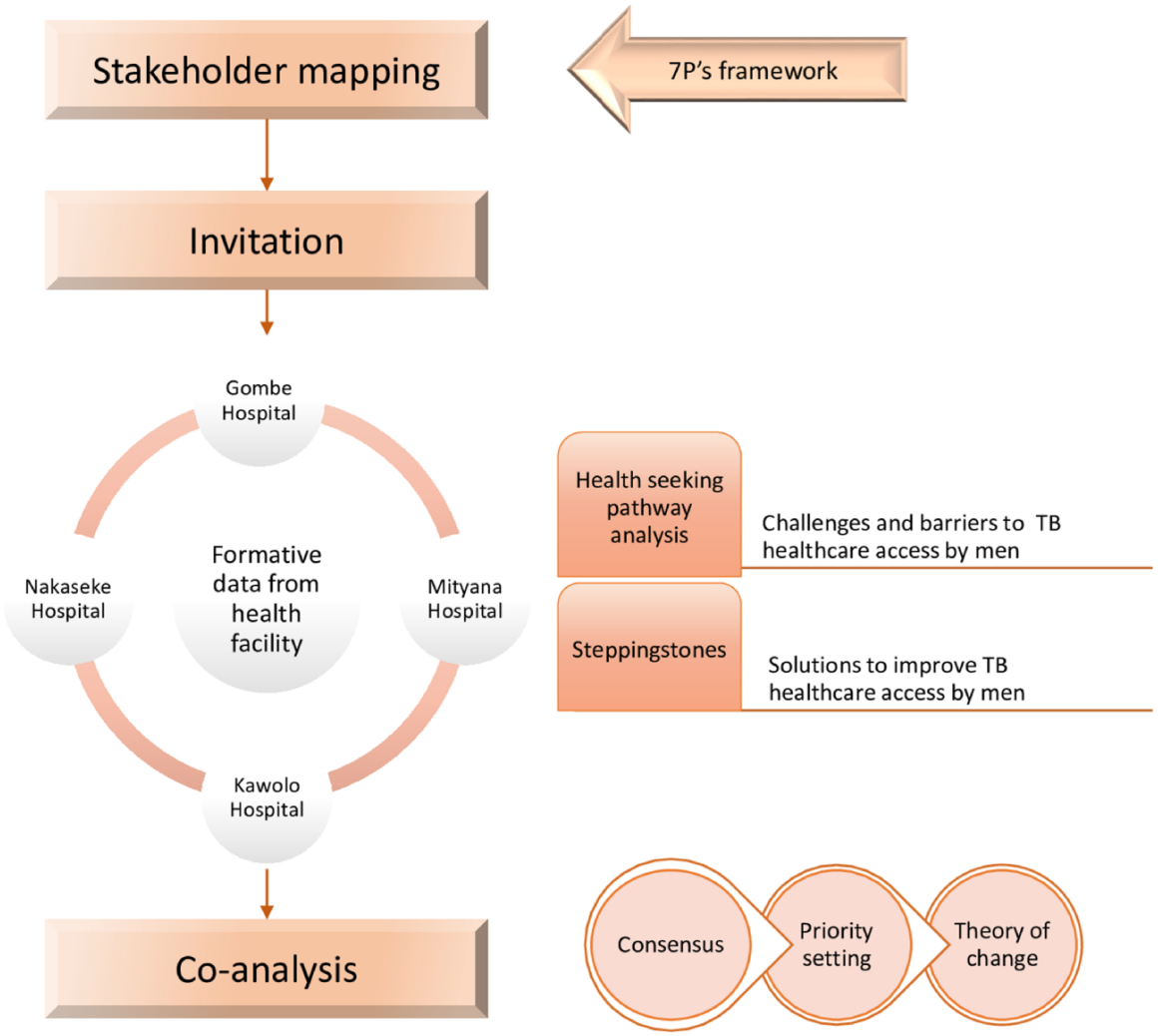


**Figure 1.** Participatory researcher led collaborative approach utilizing health-seeking pathway analysis and stepping stones

co-analysis meeting in which representatives from the health facility joined other stakeholders to synthesize learnings on the pathways and barriers to TB screening, diagnosis and management. Additionally, stakeholders discussed the proposed interventions aimed at enhancing the utilization of TB care services by men across the health facilities, and consensus was reached on the agreed-upon strategies.

## Study population and sampling

We facilitated collaboration between researchers and key TB stakeholders in four purposively selected general hospitals. We estimated that four facility-level discussions would be sufficient to reach saturation (Hennink *et al.*, 2019). To ensure a broad geographic reach and non-overlapping catchment areas, we selected hospitals located at least 50 km away from the capital city, Kampala, and used major highways as reference points. These were Kawolo, Nakaseke and Mityana General Hospitals located in Buikwe (population 429 600), Nakaseke (population 234 600) and Mityana (population 362 500) districts, respectively, in the North Central region. Additionally, we engaged with Gombe General Hospital in Butambala district (population 107 800) in the South Central region. These regions account for a quarter of Uganda's population. The hospitals vary in bed capacity, ranging from 100 to 150 beds, and primarily cater to peri-urban populations whose livelihoods are predominantly reliant on subsistence agriculture (Uganda Bureau of Statistics, 2021). The facilities are the intended venues for the IGNITE pilot.

