Research Articles

Sexual and reproductive health "Train The Trainer" programs in low- and middle-income countries: a scoping review

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Background

Universal access to reproductive health care including family planning and sexual health care are recognised as human rights and are a key contributor to the United Nations' (UN) Sustainable Development Goals, yet many people across the globe have limited access to information and services to protect their sexual and reproductive health (SRH). Universal access cannot be achieved without a skilled health workforce. 'Train the Trainer' (TTT) approaches are commonly advocated as cost-effective and sustainable options for building health capacity through up-skilling health workforces.

Methods

A scoping review was undertaken to identify the type and extent of the available literature on sexual and reproductive health TTT programs in low- and middle-income (LMI) countries, in order to gain insights to inform practice and fill the knowledge gaps to inform future research. Six databases were used as the source of information (CINAHL, EMBASE, ERIC, Global Health, Medline and Scopus).

Results

A systematic search returned a total of 700 studies. After duplicate removal, 487 studies were screened by year, title and abstract, and 39 studies were identified for full text review. After the full text review, 16 studies were deemed to meet the criteria for final inclusion. Findings show that much of the published literature on SRH TTT programs reports on HIV training in African countries. Thematic analysis revealed a wealth of practical considerations for practitioners wishing to implement SRH TTT programs in LMI country settings.

Conclusions

This scoping review identified a paucity of recent peer-reviewed literature available on SRH TTT programs in LMI country settings. Despite this, a number of practical considerations remain, relating to TTT methodology and design; factors that support or inhibit implementation; and sustainability and scaling up were identified. Future research should focus on adopting stronger outcome evaluation methodology to determine effectiveness of TTT programs; and investigate the application of TTT models across a range of SRH topics in a diverse range of LMI countries.

Sexual and reproductive health (SRH) involves complete physical, mental and social wellbeing in all matters relating to human reproduction, including the right to a safe and satisfying sex life; and the capability and freedom to reproduce if, when, and how often one chooses.[1] Access to accurate SRH information, services and contraception empowers people to protect themselves from sexually transmitted infections (STI), make informed decisions about reproduction, reduce unintended pregnancies and abortions, and support women who chose to have children, have healthy pregnancies, safe deliveries, and healthy babies.[1,2] Access to family planning services and contraception also support gender equality, increasing women's opportunities to access education, paid employment, and increasing earning capacity.[3]

Although universal access to reproductive health care is recognised as a basic human right[4] and a key contributor to the United Nations' (UN) Sustainable Development Goals,[5] many people across the globe have limited access to information and services to protect their sexual and reproductive health.[2] Around 214 million women in low- and middle-income (LMI) countries have an unmet need for contraception,[2] and STIs remain a major contributor to the global burden of disease, with over one million people becoming

infected with an STI every day.[2] HIV remains a major global challenge, with 1.7 million people becoming newly infected in 2018.[6] Cervical cancer (caused by the STI human papilloma virus) is the second most common cancer in women living in LMI countries where it has a high mortality rate.[2] Widespread violence against women also contributes to adverse SRH outcomes. Globally one woman in three is estimated to have experienced physical or sexual violence from a partner or sexual violence from a non-partner in their lifetime.[2] The fear and control instilled by perpetrators of intimate partner violence can limit victims' sexual and reproductive autonomy and health care seeking behaviour.[7]

Universal health coverage, including universal coverage of SRH care, cannot be achieved without a strong health workforce that is fit for purpose and practice,[8] but many LMI countries face significant challenges relating to shortages of appropriately skilled health workforce and poor retention of health workforce.[9] Morale and commitment of health workforce in these low resource settings are often tested and undermined by high workloads, inadequate remuneration, and limited access to formal and informal education, training, professional development, and mentorship.[9] These challenges can lead to career changes and out-migration from rural posts to cities and from LMI countries to higher income countries with greater opportunities, further exacerbating shortages.[10] To address these challenges, a focus on building capacity of health workforce in LMI countries is vital.[9]

The "Train the Trainer" (TTT) model is commonly advocated as a cost-effective and sustainable option for building the capacity of, and up-skilling the health workforce in LMI countries.[9] TTT is an approach to training that builds trainee skills in a content area as well as skills in how to deliver the same training to others.[9] The skills and knowledge gained by primary trainees enable them to transfer learnings to secondary trainees and beyond, initiating a self-sustaining cascade of training.[9,11] The model's potential for rapidly and exponentially upskilling a workforce, has made the TTT model very popular in development and global health settings.[9] Despite the popularity of the TTT model in global health settings, evidence on its effectiveness or optimal delivery in resource-poor settings are unclear in the published literature.[9]

Understanding the available literature on SRH TTT models in LMI countries is warranted to support LMI, as well as high income (HI) country partners, in their capacity building efforts and improve SRH access in LMI countries. A scoping review was undertaken to identify the type and extent of the available literature on sexual and reproductive health TTT programs in LMI countries; to identify insights to inform practice; and knowledge gaps to inform future research.

