

Innovative health intervention for Ethiopian migrant domestic workers in the Middle East: Overview of the INNOVETH programme

Kassahun Habtamu

Kasshabmek@gmail.com

Addis Ababa University

Abdu K. Seid

Frederiksberg Hospital

Dawit S. Abebe

Oslo Metropolitan University

Berhanu Seyoum

Armauer Hansen Research Institute

Samrawit Solomon

St. Paul's Hospital Millennium Medical College

Seid Muhie Yimam

University of Hamburg

Haimanot Dissasa

Addis Ababa University

Yoseph Addisu

Sefed Software Systems

Mohammed S. Ali

London School of Hygiene and tropical Medicine

Research Article

Keywords: Health intervention, Innovation, Migrant domestic workers, mental health, sexual and reproductive health, Ethiopia, Middle East

Posted Date: October 6th, 2026

DOI: <https://doi.org/10.21203/rs.3.rs-10744935/v1>

License: © ⓘ This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

Additional Declarations: No competing interests reported.

Abstract

Background

Every year, more than 350,000 Ethiopian women migrate to the Middle East legally, and many others illegally, seeking domestic work. Economic crisis, rising unemployment, and internal conflict contribute to this massive migration. Nevertheless, migrant domestic workers (MDWs) in the Middle East are subject to overwork; mental, sexual and reproductive health challenges; and limited healthcare access. MDWs are vulnerable and hard-to-reach population; however, they maintain their pre-migration social connections through telephone calls as well as social media. Studies on MDWs are mostly exploratory or cross-sectional, and longitudinal and intervention studies are lacking. We aim to develop, implement and evaluate an intervention package to address these research gaps.

Aims

In a preliminary work, we mapped the key health challenges and problems of MDWs and developed a draft intervention package. In main study, we will refine and validate the intervention, assess its feasibility and acceptability, and implement and evaluate the effectiveness and cost –effectiveness of the intervention to improve the health and wellbeing of MDWs.

Methods

INNOVETH is a four years project, designed as a cluster randomized controlled trial (RCT). We will conduct the study in Addis Ababa and in major destination Middle East countries. We will recruit MDWs in Addis Ababa during their pre-migration medical screening and interaction with employment agencies. INNOVETH draws inspiration from the peer-led microplanning model developed by the Avahan India AIDS Initiative. The risk stratification tool and the intervention package, incorporating AI-driven data-science techniques and a mobile application, will be refined iteratively and validated through expert consensus meetings and stakeholder engagement and involvement. The implementation and impact evaluation will use a pragmatic, two-arm cluster RCT with a process evaluation. Alongside the RCT, we will conduct a cost and cost-effectiveness evaluation. Extensive capacity-strengthening activities will focus on equipping early career researchers, peer researchers and key stakeholders.

Conclusion

INNOVETH is developing evidence which would support to provide risk differentiated and tailored health interventions to MDWs in the Middle East. We are creating collaboration and partnership among researchers, policymakers, practitioners and women who have lived experience to enable local led and

contextualized solutions. Key outputs include a risk stratification tool, evidence-based and technology-supported intervention and strengthened partnership and research capacity.

Background

Migration is a dynamic, complex, and multifaceted global phenomenon that shapes the political, economic, demographic, and socio-cultural situations of nations, communities, and individuals [1]. The latest available data showed that, there were 281 million international migrants worldwide in 2020 [2], which account for 3.6% of the global population. Migration is triggered by several factors, including political instability, economic difficulties, policy gaps, and environmental disasters [3]. Factors such as modernization, globalization, having a better social network, and the desire for a better life are also considered key facilitators for migration [4]. The effects of migration are multifaceted for both sending and receiving countries [5], which include economic, social, health, political, and environmental aspects.

One of the key sectors shaped by migration is domestic work, which serves as an important source of employment for millions of migrant workers worldwide. Reports on global estimates of migrant workers showed that there are 11.5 million migrant domestic workers (MDWs) worldwide [6]. This suggests that migrant workers are filling the growing demand for household services in many parts of the world. MDWs represent 7.7% of a global estimate of 150.3 million migrant workers. When disaggregated by sex, this share is even higher, representing 12.7% of the 66.6 million female migrant workers worldwide. MDWs are predominantly women, with the presence of a significant number of migrant men in some parts of the world.

Among the major global destinations for MDWs, the Arab states stand out, accounting for about 27.4% of the 11.5 million MDWs worldwide [6]. Nearly three-quarters of the MDWs in the Arab states are women. Most of them are from Asian and African countries such as Sri Lanka, the Philippines, Bangladesh, Nepal, Indonesia, Kenya, and Ethiopia [7]. MDWs provide indispensable services in the destination countries, contributing to the wealth of aging societies and the sustainability of these countries' welfare and employment systems [6]. Nonetheless, MDWs are confronted with vulnerabilities, leading to violations of their human and labor rights [8]. Most Arab states use the Kafala System of sponsorship, where workers can only work for their sponsoring employer for the length of their contract, usually two years [9]. If the employer breaches the contract, the worker's visa is canceled, resulting in undocumented migrant workers who often have no pathway to regularize their residency, and consequently they are repatriated unconditionally [9]. This system grants employers an incredible amount of power over workers, who may not report abuse for fear of retaliation.

Ethiopia is one of the major source countries for MDWs to the Middle East. According to the Ministry of Labor and Skills of Ethiopia, between July 2023 and May 2024, over 314,000 people migrated using the legal channel (mainly to the Middle East) and a lot more using illegal routes. Due to the economic crisis, high unemployment rate, drought, internal conflict and war, many are still forced to leave Ethiopia to seek employment abroad [10]. Every year, on average, around 200,000 Ethiopian women leave the country to

work as domestic workers in the Gulf States [11]. According to the information we obtained in a stakeholder engagement meeting at the beginning of January 2025 through our Phase I grant, the Ministry of Labor and Skills has a plan to send more than 700,000 domestic workers trained in various fields to different Middle east countries every year as of the 2025/26 budget year.

A recent phenomenon shaping the migration dynamics in Ethiopia is return migration [12]. According to official reports from the Ministry of Women and Social Affairs, over 70,000 MDWs are being deported from different Gulf States every year. A significant number of other MDWs are also voluntarily returning. From 2017 to 2020, over 390,000 Ethiopians were deported. In 2024 alone, over 100,000 Ethiopian migrants were forcibly returned. Several factors contributed to return migration [13], which include adverse social and cultural environment, emotional maladjustment, serious health problems, discrimination, lack of skills to fulfill employers' needs, family and personal problems, loss of job, family pressure, forced marriage and war/conflict in the destination. Most Ethiopian MDWs in the Middle East return before or without achieving their migration objectives. Hence, risk stratified, multidisciplinary and innovative health intervention strategies, such as peer support, may help to reduce return migration.