We adopted an established framework that identifies stakeholders in seven categories (7P's framework) due to its comprehensiveness (Concannon *et al.*, 2019). We purposefully select 20 stakeholders, including TB survivors and health unit management committee (patients and the public); healthcare workers (HCWs) and village health teams (Providers); District Health Officers and Secretaries (Purchasers, Payers); District leaders and health focal points (Policymakers); implementation partners (Product makers); and researchers (Principal investigators). Twenty participants were sampled to allow the inclusion of participants with diverse roles while ensuring meaningful participation to express views and reach a consensus. At the facility level, a consultation meeting was held with the District Health Officer and TB focal person to identify relevant stakeholders, ensuring diversity of respondents by category and gender. To ensure representation from diverse healthcare entry points and departments, we invited

10 HCWs from each facility and 10 participants were identified from other categories. For the co-analysis meeting, additional stakeholders from the national tuberculosis programme, authors of policy documents and TB community advisory boards were identified and invited. Eligibility for participation was extended to stakeholders aged ≥18 years, who were capable and willing to provide informed consent.

J.N. and Z.N. approached and recruited stakeholders physically from the health facilities and district offices or via work phone/email and professional groups. This was done at least one week in advance to allow potential participants ample time to consider their involvement. Identified stakeholders were given information about the study, the nature of their engagement and their role. Written informed consent was obtained from individuals who agreed to participate.

### Data collection

At the health facility, we used health-seeking pathway analysis to collaboratively identify challenges faced by men in accessing TB services and the stepping stones method to develop contextually appropriate interventions for improving men's access to TB care services (Fapohunda *et al*., 2020; Chowdhury *et al*., 2021). First, as part of the health-seeking pathway analysis, participants deliberated health-seeking pathways in two breakout groups: one group delineated the ideal sequence of necessary steps from the onset of TB symptoms to receiving appropriate TB care; the other group documented the real-life steps men with symptoms suggestive of TB typically follow when seeking care. Groups presented and compared their findings (documented on flipchart paper) and collectively identified barriers and challenges preventing men from utilizing the ideal pathway. For completeness, the facilitator (J.N.) probed, using barriers identified from the literature, to assess their relevance in each context.

Afterwards, the stepping stones method (Fapohunda *et al*., 2020; Chowdhury *et al*., 2021) utilized an analogy of crossing a river, where men's challenges to access and engage with healthcare were represented on one side, and the desired outcome of increased TB notification among men was represented on the other side. Participants explored potential stepping stones, representing steps or solutions to overcome barriers, which were written on cards by participants and displayed on the wall for all participants to see. Outputs from each group were discussed to generate a short list of contextually appropriate interventions for each health facility. M.N., Z.N. and J.N. took notes during the sessions to supplement visual outputs (flipcharts and cards). In particular, key points that emerged during these discussions were noted verbatim, effectively serving as direct quotations to preserve the essence of the dialogue. To ensure anonymity, we attributed quotes to participants by gender and role.

### Data analysis

We used content analysis (Graneheim and Lundman, 2004) to describe pathways to TB diagnosis and treatment; and understand barriers to TB services. We focussed on the 'manifest and latent content' in the co-created materials, including cards, flipcharts and meeting notes ('units of analysis'), related to the pathways and barriers to TB diagnosis and treatment. J.N. classified the various steps outlined in the pathways and the barriers identified (meaning units) methodically into distinct codes. J.N., W.K., W.M. and M.N. iteratively refined the overarching themes.

### Co-analysis

During the co-analysis meeting, representatives from the health facilities, policymakers and researchers compared and analysed facility-level data to build consensus on the interventions and their theory of change. Following the presentation of solutions identified at the health facility, J.N. and M.N. facilitated discussion and selection of a shortlist of contextually appropriate and feasible interventions. A theory of change map was then utilized to identify the resources, outputs, outcomes, impact and contextual factors that may influence the intervention. Potential mechanisms and indicators of change, key uncertainties and preconditions for increasing the number of TB cases identified and initiated treatment using the intervention were also identified. J.N. and M.N. facilitated the collaborative design of a theory of change map which was documented on cards. It summarized how the interventions could increase TB notification among men linking resources and processes to the expected outcomes and broader impact of the intervention.

### Ethical consideration

Ethical approval for the study was obtained from the Research and Ethics Committees of the authors' institutes in Uganda and in the UK.

## Results

We collected data for the formative research phase of the IGNITE study in February 2023. We involved 70 participants for the facility-level meetings (range of 16–19 participants for each meeting out of the 20 participants selected) and 17 participants for the co-analysis meeting (Table 1). At the facility-level meetings, 31 of the 70 participants (44%) were male, and 7 participants (10%) were TB survivors or members of the public. Similarly, in the co-analysis meeting, 7 out of 17 participants (41%) were male.

### Men's pathways to TB services

In the TB care pathway, TB screening was conducted within communities and health facilities to identify and refer people presumed to have TB for diagnosis. The ideal and actual health-seeking pathways are presented in Figure 2a and b.

#### Ideal pathway

Ideally, persons with symptoms suggestive of TB were identified through home visits by village health teams, contact tracing, targeted community screening and sensitization campaigns aimed at engaging with communities to raise awareness about TB and facilitate the identification of people with TB. People with symptoms suggestive of TB identified in the community were then referred to TB diagnostic and treatment units or a sputum sample that was collected from the community or Health Centres II to IV lacking TB diagnostic capabilities was referred.