METHODS

This scoping review applied Arksey and O'Malley's[12] methodological framework for scoping reviews that comprises five stages, as reported below.[12,13]

STAGE 1: IDENTIFYING THE RESEARCH QUESTION

A broad research question was developed to capture a breadth of research: *what is the type and extent of literature available on SRH TTT programs in LMI country settings?* A sub question was also developed that asked *what are the key gaps in the literature available on TTT programs on SRH in LMI country settings?*

STAGE 2: IDENTIFYING RELEVANT STUDIES

A search strategy was developed that comprised four steps:

1. A preliminary search in Scopus, Global Health, Medline and Google Scholar took place 21 April 2020 – 5 May 2020, to identify key search terms. Key search terms included terms relating to TTT, SRH, LMI countries, and health care workers. In addition to broad SRH search terms, specific search terms relating to contraception, sexually transmitted infections, HIV, cervical cancer, gender equality, and violence against women were included to reflect key SRH challenges in LMI countries (search terms provided at Appendix 1).
2. Six databases (CINAHL, EMBASE, ERIC, Global Health, Medline and Scopus) were searched on 10 May 2020 using keywords and key search terms identified in step one. The key search terms were modified to adapt to each database searched.
3. Reference lists of the included studies were searched for additional relevant studies.
4. A final search on Google Scholar was undertaken using key search terms to capture any relevant studies missed in steps 1-3.

STAGE 3: STUDY SELECTION

Inclusion and exclusion criteria were developed (see Table 1) and applied to the studies identified in Stage 2. Studies identified by electronic searches were first screened on the basis of year, title and abstract, and then underwent full text review. Eligible studies that were considered to meet the inclusion criteria were selected for charting. Additional studies from the final Google Scholar search and from the reference lists were identified based on title and abstract for full text review and studies that met the eligibility criteria were included in the review. This process was undertaken by one primary reviewer (FH), with a second reviewer confirming eligibility at each stage (JB). A third reviewer (KM) reviewed studies when the first 2 reviewers' assessment of eligibility was divergent, and final decisions were made collaboratively. Figure 1 provides an overview of the study selection process.

STAGE 4: CHARTING THE DATA

Relevant information from each study was entered in Microsoft Excel. Categories of information were selected to provide a summary of characteristics of each study to enable examination of commonalities across the studies. Authors agreed on the data to be extracted from the studies, including: authors, title, publication, year, SRH topic, study location, health care setting, partnership(s), study popula-

Table 1. Inclusion and exclusion criteria

Inclusion criteria	**Study design:** RCT, prospective or retrospective cohort studies, case-control or nested case-control studies that evaluate sexual and/or reproductive health TTT interventions in LMI countries will be included in this review. In the absence of these types of studies, relevant cross-sectional studies, surveys, case series, case reports and workshop, training or project reports were also included.
	Study population: The study population was the health care worker participants in the TTT program who were expected to be capable of delivering training to other health workers or community workers / community members after receiving training. Health workers could include nurses, social workers, community workers, auxiliary health care workers and the like. Studies where the study population was community members or patients receiving care provided by health care workers who received the TTT were also included.
	Interventions: The intervention had to be based on a TTT model, where participants trained would go on to train others in the topic following their training. Training topics related to SRH care (with a focus on contraception, sexually transmitted infections, cervical cancer, gender equality, and violence against women) will be included.
	Outcomes: Effectiveness of the TTT intervention/programme was the primary outcome measure, all measures of change (both objective and subjective) were included. This included tests of knowledge, behaviour change or trainer/patient reports, or patient/target community outcomes. Outcomes had to relate to the primary recipients of the TTT program or secondary recipients (those who receive training from the primary recipients) or patients/community members who the training ultimately aims to benefit.
	Study settings: The intervention had to be delivered in the Pacific Island Region or a LMI country setting. Interventions delivered in HI countries, targeting health workers from LMI countries (i.e. training delivered at international conferences) will be included.
Exclusion criteria	Studies published prior to 2010
	Studies delivered in HI countries targeting HI countries' health workers or community workers
	Training of peer educators
	Non-English-language studies
	Publications other than journal studies

LMI – low – and middle-income, HI – high-income, RCT – randomised controlled trial, SRH – sexual and reproductive health, TTT – Train The Trainer

tion, study aim, study design, intervention, TTT methodology and content, outcome measure(s), and key findings/results.