Several studies documented the adverse experiences of Ethiopian MDWs in the Middle East. These include human rights violations [14, 15], painful journey [16], sexual abuse [17], denial of food and salary, lack of access to healthcare, overwork, sleep deprivation [18], deportation [19], detention and confinement [20], physical and mental health problems, and stigma and discrimination [21, 22]. Migration has also led to social, psychological and economic crises, affecting not only the migrants themselves but also their families and communities [23]. The scoping review we conducted as part of our Phase I grant showed a higher prevalence of both mental (24%-51%) and physical (20%-40%) health issues among MDWs. Higher prevalence of anxiety, depression, and stress-related disorders and physical ailments was reported. During our stakeholder engagement meeting, participants with lived experience of MDW shared their experience, stating: "The emotional, mental, and physical challenges we experience, including depression, sleep deprivation, overwork, and inadequate meals, are overwhelming."

In the last few years, a new bilateral agreement was signed between the government of Ethiopia (GoE) and some of the Gulf States on recruiting MDWs. The agreement required the GoE to offer qualified MDWs who meet certain specific criteria. These include medical and physical fitness to carry out domestic work, awareness of the destination country's regulations and cultural norms, understanding of employment contract conditions, and completion of skills training at licensed technical and vocational training and education institutes. The GoE and the Gulf States also agreed that recruitment should be done through agencies that operate under valid licenses. Accordingly, comprehensive pre-migration medical screening, covering a wide range of conditions such as TB, HIV, reproductive and sexual health and mental health need to be carried out in private health facilities in Addis Ababa which are certified by the Gulf Medical Council. As a result, only those deemed medically fit are allowed to migrate to the Gulf States for work. Our analysis of the large pre-screening electronic medical data in our Phase I project showed substantial variability of MDWs in their socio-demographic characteristics such as age, marital

status, geographical origin, education, previous migration and domestic work experience. This suggests considerable variation in the risk profiles among MDWs.

The limited awareness that MDWs have regarding their legal and medical entitlements, coupled with their socioeconomic vulnerability and the nature of their work, further marginalizes and renders them a hard-to-reach population [24]. However, MDWs maintain their pre-migration social connections with their agencies, peers from the same origin, and families through telephone calls or social media communications [25]. These networks, in combination with the big health data generated as part of the pre-migration process and technology [26, 27], could be utilized to provide targeted health and psychosocial interventions tailored to the needs of MDWs. Using big data, social networks, social media platforms, and innovative technology, we sought to understand key health challenges of MDWs and their level of risk. Furthermore, we will design a risk-differentiated health intervention package in order to support these marginalised, heterogeneous groups of women.

Addressing the unmet health needs and barriers to healthcare access among MDWs would significantly contribute to the ongoing efforts to enhance the resilience and well-being of this population. However, such knowledge is limited both in Ethiopia and sub-Saharan Africa. Furthermore, most of the studies conducted on MDWs in the Middle East are either qualitative or cross-sectional surveys exploring or snapshotting their experiences in the destination countries. In addition, most studies collect data mainly from migrant returnees. To the best of our knowledge, there are no studies conducted on Ethiopian MDWs while they were in destination countries. Finally, none of these studies attempt to design and test interventions that may help improve the negative experiences of MDWs.

MDWs' mental, sexual, and reproductive health (MSRH) challenges vary based on socio-demographic characteristics, utilization of MSRH services, and host family characteristics. For example, younger, less educated, first-time migrants in larger or abusive host families may face higher mental health risks. Clusters of MDWs with specific health challenges could be identified and risk-stratified based on their socio-demographic characteristics using data science methods. Based on previous experience and evidence, we hypothesize that a theory-based health intervention, adapted to the Ethiopian context, combining peer-support, counselling, self-help groups, and innovative technology can improve service utilization and enhance adherence to MSRH services that will lead to improved health and well-being in a cost-effective way. The INNOVETH project is, therefore, aimed at addressing these critical gaps in the field of migration health.

Aims and objectives

The overall aim of INNOVETH is to develop, implement, and evaluate a health intervention to improve the health and well-being of MDWs. Leveraging community engagement and involvement, social networks, social media platforms, big data, and innovative technology, we aim to stratify the level of risk of MDWs, design risk-differentiated health intervention and evaluate the effectiveness and cost-effectiveness of

the intervention to enhance the MSRH, well-being, resilience, and empowerment of these marginalized, heterogeneous groups of women.

The specific objectives are the following:

- Develop, refine, and validate a risk-stratification tool to tailor the intervention
- Develop, refine, pilot test and implement the intervention, and evaluate its feasibility and acceptability
- Evaluate the impact of the intervention in improving MSRH of MDWs and on strengthening their empowerment and social networks
- Evaluate the cost and cost-effectiveness of the intervention
- Strengthen the capacity of key stakeholders and early career researchers through implementing a comprehensive capacity-building initiative

Methods

INNOVETH is a four-year project structured into five work packages (WP): WP1 (develop, refine and validate the risk stratification tool and the intervention), WP2 (implementation, and impact and process evaluation), WP3 (cost-effectiveness evaluation), WP4 (capacity building and integration of early-career researchers), and WP5 (project management). In the project, we have prioritised the involvement and engagement of key stakeholders, including women with lived experience of migrant domestic work, in all aspects of the research and delivery of the interventions. See Fig. 1 for an overview of the objectives and proposed methods.

Study setting

MDWs travel to different Middle East countries, coming from all over Ethiopia; however, there are parts of the country that are considered migration hotspots, where the majority of MDWs come from. These hotspot areas include Addis Ababa, North and South Wollo, North Gondar, Eastern Arsi, Central Ethiopia region (Halaba, Hadiya, and Gurage), Eastern and Southern Tigray and Wolayita [28].

Potential migrants come to Addis Ababa, the capital city of Ethiopia, for pre-migration comprehensive medical screening, to meet their local recruitment agencies, receive skills training and finally to travel to their respective destination country. Hence, we will recruit participants in Addis Ababa when they come for these services. We will strive to make the participants representative of the major migration hotspot areas in Ethiopia. See Fig. 2 for a summary of the MDWs' journey from their area of original residence to the destination country.

Theoretical framework

Health challenges of MDWs are framed within a socio-ecological model [29], which require to understand and proposing interventions to address the individual, family, societal and structural level barriers to health and wellbeing. This project draws inspiration from the peer-led microplanning model developed by the Avahan India AIDS Initiative, which optimised female sex workers (FSW) programme coverage through trained peer-educators using a risk-based vulnerability algorithm [30]. Similarly, the AMETHIST intervention in Zimbabwe, a peer-led support initiative for FSWs through the structured risk algorithm, successfully reduced HIV transmission [27, 31, 32]. Building on this evidence and leveraging pre-migration medical screening and socio-demographic data among Ethiopian MDWs, we propose a theory-based, risk-differentiated intervention, tailored to Ethiopian MDWs. This approach aims to enhance social cohesion, empower communities, and improve MSRH outcomes among Ethiopian MDWs in the Middle East.

The intervention monitoring and process evaluation will follow the Medical Research Council (MRC) framework for developing and evaluating complex interventions [33]. We will use theory of change as a tool to inform each aspect of the MRC approach (Fig. 3).

WP1: Develop, refine and validate the risk stratification tool and the intervention

Develop, refine and validate the risk stratification tool

In Phase I, we obtained ethical approval from Addis Ababa University to use anonymised pre-migration data from more than 200,000 MDWs retrieved from three private clinics, through which we conducted exploratory analyses. In addition, we collected pilot post-migration MSRH data using a Telegram bot application we have developed, which was linked to the pre-migration data. We plan to collect more data using the Telegram bot application, which will enable the development of a risk stratification tool, based on MDWs' socio-demographic and migration related characteristics. This will be used to deliver tailored intervention based on MDWs' level of risk.