TB care entry points within TB diagnostic and treatment units included casualty, accident and emergency units, outpatient and in-patient departments, maternity wards, antenatal

**Table 1.** Study participants by meeting type, role and gender

| Workshop category | Kawolo facility-level meeting | | Gombe facility-level meeting | | Nakaseke facility-level meeting | | Mityana facility-level meeting | | Co-analysis meeting | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Male | Female | Male | Female | Male | Female | Male | Female | Male | Female |
| Patients and the public | 1 | 1 | 1 | | 1 | 1 | 2 | | | |
| Providers: healthcare workers | 5 | 3 | 2 | 8 | 3 | 8 | | 9 | 3 | 8 |
| Providers: community health workers | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | | 1 |
| Purchasers/payers | | 1 | | | | | | 1 | | |
| Policymakers | 2 | 1 | 3 | | 2 | 1 | 2 | 1 | 2 | |
| Product makers | | | 1 | | 1 | | | | | |
| Principal investigators/researchers | | | | | | | | | 2 | 1 |
| Total | 9 | 7 | 8 | 9 | 8 | 11 | 6 | 12 | 7 | 10 |

care, youth friendly, ART and TB clinics. Regardless of the service delivery point, HCWs provided health education and screened for TB using WHO recommended four symptom screen (i.e. cough for 2 weeks or more, fever, night sweats and unexplained weight loss). Individuals presumed to have TB were then entered into the presumptive TB register and referred for further investigations.

Available TB diagnostics included sputum analysis using GeneXpert and microscopy; and urine lipoarabinomannan (LAM) for people living with HIV. All facilities had digital X-ray machines with one facility equipped with additional automation with artificial inteligence to generate predictive scores indicating the likelihood of TB. Regarding the turnaround time, same-day results were available for chest X-ray and urine LAM with GeneXpert results often available within 48 h. Treatment initiation for people with confirmed TB was done at the TB clinic across sites.

### Actual pathway and men's barriers to TB services

The actual pathways described for TB were more complex, marked by numerous delays and bottlenecks. In all health facilities, these deviated from the ideal one, especially in the community. After the onset of symptoms, men were often thought to seek care outside the formal or public health systems and common practices included self-medication, seeking care from private health facilities, pharmacies or drug shops and unconventional sources like religious leaders or traditional healers. Men with symptoms suggestive of TB could also be missed if they were not screened or tested for TB, their test results were delayed or not delivered and if they did not follow referrals. Several challenges impeded timely TB diagnosis and treatment among men, including individual-level, HCW-related, public and private health systems barriers depicted in Figure 3. These barriers varied in gender specificity. We present general barriers and barriers that differentially affect men as synergistically they all play a pivotal role in missing men with TB by the health system.

### Individual barriers

Men's poor health-seeking behaviour was intricately linked to societal expectations and norms surrounding masculinity, which reinforce an expectation of self-reliance. The role of being a breadwinner led men to prioritize work over health, often leading to a disregard for symptoms and delayed care seeking. A male implementing partner noted that 'men are at the centre of everything' in their homes. The time and cost associated with healthcare further discouraged men from seeking timely medical attention. A male community health worker noted reluctance to acknowledge health concerns potentially contributes to delayed diagnoses among men: '*if you ask them (male patients) if they have cough it is easy for them to say "no." If a man has another pressing issue that has brought him to the hospital it is easier for him to say he does not have cough*.' Participants further linked the low prioritization of health among men to observed inferior health outcomes. '*There is escalating mortality [among men] due to poor health seeking behaviour… an average of 28 males died monthly at the health facility*

*and among females, this was less than 5′* (male HCW, facility-level meeting). TB was also associated with poverty, presenting a substantial hurdle in meeting the financial demands associated with accessing TB care services. This encompassed expenses such as transportation costs, thereby hindering individuals' access to crucial healthcare services, including referrals, follow-up visits for medical results, and continuous treatment.

Moreover, societal stigma towards TB contributed to a reluctance to acknowledge symptoms or seek help, as it conflicts with stereotypical images of strong and resilient masculinity. TB stigma, which was historically driven by its association with HIV and more recently COVID-19, was a major challenge limiting access to care services and identification of people for screening due to nondisclosure. Misconceptions and myths surrounding TB, particularly its perceived connection to witchcraft, persist. It was noted that individuals may attribute the TB symptoms to bewitchment, contributing to delays as care was sought from religious leaders or traditional healers. Stakeholders highlighted low levels of community engagement as the underlying cause for low levels of TB awareness. Consequently, people with symptoms suggestive of TB may not recognize their symptoms and access appropriate diagnosis and management services.

### Health worker-related challenges

TB stigma was not only confined to the community but also permeated health facilities. Negative attitudes towards individuals with TB were driven by a perceived heightened risk of contracting TB, particularly if HCWs did not have appropriate personal protective equipment. Consequently, patients identified with TB in general clinics were swiftly referred to specialized TB clinics, reflecting the pervasive stigma. A male administrator noted that '*it used to be hard to allocate* [a member of staff] *to the TB ward… staff would come and explain why they should be reallocated because they are at an increased risk* [for acquiring TB]'. Stakeholders also reported knowledge gaps among HCWs in the cardinal TB symptoms and risk stratification by gender, contributing to missed opportunities for TB screening among men. Improper record-keeping along the TB cascade also contributed to underreporting of TB, including among men.