STAGE 5: COLLATING, SUMMARIZING AND REPORTING THE RESULTS

Key study characteristics from the charted data were collated and summarised in Table 2. A descriptive analysis was then conducted to summarise the literature available on SRH TTT programs in LMI country settings; and a thematic analysis was then undertaken to report key themes identified in the literature.

RESULTS

The literature search returned a total of 700 studies. After duplicates were removed, 487 studies were screened by year, title, and abstract, and 39 studies were identified for full text review. After the full text review 16 studies were deemed to meet the criteria for final inclusion (**Figure 1**).

The majority of the studies focused on training related to HIV (n=9), three of which focused on multiple health issues including HIV (HIV and cervical cancer; HIV and unplanned pregnancy; HIV/AIDS, tuberculosis, malaria, asthma, chronic obstructive pulmonary disease, and STIs). Training related to long acting reversible contraceptives (LARC) was the focus of two studies. The remaining five studies focused
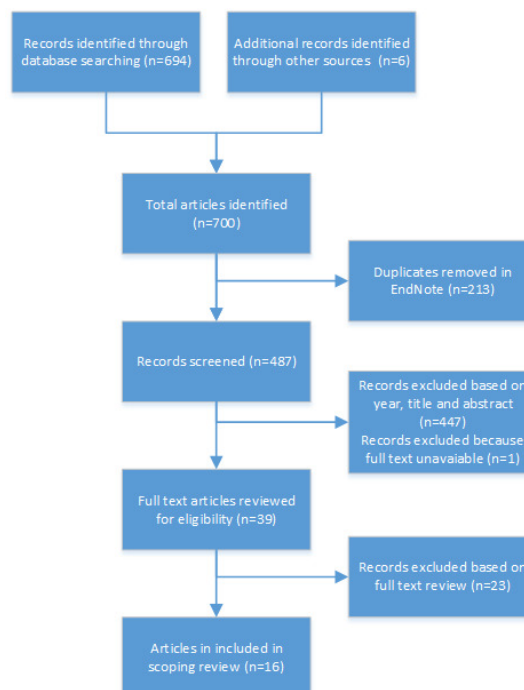
Figure 1. Study selection process/results

on training related to gender-based violence, abortion, vasectomy, adolescent SRH, and cervical cancer, respectively.

Table 2. Study characteristics

Study	SRH topic	Location	Study type	Study period	Number of participants	Key outcome measures	Key findings	Scale reported in study
Butts et al. (2020) Development, implementation and dissemination: Couples and Parent-Child Communication Workshops in Zambia	HIV	Zambia	Quantitative Impact evaluation Pre-experimental pre-post single group design	January -June 2017	Primary* = 6 Secondary** = 195	Readiness to conduct a workshop and implementation	• Participant readiness to conduct a workshop was generally high in both Provinces • Approximately half of the primary participants conducted workshops	6 districts across 2 provinces
Darras and van der Heide (2015) Implementing psychosocial methods to reinforce women's legal rights awareness training in Jordan	Gender-based violence	Jordan	Mixed methods Formative and impact evaluation Pre-experimental pre-post 2 group design	Not specified	Primary = not specified Secondary = 170 (approx.)	Participant knowledge, legal awareness and participant perceptions of training methods	• Participant knowledge and legal awareness increased in both methods of delivery (2x 1hour sessions and 2x 2.5hour sessions) • Participants and facilitators preferred longer sessions	Single community
Foster et al. (2017) Community-based distribution of misoprostol for early abortion: evaluation of a program along the Thailand–Burma border	Abortion	Thailand & Burma	Mixed methods Outcome evaluation Pre-experimental: post only single group design	January 2012 - December 2014	Primary = 2 Secondary = 5	Pregnancy outcomes	• 918 women were provided with misoprostol for early abortion • 885 women (96.4%) were no longer pregnant at follow-up • 29 women were pregnant at follow-up (3.2%) • 4 women were lost to follow-up (0.4%)	Regional
Jones et al. (2015) HIV Prevention in Resource Limited Settings: A Case Study of Challenges and Opportunities for Implementation	HIV	Zambia	Mixed methods Process evaluation	2009-2012	Primary = 130 Secondary = 52	Training delivery rates, providers' intentions to initiate and continue provision of the program, comfort delivering the intervention, competence in the delivery of the intervention, number of clinics, staff trained, sessions, drop out and discontinuation	Implementation addressed multiple issues relating to: • training • consultants • decision making administration • evaluation • travel • staff compensation • ongoing quality assurance	Scale up to 4/10 provinces