In this WP, we will conduct an expanded analysis of the linked pre-migration health screening and the MSRH data we will collect to identify key characteristics of MDWs that predict the risk of psychological distress post-migration. We will further develop, refine and validate the risk stratification tool.

Develop, refine and validate the intervention

As part of our Phase I activities, we have developed a health intervention package, which includes MSRH and digital skills training, peer support delivered by trained MDWs as empowerment workers (EWs), self-help groups (SHGs) on WhatsApp and Telegram, and a mobile health application. The intervention package is designed to be implemented at all stages of the migration journey: before, during, and after departure. Authorised institutions provide MDWs a certificate of competency (COC) after completing a standard 21-day training consisting of how to navigate destination countries and a review of existing

rules and procedures (the usual care). All MDWs undergo routine medical screening to ensure ‘fitness’ for travel. Those who are ‘unfit’ to travel will receive a tailored basic health consultation linked to nearby health institutions for follow-up treatment.

The intervention starts with an enhanced training package of psychosocial education on resilience and mental health [34], a comprehensive sexual and reproductive health (SRH) education [35], and digital literacy training to equip MDWs access resources and support through a mobile app in the destination. The intervention will also leverage the mobile app to deliver educational materials in text and voice formats. Around 20–30 MDWs in the intervention group will be linked to a trained EW. When MDWs visit their local agency for the routine pregnancy test one day before their departure, we will install INNOVETH mobile app, provide MDWs training on digital literacy and using the mobile app to access the health education, and link them with the EW for peer support.

EWs will receive an intensive one-week training to enable them support MDWs based on their specific needs and risk profiles and take a diary to record relevant data. This ensures personalised and scalable support tailored to each MDW’s risk level. Trained EWs will contact fellow MDWs regularly through virtual or in-person meetings, assess their vulnerability on a quarterly basis, record data on each contact, and adjust the frequency of contact with MDWs guided by data collected at their previous contact and MDW’s level of risk (weekly for those at the highest risk and monthly for those at the lowest risk). EWs will also support MDWs on the mobile app and respond to crises such as workplace conflict, abuse, or health emergencies. EWs will work closely with their supervisors based in Ethiopia (MSRH specialists) to review the data, discuss risk stratification, and identify topics for subsequent follow-up contact. They will also refer MDWs experiencing moderate to severe mental health conditions to specialised MSRH services at St. Paul’s Millennium Medical College in Ethiopia via telephone-based consultation.

EWs will also invite some of the MDWs to join an SHG which include 5–10 women who will meet every two weeks. Each SHG will identify its own priorities, facilitate discussions and activities on topics such as saving money, coping strategies, and accessing social and emotional support. The SHGs will strengthen social networks and MDWs’ resilience, develop ownership of the intervention and community empowerment, and uptake of MSRH services. Figure 4 summarizes the intervention package.

The risk stratification tool and the health intervention package will be refined iteratively and validated through expert consensus meetings, as well as active engagement and involvement of MDWs community and stakeholders.

WP2: Implementation, and impact and process evaluation

Implementation and impact evaluation

Study design

WP2 includes the implementation and evaluation of the health intervention (see Table 1). The implementation and impact evaluation will use a pragmatic, two-arm cluster randomised controlled trial (RCT) with a process evaluation: usual care versus INNOVETH intervention (1:1). A Cluster refers to a district, administrative and geographical hotspot in Ethiopia from which MDWs originate. MDWs from the same district share a common language and cultural background. This will enable the use of existing social connections, ease building new networks among MDWs, minimise cultural and communication barriers, strengthen peer-led SHGs, and facilitate intervention implementation. The recruitment strategy will ensure a representative and scalable approach, while addressing logistical challenges associated with a mobile population.

Table 1
Summary of methods of the INNOVETH studies

Study	Develop, refine and validate the risk stratification tool and the intervention	Implementation and impact evaluation	Process evaluation	Cost-effectiveness evaluation
Aim(s)	i) Identify key characteristics of MDWs that predict the risk of psychological distress post-migration ii) Develop the risk stratification tool iii) Refine and validate the risk stratification tool iv) Refine and validate the intervention package developed in Phase I	Evaluate the impact of the intervention in improving MSRH of MDWs and thereby strengthening their empowerment, resilience and social networks	i) Document implementation of the intervention ii) Assess fidelity and intervention quality iii) Identify core components of the intervention that maximize impact iv) Understand mechanisms of action of the intervention and contribute to interpretation of the trial findings	Evaluate the cost and cost-effectiveness of the intervention
Design	Cross-sectional survey, expert meetings and stakeholder engagement and involvement	Cluster-randomized controlled trial	Mixed methods study	Economic evaluation following Drummond and colleague's approach alongside the cluster-RCT
Site	Addis Ababa and several destination countries (e.g. Kingdom of Saudi Arabia, United Arab Emirates)	Addis Ababa and several destination countries (e.g. Kingdom of Saudi Arabia, United Arab Emirates)	Addis Ababa and several destination countries (e.g. Kingdom of Saudi Arabia, United Arab Emirates)	Addis Ababa and several destination countries (e.g. Kingdom of Saudi Arabia, United Arab Emirates)
Participants and sample	Migrant domestic workers in the destination countries (n = 400); Steering Committee members and others experts in mental health, migration, epidemiology and data science (n =	Migrant domestic workers (n = 2400 in the intervention clusters and n = 2400 in the control clusters)	MDWs, empowerment workers, trainers, counselors and clinicians who will provide specialist mental health and sexual and reproductive health services, key stakeholders including	Migrant domestic workers (n = 2400 in the intervention clusters and n = 2400 in the control clusters)

Study	Develop, refine and validate the risk stratification tool and the intervention	Implementation and impact evaluation	Process evaluation	Cost-effectiveness evaluation
	15); MDWs and other stakeholders (n = 20)		recruitment agencies and health facilities	
Data collection methods	Structured questionnaires; expert consensus meetings and stakeholder meeting	Structured, standard and validated instruments and researcher developed questionnaires	Structured and researcher developed questionnaires; interviews, focus group discussion, process data, document reviews, and observations	Structured, standard and validated instruments and researcher developed questionnaires
Data analysis	Regression analysis, machine learning; thematic analysis	Cluster summaries using mean and standard deviation; linear regression model; logistic regression model	Descriptive statistics (frequency, percentage, mean and standard deviation; thematic and framework analysis for the qualitative data	To compare costs and effects between the intervention and control groups an incremental cost-effectiveness ratio will be calculated; the overall benefits of the intervention will be assessed in terms of quality-adjusted life years

Study population recruitment

We used Hayes and Bennett's approach [36] for cluster RCT to calculate sample size and power. With 4800 MDWs from both intervention groups (200/cluster), assuming outcome prevalence of 30% [21], the coefficient of variation between clusters (k) of 0.25 and type I error rate of 5%, we have 90% power to detect a 33% difference in proportion of MDWs who have psychological distress between the intervention and control arms.