### Public health system

A lack of health programmes tailored towards reaching men and improving men's health resulted in low levels of male involvement with health facilities, which were predominantly attended by women. The alignment of outpatient clinic hours, particularly those offering TB screening, with standard work hours posed a challenge, particularly in the context of traditional masculinity norms with men as breadwinners. This overlap was a deterrent, limiting the accessibility of TB services by men, who often adhere to societal expectations. This was particularly significant given the multi-step nature of the TB screening, leading to drop offs in patient engagement at various stages. Community engagement activities that were

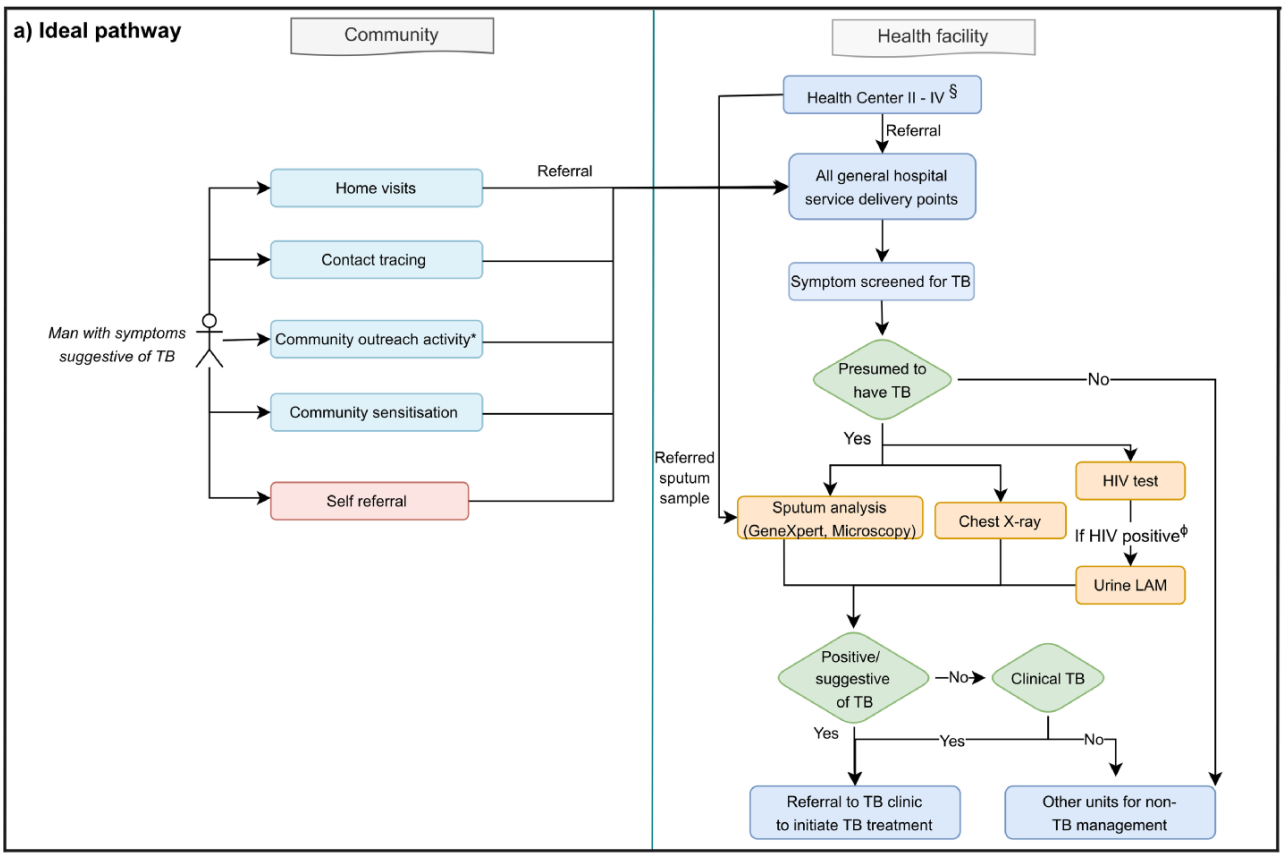


**Figure 2.** Ideal and actual TB health seeking pathway at a General Hospital

* Community outreaches are targeted TB screening campaigns conducted in the community. § Health centres II–IV that lack TB diagnostic and treatment capability. $\phi$ People who test positive for HIV get referred to care