Study	SRH topic	Location	Study type	Study period	Number of participants	Key outcome measures	Key findings	Scale reported in study
Kohi et al. (2010) The Tanzania HIV/AIDS nursing education (THANE) preservice curriculum	HIV	Tanzania	Quantitative process & impact evaluation Pre-experimental: Pre-post test single group design	2009-2013	Primary = 18 Secondary = 300	HIV knowledge, confidence in teaching, and thoughts about HIV, participant satisfaction with the workshops, and implementation and dissemination of program	Evaluation findings not reported in paper. Development and implementation learnings included: • Support from stake-holders is essential • Challenges include: lack of resources, integrating training into existing systems, keeping content current	National scale up
Labrecque et al. (2013) Strengthening vasectomy services in Rwanda: introduction of thermal cautery with fascial interposition	Vasectomy	Rwanda	Quantitative Outcome evaluation Pre-experimental: Post only single group design	Primary training – 5 days in 2010 Scale up period unclear	Primary = 3 Secondary = 46 (secondary training not reported in paper)	Number of men who received vasectomies	67 men received vasectomies	5 rural health centres (scale up to 27 districts not reported in paper)
Lieber et al. (2019) Cervical Cancer Screening in HIV-Positive Farmers in South Africa: Mixed-Method Assessment	HIV & cervical cancer	South Africa	Mixed methods Process & impact evaluation Pre-experimental: post only single group design	Not provided	Primary = not provided Secondary = not provided	Advancements in knowledge and skills of providers and improvements in knowledge, attitudes, and behaviours of participants, perspectives and experiences of participants and providers, gaps in the program that would inform improvements moving forward	• Improved cervical cancer screening understanding and awareness report by participants • Barriers included concerns about privacy and negative perceptions of medical care • Trained healthcare workers displayed ongoing clinical competence • Positive correlation identified between visual inspection with acetic acid (VIA) and Pap smear results • Loss to follow up = approximately half of the first cohort of patients • month-over-month change for overlapping	Single farm-based HIV clinic site

Study	SRH topic	Location	Study type	Study period	Number of participants	Key outcome measures	Key findings	Scale reported in study
							4 months of programming between 2015 and 2016 revealed ◦ 4.4% negative change in number of Pap smears ◦ 57% negative change in VIAs	
Makins et al. (2018) FIGO postpartum intrauterine device initiative: Complication rates across 6 countries	Long acting risible contraceptives	Sri Lanka, India, Nepal, Bangladesh, Tanzania, and Kenya	Quantitative Outcome evaluation (post hoc analysis) Pre-experimental: Post only single group design	May 2014 to September 2017	Primary = 12-18 Secondary = 4,904	Complication rates following postpartum intrauterine device (PPIUD) insertion	• 36 766 PPIUDs were inserted • Expulsion rate = 2.6% • Removal rate = 3.6%,	6 countries
Malama et al. (2020) A couple-focused, integrated unplanned pregnancy and HIV prevention program in urban and rural Zambia	Unplanned pregnancy & HIV	Zambia	Quantitative Outcome evaluation Pre-experimental: post-only single group design	2013-2016	Primary = 391 Secondary = 810	Number of staff trained, clients served, HIV infections averted, unplanned pregnancies averted	• 1201 counsellors trained • 120,535 urban and 87,676 rural couples received intervention • 12,869 urban and 8279 rural adult HIV infections were estimated to be averted • 98,626 unintended urban pregnancies were estimated to be averted	55 urban clinics 215 rural clinics across 33 districts
Nyamathi et al. (2010) Delivery of a model HIV prevention and health promotion train-the-trainer program in India by homeopathy and Ayurveda practitioners and educators	HIV	India	Quantitative Impact evaluation Pre-experimental: pre-post 2 group design	2006 (12 months)	Primary = 202 Secondary = 782	Change in knowledge of and attitudes regarding HIV/AIDS, number of secondary trainees trained by the primary trainees	• Significantly increases in HIV/AIDS knowledge and attitude for both 1-day and 3-day primary training groups • Ongoing improvements in both groups reported at 3- and 6-month post training • 26% of participants who participated in the one-day program trained secondary trainees • 36% of participants in	Metropolitan region (Delhi)