The study population for this project includes women migrating to the Middle East for domestic work (migrant domestic workers, MDWs), who are disadvantaged, marginalized and underserved groups. Recruitment will be conducted using a random draw from clusters of MDWs eligible for migration to the Middle East and have completed the COC (Certificate of Competency) required by the Ethiopian government and the host countries. The list is collected as part of the registration for the training and medical screening. Written informed consent in local languages (Amharic, Afan Oromo, and Tigrigna) will be taken and only women who consented to participate in the study will be enrolled. MDWs who do not consent to the study will be excluded and this will be documented.

We have conducted several engagement and involvement activities to improve retention and we will strengthen this throughout the intervention. Our trained empowerment workers will collect program data, and we will use this to improve retention of study participants. Our engagement and involvement of key stakeholders, both in Ethiopia and the Middle East countries, will ensure participants will get the full support to remain in the study.

Primary and secondary outcomes

The primary outcome is a composite psychological distress index, including depression, anxiety and stress among MDWs. This is the proportion (%) of MDWs who have psychological distress after 24 months, measured using the 21-item Depression, Anxiety and Stress Scale [37].

Secondary outcomes include 1) % MDWs who have psychological distress after 12 months; 2) % MDWs who have a) depression, b) anxiety and c) stress at 24 months; 3) %MDWs who have self-reported sexual and/or reproductive health problems and sought healthcare services; 4) %MDWs who have self-reported sexual, emotional or physical violence 5) %MDWs who have self-reported physical injury 6) % MDWs who have self-reported pregnancy; 7) knowledge and attitude of MDWs on MSRH and services 8) % MDWs who have changed their employer during the two years due to conflict, and 9) the overall well-being of MDWs, measured in terms of quality of life (QoL) at 24 months.

Data collection

We will collect outcome data at four time points: predeparture, baseline (1–2 months post-departure), midline (12 month) and endline (24 month). Data will be collected on socio-demographic and behavioural characteristics, MSRH, physical health, utilisation of health services, economic characteristics, host family characteristics, and QoL using an Audio-Computer Assisted Self-Interview (ACASI). ACASI, which will be uploaded on a custom-developed mobile app, is believed to improve quality data collection, reporting of sensitive behaviours and exposures such as MSRH, abuse, and sexual risk taking. It has been tested in humanitarian settings in low- and middle- income countries [38]. In addition to obtaining data, the pre-departure survey will familiarize MDWs with ACASI and facilitate post-departure data collection.

Data analysis and statistical considerations

The primary analysis will be based on intention-to-treat principle, using cluster summaries to account for clustering. Cluster summaries of individual MDWs will be calculated, and then the mean of the cluster summaries will be calculated for each group. For unadjusted analysis, we will fit a linear regression model on the cluster summaries at the endline, with treatment dummy and cluster summaries at baseline as regressors.

To address the possibility of confounding, we will conduct adjusted analysis using the ‘two-step’ method of Hayes and Moulton [39]. We will fit individual logistic regression model with the primary outcome as the dependent variable and other variables as independent variables to generate predicted probabilities. The mean of the predicted probabilities will be interpreted as predicted prevalence for each cluster. We

will calculate the 'residual' risk difference by subtracting the predicted prevalence from the observed prevalence in each cluster. We will then fit a linear regression model on the residuals to calculate adjusted risk difference and associated 95% confidence interval. A statistical analysis plan will be agreed upon between the study investigators and the statistical advisor. The External Advisory Committee and Data and Safety Monitoring Board will approve the analysis plan.

Process evaluation

Effective implementation of an intervention requires ongoing evaluation and adaptation to local circumstances [40]. For effective implementation, we will strictly adhere to the intervention protocol, maintain meticulous records, actively engage key stakeholders, and provide extensive training to intervention providers. This will help to ensure fidelity, enhance intervention quality, and identify core components that maximize impact.

We will conduct a comprehensive process evaluation to document implementation of the intervention, understand its mechanisms of action, and contribute to the interpretation of the trial findings. A mixed methods study will be used for the process evaluation. Quantitative data will be collected using surveys and the process data. The mobile app will also monitor user interactions, providing insights into cultural and contextual factors affecting intervention delivery. We will conduct in-depth interviews with MDWs, empowerment workers, trainers, and key stakeholders, including recruitment agencies and health facilities and focus group discussions (FGD) with MDWs and EWs. Document reviews and observations related to the design and implementation of the intervention will also be used.

WP3: Cost-effectiveness evaluation

Alongside the RCT, we will conduct an economic evaluation following Drummond and colleague's approach [41]. Data on resource use and health outcomes will be collected at baseline, midline, and endline. Costs associated with developing, modifying, delivering, and maintaining the intervention; staff costs related to training, moderating the online forum (application), and telephone consultation for counselling will be included. To compare costs and effects between the intervention and control groups an incremental cost-effectiveness ratio (ICER) will be calculated. The overall benefits of the intervention will be assessed in terms of quality-adjusted life years (QALYs).

QALY is the primary outcome for the cost-utility analysis, calculated using the EQ-5D-5L instrument, a generic utility-based health status tool developed by the European QoL (EuroQol) Group, and the Ethiopian tariff proposed by Welie et al., [42]. This approach captures the overall improvement in well-being resulting from fewer or less severe cases of psychological distress due to the intervention. Both costs and health outcomes will be discounted at an annual rate of 3% [43].

WP4: Capacity building and integration of early-career researchers

Our capacity-building effort will focus on training and supervising PhD and postdoctoral fellows at the intersection of health, epidemiology, AI and data science. We will support three PhD students in public health, mental health, and AI and data science. In addition, we will engage two postdoctoral fellows. PhD and postdoctoral fellows will be engaged at the study design, data collection, analyses, and dissemination of findings; they will also have an overseas research stay at collaborative institutions.

Regular training sessions and workshops will strengthen collaboration between junior and senior researchers in Ethiopia and Europe and build capacity in research and leadership. An interdisciplinary team will collaborate across the project, integrating insights from psychology, public health, migration studies, and data science. Their work will be instrumental in shaping the project's outcomes, with support from senior researchers and dedicated training sessions. A Software Development Team composed of 2–3 early-career software developers will focus on the development and deployment of mobile applications and digital tools vital for the intervention. They will work under expert guidance, collaborating with data scientists to ensure user-centric solutions. This experience will enhance their proficiency in digital health technologies, supporting university-industry linkages in line with the Ministry of Education's strategy to build the capacity of higher education institutions in Ethiopia.

We will also have regular stakeholder engagement and involvement activities, training sessions and workshops to build capacity and facilitate evidence uptake into practice and policy. We plan one stakeholder engagement and involvement activity and one training workshop every year for local recruitment agencies, pre-migration health screening clinics, returnee associations, practitioners working in mandated government sectors and other key stakeholders.