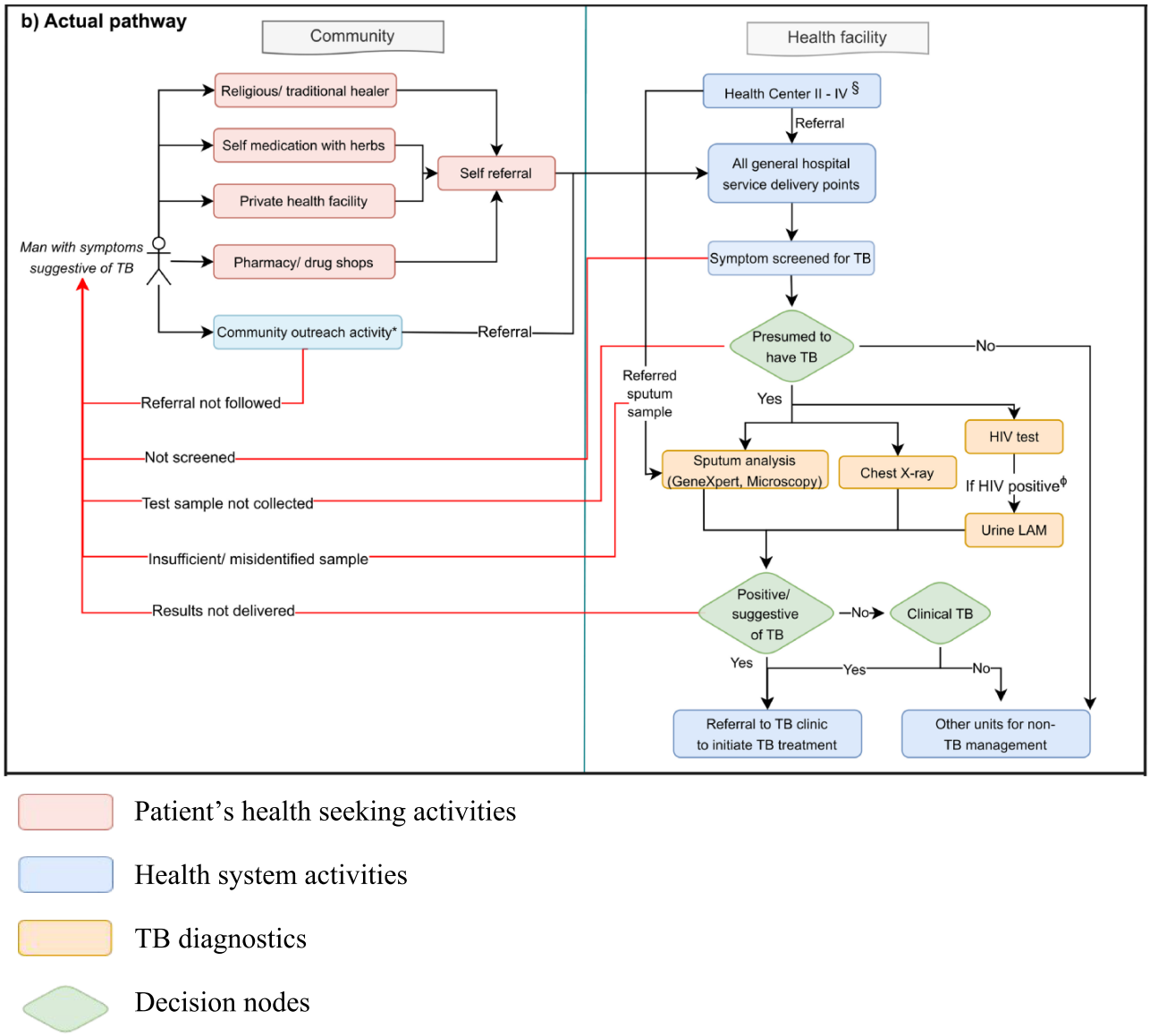


**Figure 2.** (continued)

conducted also failed to reach men as they were not readily found at home. Long waiting times at health facilities further complicate accessibility as often men were reluctant to invest significant time in healthcare settings. These long waiting periods were driven by insufficient staffing levels amid increasing patient numbers leading to increased HCWs' workload and prolonged turnaround times for TB diagnostic tests.

> *'I received a taxi driver diagnosed with TB who leaves work at 10pm. When will he come for treatment? The chest X-ray*[predictive score] *was 85%. We had to initiate him on treatment. He had given his car to a friend, that was the only chance I got… People are doing emele lya leero (working for daily bread) and they will say, "My family can't suffer today when I am alive."'*(female HCW, facility-level meeting)

Generally, insufficient funding affected programme implementation while frequent shortages of diagnostic and treatment supplies, such as X-ray films, led to delays in TB diagnosis and management, further dissuading people.

### Private health system

Private facilities, from which it was reported that men prefer to receive care, like drug stores are revenue driven. Private facilities often lack TB diagnostics and since TB care is not profitable, there was low interest for them to invest in TB. In addition, collaboration with public health facilities was limited contributing to delays and missed opportunities to diagnose TB.

## Proposed interventions

At the co-analysis meeting, stakeholders identified five contextually suitable interventions, previously developed at the health facility through the stepping stones approach and constructed a corresponding theory of change. These interventions were designed to tackle both male-specific and general