WP5: Project management

The INNOVETH consortium is composed of a multidisciplinary team from Addis Ababa University, Ethiopia (the hosting and administering institution), and four co-applicants (London School of Hygiene and Tropical Medicine, UK; Oslo Metropolitan University, Norway; Armauer Hansen Research Institute, Ethiopia; St. Paul's Hospital Millennium Medical College, Ethiopia). The consortium has collaborators from the University of Hamburg, Wollo University and Sefed Software Systems, and partner institutions from government, international and local non-governmental organizations (NGOs) and private business organizations (local recruitment agencies and pre-migration health screening clinics). The team brings expertise in mental health, migration studies, implementation science, evaluation of complex interventions and randomised controlled trials (RCT), public health and epidemiology, economic evaluation, and data science and digital technology.

This WP ensures the effective coordination, execution, and monitoring of all project activities. The project management plan includes detailed planning, task management, risk assessment, stakeholder communication, and monitoring and evaluation to facilitate smooth collaboration and timely delivery of project outcomes. A key component is maintaining efficient communication between consortium members, stakeholders, funding organisations, and the public. Regular status meetings, quarterly progress reports, and Steering Committee oversight will ensure continuous evaluation and effective

implementation of project activities. The Steering Committee will have regular meetings to update progress, identify challenges and risks and design strategies to mitigate these. The PI and co-PIs will oversee the progress and accomplishment of activities and tasks across the WP.

An independent External Advisory Board will be established to provide strategic oversight and guidance throughout the project's duration. The Board will include representatives from key stakeholders and international experts. The Advisory Board will provide critical oversight by aligning the project's vision with stakeholder expectations, monitoring progress to meet milestones, advising on risk management, and ensuring compliance and effective delivery. Online project and team management tools will be established to support research activities. A Data Safety and Monitoring Board (DSMB) will be also established to provide advice to researchers and monitor several aspects of the trial. The DSMB will ensure trial participants' safety, ensure data integrity, and maintain the trial's scientific and ethical validity by independently reviewing process and outcome data accumulated throughout the trial.

Dissemination

The project intends to disseminate its findings through scientific publications in high-impact, peer-reviewed international, regional, and national journals. These will address key themes of the project, such as health challenges or problems of MDWs, impact of the intervention to improving MSRH outcomes, process evaluation of the implementation of the intervention, cost-effectiveness of the intervention, peer-support frameworks, and policy recommendations to improve health and social service delivery. Public and stakeholder engagement will be prioritized through collaboration with partners, government agencies, NGOs, and the External Advisory Board, ensuring direct communication with policymakers and target populations.

Findings will also be presented at international and regional conferences, as well as through meetings, workshops, webinars, and scientific forums focused on migration and health. Partnerships with higher education institutions, healthcare providers, and NGOs will facilitate dissemination to practitioners, healthcare workers, and students.

Beyond academic channels, dissemination will extend to newspapers, social media, and short documentary films highlighting MDWs' experiences and the intervention's impact. The overall goal is to share the results of INNOVETH widely with scientific audiences, stakeholders, and the general public. Regular updates will also be published on the INNOVETH website (<https://innoveth.org>).

Data sharing, protection and ethics

The INNOVETH project follows a robust framework for data sharing, protection, and ethical compliance. Informed consent will be obtained from all participants after ensuring they fully understand the study, data usage, and potential risks. All sensitive data will be anonymized and de-identified. The principal investigator, co-principal investigators and collaborators have training on the General Data Protection Regulation and Good Clinical Practice. Ethical approval will be obtained from the Ethics Committees of the hosting organization (i.e. Addis Ababa University Research Ethics Committee) and all co-applicant

institutions (i.e. the Research Ethics Committees of the London School of Hygiene and Tropical Medicine, Oslo Metropolitan University, Armaeur Hansen Research Institute, and St. Paul's Hospital Millennium Medical College) before recruitment starts. Ethics approval and permission will also be obtained from the Middle East countries where this study will be conducted. Details of the ethical considerations pertaining to risks and harms of participating in the trial and participant protection and safeguarding will be reported in an upcoming trial protocol paper.

The data sharing and protection ethics of this project align with The Ethiopian Data Protection Act, Personal Data Protection Proclamation No. 1321/2024. Strict data security measures, including encryption, controlled access, and secure storage, will be implemented to prevent unauthorized access. Key stakeholders, community representatives, and advocacy groups will be actively engaged to ensure the project is conducted in a culturally sensitive and ethically responsible manner.

Discussion

The project addresses key healthcare needs of Ethiopian MDWs in the Middle East and aims to improve MSRH outcomes across the different stages of migration: pre-departure, during travel and in the destination. This will contribute to the existing body of research, where there is a critical gap in migration health research. The project also utilises advanced and innovative transdisciplinary approaches to develop need-based, risk-tailored, and scalable health interventions. A mobile app, peer-led support and SHG offer an innovative intervention model for the hard-to-reach MDWs. This will enable to address the determinants of MDWs' vulnerability, deliver community support and services, empower MDWs and enhance their resilience and empowerment through addressing their MSRH needs.

The use of epidemiological, data science, and artificial intelligence methods to develop and refine scalable health interventions is a novel approach in this context. These methods will generate actionable insights and tools, setting a precedent for data-driven, culturally appropriate health interventions targeting vulnerable migrant populations. The transdisciplinary approach employed in this project, combining digital health tools, community engagement, and stakeholder collaboration, is groundbreaking. The development of a mobile application tailored to the unique needs of MDWs, combined with the use of AI for risk stratification, represents a significant leap forward in intervention design and delivery. The INNOVETH programme prioritizes building local research capacity through the training of PhD fellows and supporting post-doctoral researchers.

MDWs' limited awareness of their legal and medical entitlements, combined with their socio-economic vulnerability and the nature of their work conditions, makes them a hard to reach and marginalized groups [25]. Hence, the major challenge we anticipate in this project is easily accessing MDWs, particularly in the destination countries. Nevertheless, MDWs maintain their pre-migration social connections with their employment agencies, peers from their place of origin, and families through telephone calls or social media platforms [26]. We will use these networks and technology to access MDWs and provide targeted health interventions tailored to their needs. In addition, we conducted

extensive stakeholder engagement as part of our Phase I activities and we will further expand this engagement in Phase II in both Ethiopia and destination countries. Insights and inputs from stakeholder engagement and involvement activities will be used to iteratively improve the implementation of the intervention package, outcome assessment, process evaluation, capacity building and other key activities of the project over its lifecycle.

Implications for practice and policy

The findings from this study will inform evidence-based policy and advocacy efforts for MDWs, a highly neglected demographic in global health policies. By addressing barriers to healthcare access, the project has the potential to improve health equity and social justice for MDWs, influencing regional and international migration health frameworks. The project will also generate evidence to inform advocacy efforts, practice and policy formulation aimed at driving societal transformation, improving healthcare access, and promoting health equity for MDWs.

Engagement and involvement of stakeholders and policy makers will facilitate translation of research outcomes into policy and dissemination of findings. The project will also build local research capacity through engagement of early career researchers and effective collaboration with a multidisciplinary team.

Conclusion

With the INNOVETH project, we are developing evidence to support the delivery of risk differentiated and tailored MSRH intervention for MDWs in the Middle East. INNOVETH focuses on creating collaboration and partnership among researchers, policymakers, practitioners and women who have lived experience of migrant domestic work to enable local led and contextualized solutions. Key outputs in the INNOVETH project include a risk stratification tool, evidence-based interventions and strengthened partnership and research capacity. While focused on Ethiopian MDWs, the insights are globally relevant and can be adapted to other MDWs populations in the Middle East, paving the way for transformative advances in migration health research, practice, and policy.