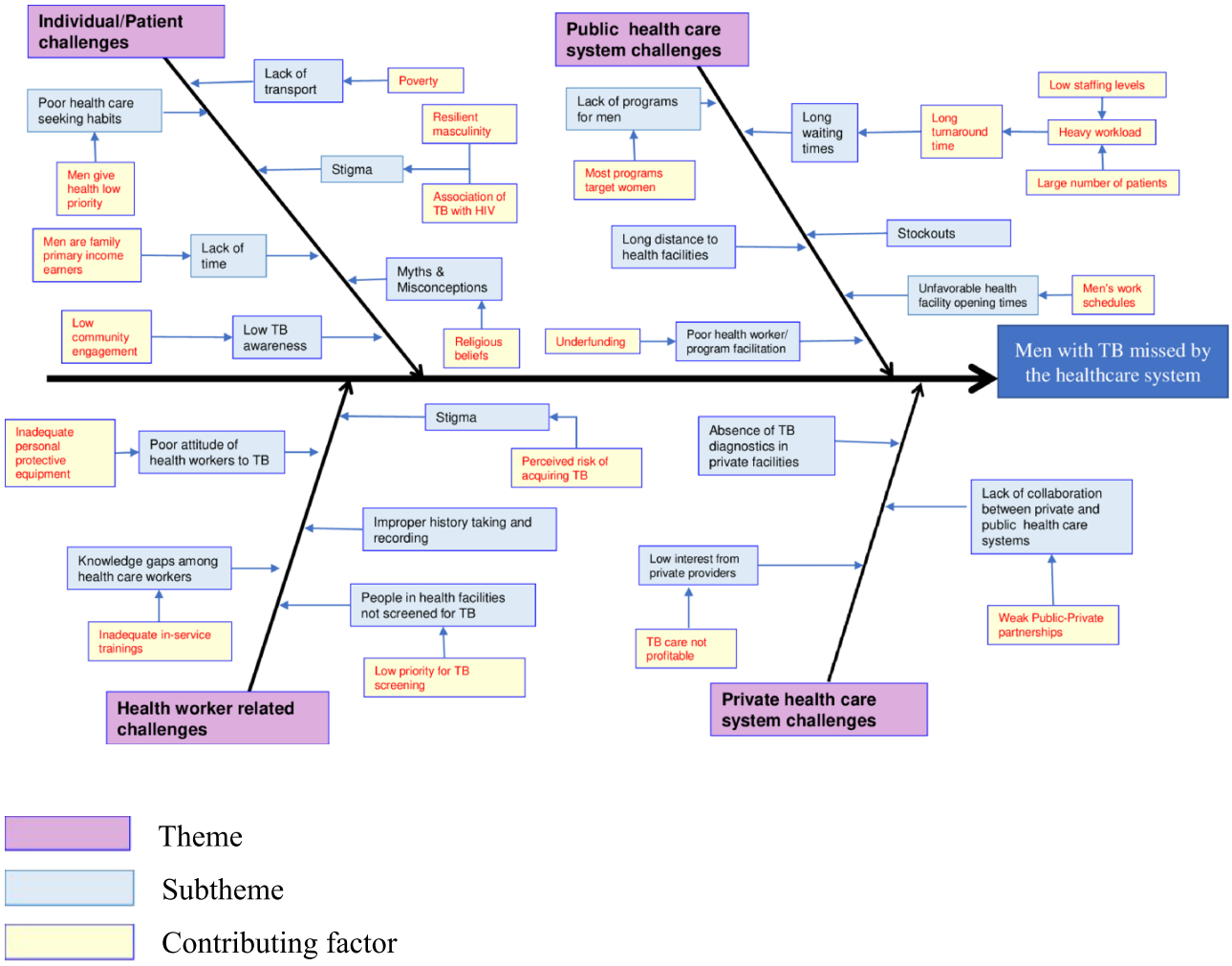


**Figure 3.** Barriers to TB services categorized under four major themes highlighting related subthemes and contributing factors

barriers that impede men with symptoms indicative of TB from accessing diagnostic and treatment services. A comprehensive theory of change map, detailing these male-specific and general interventions, is presented in Figure 4.

### Male-specific services

Stakeholders reached a consensus regarding the imperative to establish dedicated healthcare services for men that consider societal gender norms to effectively cater to their specific needs. Stakeholders also noted a need for diverse formats based on the health facility's context. This could manifest in the form of a weekly male-friendly clinic, strategically aligned with market days or a daily operating men's corner seamlessly integrated into the TB clinic or outpatient department, providing flexibility to cater to varying healthcare needs and preferences. These could address the timing of healthcare services by offering extending hours or implementing flexible schedules such that men can access TB care without compromising their work responsibilities.

### TB screening at all service delivery points

Consensus emerged on the need to integrate TB screening across all service delivery points and enhance documentation practices. Simplifying the TB care continuum could be achieved by providing sputum collection containers at each point of care, thereby reducing the time patients spend in health facilities. Additionally, stakeholders recommended X-ray screening for people with cough, especially men, as it offered same-day results. People presumed to have TB would then be referred to the TB clinic offering male-friendly services for further evaluation and treatment initiation. To support this streamlined process, additional recommendations were put forward, including maintaining an optimal stock mix, ensuring timely ordering and accurate quantification of supplies, and engaging TB implementation partners to provide buffer stocks of X-ray films These measures aim to facilitate a more efficient and effective TB screening and treatment system.

### Health education

Stakeholders emphasized the critical role of providing daily health education on TB at all service delivery points to enhance TB awareness among men, which was expected to lead to improved health-seeking behaviour. Key messages should focus on stigma reduction, promoting healthy lifestyles to decrease smoking and alcohol use, and reinforcing cough hygiene. This approach was anticipated to not only increase men's knowledge but also stimulate demand for appropriate healthcare services. Health education could effectively be disseminated through TB or male champions whose lived

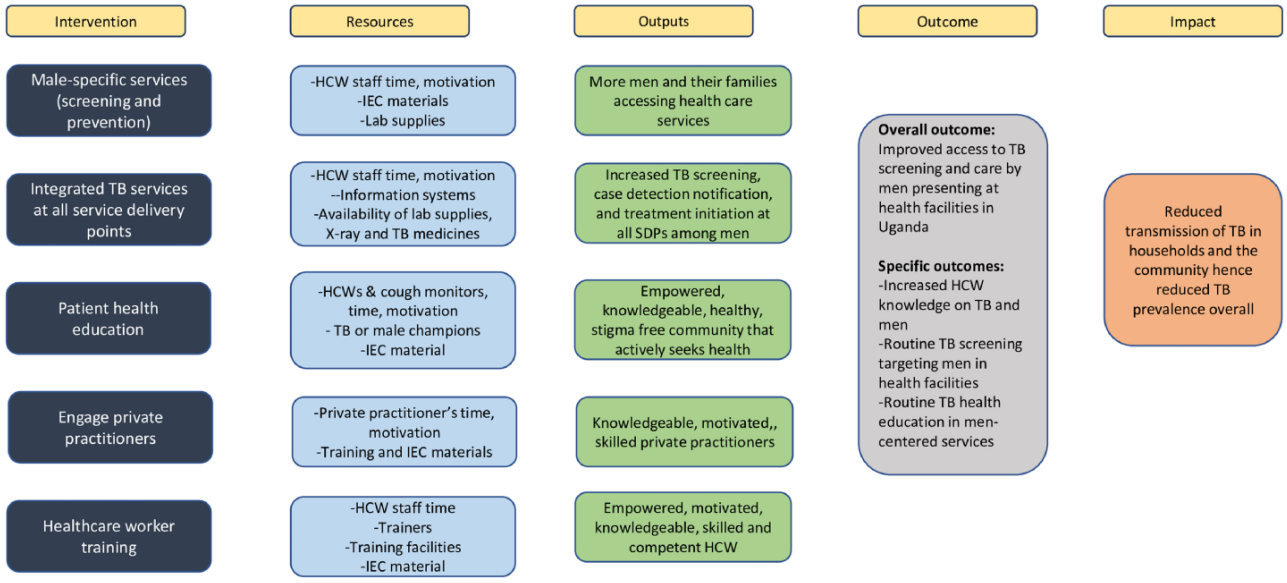


**Figure 4.** Theory of change map for proposed interventions
HCW-Health care workers. IEC- Information, Education, Communication

experience of TB was considered beneficial. Other health educators included HCWs, community resource persons, women and local leaders who were trusted in the community.

Although the study's primary goal was to develop a health facility-based intervention, the importance of community engagement was underscored. Community-based health education leveraging both conventional methods, such as mass media and promotional advertising, and unconventional approaches, like reaching out to places where men commonly gather (e.g. motorbike taxi stages, and market days) and sponsoring male-oriented activities (e.g. football matches or game-board clubs) was proposed. The dual approach of facility-based and community-level interventions was seen as key to achieving a more effective and holistic TB health education strategy.

### Engage private health practitioners

Recognizing the preference of some men for private health facilities, stakeholders recommended initiatives aimed at involving private practitioners. This entails orienting and incentivizing these practitioners to actively participate in the detection of TB, particularly among men, ensuring a more comprehensive and inclusive approach to TB prevention and management. This could include strengthening diagnostics and referrals, financial incentives, recognition, or other non-monetary rewards.

### HCW training

To bridge the knowledge gap among HCWs regarding TB screening, diagnosis, management and gender-specific risk assessment, as well as to address their attitudes, continuous medical education was highlighted as a crucial solution. This training should encompass not only active case-finding strategies but also training modules on integrated male-friendly services. Additionally, the implementation of improved supportive supervision and onsite mentorship was proposed to promote positive attitudes and practices among HCWs regarding TB management and care.

## Discussion

This study proposed a combination of complementary TB interventions designed to address the multitude of individual and structural barriers faced by men with presumptive TB in peri-urban settings in Uganda. Our findings provided valuable insights into men's challenges in accessing TB care due to an array of individual, HCW, public and private health system factors. Our participatory engagement with TB stakeholders culminated in a theory of change map for proposed interventions, encompassing HCW training, health education, male-friendly services within TB clinics, enhanced provider-initiated TB screening at all service delivery points and the engagement of private providers, to be piloted under the IGNITE study in the same facilities.

This study applied a gender lens to barriers that impede access to TB care aligning with previous research that highlights a range of factors influenced by traditional notions of masculinity. Masculine norms and societal expectations play a crucial role in influencing men's health-seeking behaviour, particularly in the context of TB access (Addis and Mahalik, 2003). Traditional notions of masculinity often emphasize strength, self-reliance, and a stoic attitude towards health issues, which can lead to reluctance among men to acknowledge illness and seek medical help (Siu *et al.*, 2013; Sileo *et al.*, 2019). This is compounded by the societal expectation of men as breadwinners, where taking time off work for health reasons can be seen as a failure to fulfil their economic role (Chikovore *et al.*, 2014). Consequently, men may ignore or downplay symptoms of TB, delaying diagnosis and treatment (Chikovore *et al.*, 2015). Additionally, the stigma attached to TB, fuelled by misconceptions about HIV and fears of social exclusion, further discourages men from accessing TB care, as admitting to having the disease can be perceived as a sign of

weakness, undermining their masculine identity (Chikovore *et al.*, 2017; Sileo *et al.*, 2019).

The health system itself often inadvertently reinforces these masculine norms, presenting additional barriers to TB access for men. Health facilities with long waiting times and unfavourable operating hours clash with men's work schedules, making it challenging for them to seek care without compromising their work responsibilities (Coursey *et al.*, 2022). The lack of gender-specific health services and health education tailored to men's needs also contributes to lower engagement with TB care as it reinforces views of health facilities as spaces for women (Skovdal *et al.*, 2011; Sileo *et al.*, 2019; Chikovore *et al.*, 2020). Moreover, negative attitudes and lack of sensitivity to privacy concerns among HCWs towards male patients can further alienate them from seeking help (Citro *et al.*, 2021; Coursey *et al.*, 2022).