Abbreviations

MDWs

migrant domestic workers

MSRH

mental, sexual and reproductive health

RCT

randomized controlled trial

INNOVETH

Innovative health intervention for migrant domestic workers in the Middle East

WP

work packages

MRC

Medical Research Council

EWs

empowerment workers

SHG

self-help groups

COC

certificate of competency

QoL

quality of life

ACASI

Audio-Computer Assisted Self-Interview

FGD

focus group discussions

ICER

incremental cost-effectiveness ratio

QALYs

quality-adjusted life years

DSMB

Data Safety and Monitoring Board

NGOs

non-governmental organizations.

Declarations

Funding

The research reported in this publication is funded by the Wellcome Trust (reference number: 335603/Z/25/Z). The views expressed in this publication are those of the authors and not necessarily those of the Wellcome Trust.

Competing interests

None.

Ethical standards

The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration.

Ethics approval and consent to participate

Not applicable

Consent for publication

Not applicable

Clinical Trial Number

Not applicable

Author Contribution

KH, AKS, DSA, MSA, BS, SS, HD, YA and SMY conceived and designed the study. KH produced the first draft of the manuscript. All the authors significantly contributed in the writing of the manuscript. All authors (KH, AKS, DSA, MSA, BS, SS, HD, YA and SMY) approved the final manuscript to be submitted for publication.

Acknowledgement

None

Data availability

Data sharing is not applicable to this article as no data were created or analysed at this stage or level of the research project. The data we generated in Phase I and used in this project are available upon reasonable request from the first author.

References

1. Jiang Z, Wang Y, Guo F, Gollan PJ. Vocational experiences and quality of life of migrants: Overview and future research. *Soc Indic Res.* 2018;139(1):403–14.
2. International Organization for Migration. World migration report 2024: Geneva; IOM 2024.
3. Buuba BD. Africa: Setting for Human Migration. *view Latin Am.* 2007;40(3–4):211.
4. De Haas H. Migration and development: A theoretical perspective. *Int Migrat Rev.* 2010;44(1):227–64.
5. Helms B, Leblang D. Global migration: Causes and consequences. In: *Oxford Research Encyclopedia of Politics*. edn.; 2019.

6. International Labour Organization. ILO global estimates on migrant workers: results and methodology. *Geneva: LO*2015.
7. Auwal MA. Ending the exploitation of migrant workers in the Gulf. *Fletcher F World Aff.* 2010;34:87.
8. Zewdu GA. Ethiopian female domestic labour migration to the Middle East: Patterns, trends, and drivers. *Afr Black Diaspora: Int J.* 2018;11(1):6–19.
9. Blaydes L. Assessing the labor conditions of migrant domestic workers in the Arab Gulf States. *Ilr Rev.* 2023;76(4):724–47.
10. Lindgren D, Uaumnay T, Emmons K. Baseline survey: Improved labour migration governance to protect migrant workers and combat irregular migration in Ethiopia project. *International Labour Organization: Geneva, Switzerland* 2018.
11. Tayah M-J, Atnafu A. Promoting and protecting the rights of migrant domestic workers in transit: The case of Ethiopian women migrants. *Research Series, International Labour Organization, Geneva* 2016.
12. Kuschminder K, Ogahara Z, Rajabzadeh I. Evaluations of return within a mass deportation: Ethiopians' experiences of return after expulsion from Saudi Arabia. *Int Organ Migration.* 2021;59(2):167–85.
13. Flight FES, Center MC, Ababa A. Understanding the forced repatriation of Ethiopian migrant workers from the Middle East. 2021.
14. Mihret FB. Potential Migrants: the Overlap between Migration and Human Rights in Ethiopia. *Ethiop J Hum Rights.* 2019;4(1):95–123.
15. Gezie LD, Atinafu A. Physical health symptoms among Ethiopian returnees who were trafficked aboard. *Int J Migration Health Social Care.* 2021;17(2):215–23.
16. Minaye A. Trafficked to the Gulf States: The experiences of Ethiopian returnee women. *Social Development and Social Work.* edn.: Routledge; 2013. pp. 112–33.
17. Gezie LD, Worku A, Kebede Y, Gebeyehu A. Sexual violence at each stage of human trafficking cycle and associated factors: a retrospective cohort study on Ethiopian female returnees via three major trafficking corridors. *BMJ open.* 2019;9(7):e024515.
18. Fernandez B. Health inequities faced by Ethiopian migrant domestic workers in Lebanon. *Health Place.* 2018;50:154–61.
19. De Regt M, Tafesse M. Deported before experiencing the good sides of migration': Ethiopians returning from Saudi Arabia. *Ethiopians in an Age of Migration.* edn.: Routledge; 2018. pp. 104–18.
20. Mengiste TA, Abebe T. Ethiopian girls narratives of risk and governance of circular migration to the Arabian Gulf. *Child Soc.* 2025;39(3):603–19.
21. Habtamu K, Minaye A, Zeleke WA. Prevalence and associated factors of common mental disorders among Ethiopian migrant returnees from the Middle East and South Africa. *BMC Psychiatry.* 2017;17(1):144.

22. Gelaye KA, Sisay MM, Akalu TY, Teshome DF, Wolde HF, Demissie GD, Wami SD, Azale T, Ayele TA. Common mental disorders among seasonal migrant farmworkers in Northwest Ethiopia. *BMC Psychiatry*. 2021;21(1):69.
23. Desale G. Exploring the Interplay Between Migration and Changes in the Social Capital of Sending Communities: Experiences from Raya Kobo Woreda, North Wollo. MA Thesis. Unpublished, AAU; 2016.
24. Kumar R, Jamil R. Labor, health, and marginalization: A culture-centered analysis of the challenges of male Bangladeshi migrant workers in the Middle East. *Qual Health Res*. 2020;30(11):1723–36.
25. Idowu A. The unequal world of migrant domestic workers in the middle east: the paradoxical role of technology. In: *International Conference on Implications of Information and Digital Technologies for Development: 2024*: Springer; 2024: 152–166.
26. Busza J, Teferra S, Omer S, Zimmerman C. Learning from returnee Ethiopian migrant domestic workers: A qualitative assessment to reduce the risk of human trafficking. *Globalization health*. 2017;13(1):71.
27. Cowan FM, Machingura F, Chabata ST, Ali MS, Busza J, Steen R, Desmond N, Shahmanesh M, Revill P, Mpofu A. Differentiated prevention and care to reduce the risk of HIV acquisition and transmission among female sex workers in Zimbabwe: study protocol for the 'AMETHIST' cluster randomised trial. *Trials*. 2022;23(1):209.
28. Desie Y, Gezie LD, Habtamu K, Minaye A, Asnake M, Mulugeta E, Admas F, Alemu AA, Abera D, Gina E. The mediating role of psychological distress in the association between migration experiences and stigma and coping strategies: a cross-sectional study on Ethiopian migrant returnees. *BMC Psychiatry*. 2024;24(1):827.
29. Bronfenbrenner U. Ecological systems theory. American Psychological Association; 2000.
30. Tanser F, Barnighausen T, Dobra A, Sartorius B. Identifying 'corridors of HIV transmission' in a severely affected rural South African population: a case for a shift toward targeted prevention strategies. *Int J Epidemiol*. 2018;47(2):537–49.
31. Cowan FM, Machingura F, Ali S, Chabata ST, Takaruzza A, Dirawo J, Makamba M, Bansi-Matharu L, Matambanadzo P, Shahmanesh M. AMETHIST—A Risk-Differentiated, Community-Led Intervention to Strengthen Uptake and Engagement with HIV Prevention and Care Cascades Among Female Sex Workers in Zimbabwe: The Results of a Cluster Randomised Trial.
32. Machingura F, Madimutsa G, Makamba M, Kujeke T, Takaruzza A, Maguma J, Ali S, Chabata ST, Matambanadzo P, Steen R. We carried her in a wheelbarrow to the clinic: process evaluation of the AMETHIST intervention combining microplanning with self-help groups to improve HIV prevention and treatment among female sex workers in Zimbabwe. *BMC Health Serv Res* 2026.
33. Moore GF, Audrey S, Barker M, Bond L, Bonell C, Hardeman W, Moore L, O'Cathain A, Tinati T, Wight D. Process evaluation of complex interventions: Medical Research Council guidance. *bmj* 2015, 350.
34. World Health Organization. Guidance and technical packages on community mental health services: promoting person-centred and rights-based approaches: executive summary. Geneva; WHO 2021.

35. Lisam S. Minimum initial service package (MISP) for sexual and reproductive health in disasters. *J evidence-based Med*. 2014;7(4):245–8.
36. Hayes RJ, Bennett S. Simple sample size calculation for cluster-randomized trials. *Int J Epidemiol*. 1999;28(2):319–26.
37. Lovibond PF, Lovibond SH. The structure of negative emotional states: Comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories. *Behav Res Ther*. 1995;33(3):335–43.
38. Falb K, Tanner S, Asghar K, Souidi S, Mierzwa S, Assazenew A, Bakomere T, Mallinga P, Robinette K, Tibebu W. Implementation of Audio-Computer Assisted Self-Interview (ACASI) among adolescent girls in humanitarian settings: feasibility, acceptability, and lessons learned. *Confl Health*. 2016;10(1):32.
39. Hayes RJ, Moulton LH. Cluster randomised trials. Chapman and Hall/CRC; 2017.
40. Rogers PJ, Woolcock M. Process and implementation evaluation methods. 2023.
41. Drummond MF, Sculpher MJ, Claxton K, Stoddart GL, Torrance GW. Methods for the economic evaluation of health care programmes. Oxford University Press; 2015.
42. Welie AG, Gebretekla GB, Stolk E, Mukuria C, Krahn MD, Enquoselassie F, Fenta TG. Valuing health state: an EQ-5D-5L value set for Ethiopians. *Value health Reg issues*. 2020;22:7–14.
43. Edejer TT-T, Edejer TT-T. Making choices in health: WHO guide to cost-effectiveness analysis. Volume 1. World Health Organization; 2003.