The study proposes five contextually appropriate interventions considered to have the potential to address men's healthcare challenges and improve men's utilization of TB services. Previous research showed that male-targeted health interventions can increase men's involvement in healthcare. Men's clinics, some of which engaged male HCWs, documented increased healthcare visits by men and increased utilization of screening and preventative care services (Dowden *et al.*, 2019; Stender and Rozario, 2020). Stakeholders highlighted the role private healthcare providers play in facilitating men's access to TB services. Men rely on private health services more than women (Uganda Bureau of Statistics, 2021). Since TB services were more readily available in public health facilities (Ministry of Health, Uganda June Ministry of Health, Uganda, 2019), men's reliance on private healthcare could explain why more men than women miss out on TB care (Uganda Ministry of Health, 2015). Significant improvements in TB notification rates were observed in studies that engaged and incentivized private health practitioners to refer people presumed to have TB for further evaluation (Habib *et al.*, 2020; Vo *et al.*, 2020; Kelamane *et al.*, 2021; Chijioke-Akaniro *et al.*, 2022). A systematic review demonstrated training HCWs and volunteers can improve TB notification, highlighting the need for the integration of TB training programs in routine in-service training (Amare *et al.*, 2023). Systematic screening for TB increases TB notification (Kagujje *et al.*, 2020; Kazibwe *et al.*, 2021) with the potential to reduce the chances of TB transmission. However, the long-term impact of health promotion on TB notification is uncertain (Mhimbira *et al.*, 2017).

Formative research is essential for planning intervention programs. Our study (1) identified which factors influencing care-seeking among men are relevant to the specific research context (empirical evidence) and (2) provided methodological evidence of a collaborative approach to designing TB interventions that meaningfully engage those affected. By employing cocreation methodologies, the formative research phase of the IGNITE study engaged a diverse range of stakeholders to ensure the interventions were context-specific and addressed the unique challenges faced by the community. Additionally, engaging stakeholders early and continuously throughout the research fosters a sense of ownership and collective insights into the intervention, thereby increasing the likelihood of successful implementation (Skivington *et al.*, 2021).

The barriers to TB care identified in our study align with those reported in the literature, underscoring their significance across diverse contexts. While gendered barriers to TB care are well-researched, few studies link them to potential interventions, which was the focus of this study. A similar study in Malawi that cocreated gender-specific interventions for men in informal settlements identified legislative changes to protect workers' rights, feedback systems to protect patients' rights, health education and TB outreach services as potential interventions (Phiri *et al.*, 2021). Although their proposed interventions address broader socio-economic factors limiting men's access to TB care services, this study builds on that knowledge by engaging stakeholders to cocreate health system-focused interventions. IGNITE will conduct a pilot study to evaluate the feasibility, effectiveness and cost-effectiveness of identified interventions in enhancing TB notification and treatment initiation for men.

We conducted this study in four general hospitals in peri-urban settings in Uganda. Therefore, our findings, including the combination of general and gender-specific TB interventions for men, may not be generalizable to other settings. We acknowledge that our sampling approach included a variety of stakeholders and as a result, the number of male TB survivors was small. Additionally, we oversampled HCWs to get views from all hospital care entry points. Given two-thirds of the health workforce is female (World Health Organization, 2024), more female respondents participated in the study. A separate meeting with male TB survivors would have been of additional benefit but was not feasible due to time and budget constraints and we recommend this for future research studies using similar sampling. We further acknowledge that acceptability testing of the proposed interventions among men will be essential part of the IGNITE pilot.

## Conclusion

A combination of awareness creation, capacity strengthening and structural interventions is needed to facilitate access to TB care among men with symptoms presumptive of TB in peri-urban Uganda. Our researcher-led collaborative approach enabled us to cocreate a theory of change map for a shortlist of context-specific, person-centred TB interventions for men to address the compounded barriers to TB care, combining individual and structural factors, affecting this population. Next, we will evaluate the feasibility, effectiveness and cost-effectiveness of the interventions. Overall, our study fostered active involvement of stakeholders and communities to facilitate dialogue and learning between different health actors to explore a gender-specific TB response for ending TB.

## Data availability

The data underlying this article will be shared on reasonable request to the corresponding author.

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## Author contributions

J.N. led conceptualization, data collection, data analysis, interpretation of results and drafted the manuscript. W.K. and W.M. contributed to conceptualization, data analysis, interpretation of findings and drafting of the manuscript. B.R. contributed to conceptualization, data analysis and interpretation of results. M.N. contributed to conceptualization, data collection, data analysis and interpretation of findings. Z.N. was involved in data collection. J.P., T.W., R.T. and B.K. contributed to conceptualization and provided academic supervision and critical revision of the manuscript. All authors critically reviewed and contributed to the writing of the final manuscript and gave final approval.

## Reflexivity statement

In reflecting on the goal of reducing inequities in global health research, our authorship team for this paper represents a conscious effort towards inclusivity and balance across various dimensions. Our team composition is a deliberate mix, with a female Principal Investigator and lead author from Uganda at the helm and 50% of authors are female, bringing diverse perspectives and addressing the gender imbalance often found in scientific global health research. Six members are from Uganda with multiple years of research and/or clinical practice at different levels of seniority ensuring the research is situated within the social, cultural and health system context of Uganda. Another four authors are from high-income countries, serving in academic supervisory roles and complementing in-country expertise (including methodologically). Consciously structuring our team in this manner has enabled us to enrich the research with varied insights (from clinical practice, communications, health economics, implementation research and social sciences among others); to ensure voices from a high TB and TB/HIV burden country are prioritized; and to model the equity we advocate for in TB care for global health research, acknowledging that diverse and inclusive teams are crucial for producing research that is both impactful and representative of the global community.

*Ethical approval.* Ethical approval for the study was obtained from the Makerere University School of Medicine Research and Ethics Committee (2022–432) in Uganda and the Liverpool School of Tropical Medicine Research and Ethics Committee (22–057) in the UK. Regulatory approval was obtained from the Uganda National Council of Science and Technology.

*Conflict of interest:* None declared.

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