Figures

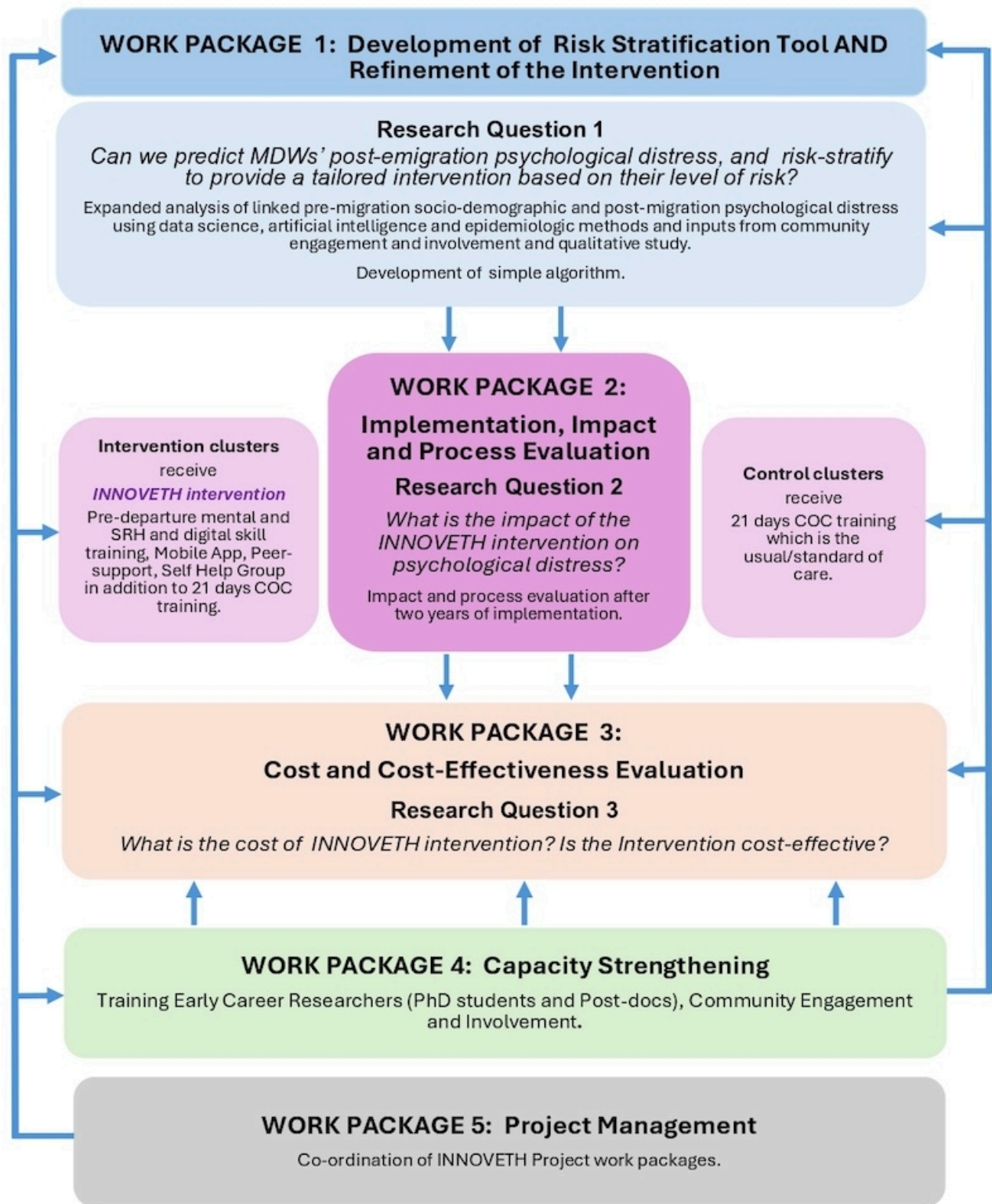


Figure 1

Overview of the objectives and proposed methods of the INNOVETH programme

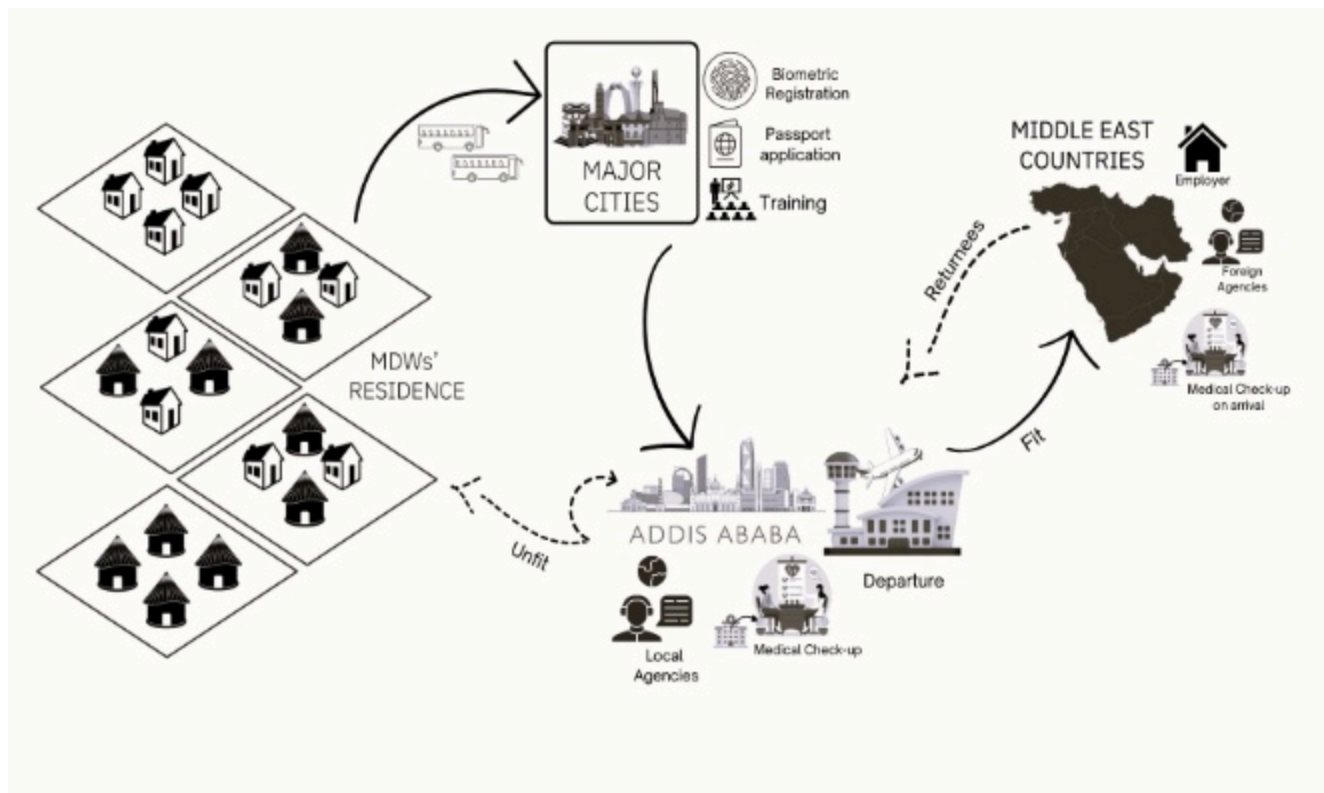


Figure 2

Migrants' journey from their area of original residence to the destination

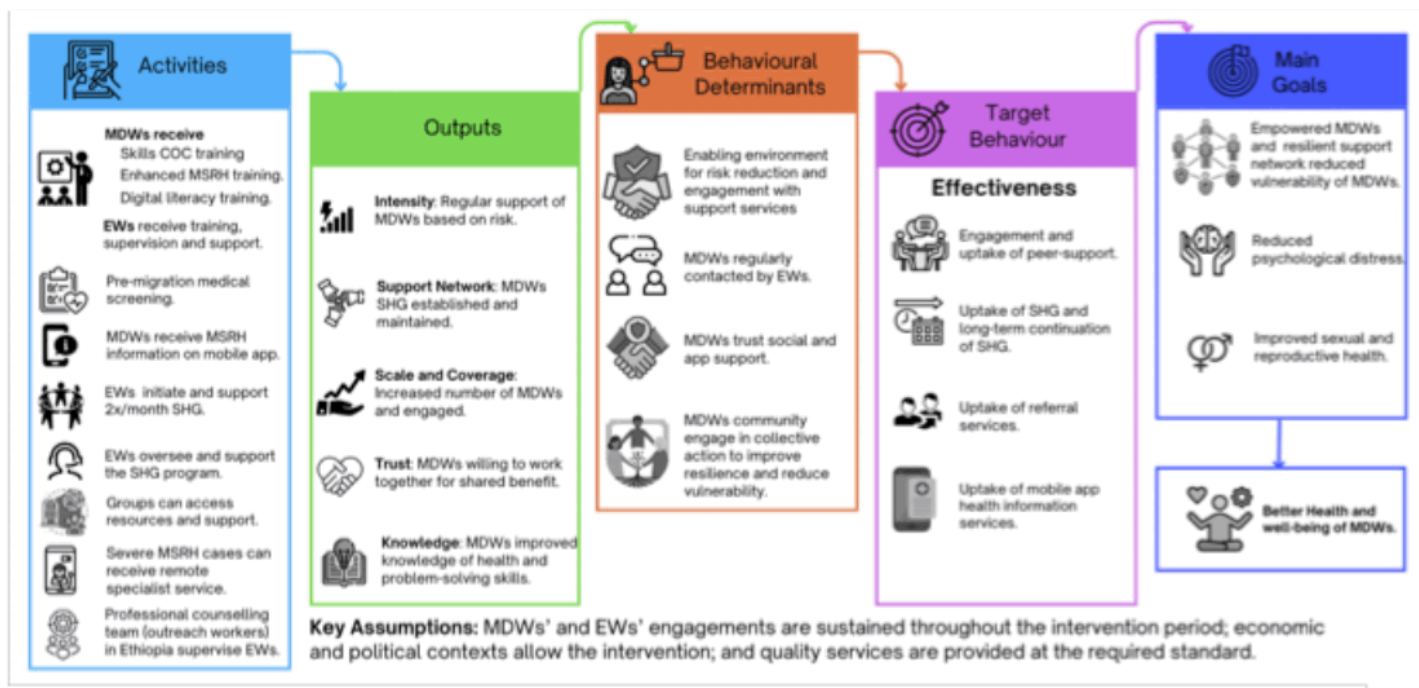


Figure 3

Theory of change map

Pre-departure training Mobile App	• Enhanced training on mental resilience and SRH, and digital literacy. • Mobile App: mental and SRH information (multi-language, text and audio).
Peer-led support	• Regular risk-differentiated, individualised support by EWs for MSRH. • Tailored referral to mental, sexual and reproductive health support services.
Self-help group	• Biweekly peer-led, community self-help group. • MDWs' priorities, build empowerment, and social resilience.
Skill Training	• 21 -days skills training program at COC centres. • Medical screening and pregnancy test pre-departure. • In depth theory-based process evaluation.

Figure 4

Summary of INNOVETH intervention components