Study	SRH topic	Location	Study type	Study period	Number of participants	Key outcome measures	Key findings	Scale reported in study
							the 3-day program trained secondary trainees	
Pitipan et al. (2017) Fidelity Moderates the Association Between Negative Condom Attitudes and Outcome Behaviour in an Evidence-Based Sexual Risk Reduction Intervention for Female Sex Workers	HIV	Mexico	Quantitative (post hoc analysis) Outcome evaluation Randomised Control trial design	2004-2006	Primary = not reported Secondary = not reported	Attitudes toward condoms, fidelity of the implementation of the intervention	• Only 15.1% (n=73) sessions were found to have demonstrate complete fidelity • Negative condom attitudes predicted greater condomless sex at lower levels of fidelity, • The effect of condom attitudes on condomless sex was weaker at higher levels of fidelity	13 clinics across 8 states
Renju et al. (2010) A process evaluation of the scale up of a youth-friendly health services initiative in northern Tanzania	Adolescent SRH	Tanzania	Mixed methods Process & impact evaluation Pre-experimental: Pre-post single group design	June 2004 - December 2008	Primary = 24 Secondary = 429	Knowledge on STI/HIV/AIDS transmission and prevention, knowledge on pubertal changes, attitudes towards condoms, confidentiality and young people's rights to treatment, coverage, attendance, selection, motivation, experiences, attitudes, perceptions, characteristics, ownership, training content and delivery, levels of support, logistics and other external factors.	• Improvements in trainers' confidence and ability to lead were reported • Significant improvements in HIV/AIDS and puberty knowledge following district-led training • Significant improvements in attitudes towards condoms, confidentiality and young people's rights to treatment following district-led training • Compared to control health units, intervention health units scored higher in simulated patient scenarios for family planning and condom request, but lower in the STI scenario	Regional scale up

Study	SRH topic	Location	Study type	Study period	Number of participants	Key outcome measures	Key findings	Scale reported in study
							• Selection and retention of trained health workers was key challenge for the scaling up • Numerous contextual and structural constraints were challenges to the scaling up	
Sodhi et al. (2014) Supporting middle-cadre health care workers in Malawi: Lessons learned during implementation of the PALM PLUS package	HIV & STIs (& non SRH topics tuberculosis, malaria, asthma, chronic obstructive pulmonary disease)	Malawi	Mixed methods Process evaluation component of an RCT	January 2010 to December 2011	Primary = 37 Secondary = 519	Trainee satisfaction and retention, patient clinical outcomes, programmatic lessons learned	Key enablers included: • Building peer support networks • ensuring adequate training capacity • building linkages to continuing professional development accreditation • providing modest training budgets Key barriers included: • Staff turnover • Financial training allowances	District scale up
Stormo et al. (2013) Findings and lessons learned from a multi-partner collaboration to increase cervical cancer prevention efforts in Bolivia	Cervical cancer	Bolivia	Quantitative Formative & impact evaluation Pre-experimental: pre-post single group design	September 2010 to December 2012	VIA & cryotherapy Primary = 12 Secondary = 61 (approx. half of secondary trainees were trained by primary trainees)	Knowledge gained, level of skill demonstrated in simulation exercises and oral presentations and ability to plan, implement a basic course on VIA and cryotherapy, and perceptions of course	• Most VIA and cryotherapy course participants received a satisfactory post-test score	Regional
Tilahun et al. (2017) Improving contraceptive access, use, and method mix by task sharing	LARC	Ethiopia	Quantitative Process and outcome evaluation Pre-experimental: post	Learning phase: Jul –Sept 2009	Learning phase: Primary = 72	Number of TOT and rollout trainings, number of providers trained, and number of clients served	• 2,328 clinicians trained through 98 TTT sessions	National scale up

Study	SRH topic	Location	Study type	Study period	Number of participants	Key outcome measures	Key findings	Scale reported in study
Implanon insertion to frontline health workers: the experience of the Integrated Family Health Program in Ethiopia			only single group design	Dec 2009 – Sept 2015	Secondary = 218 Scale up phase: Primary = 2,327 Secondary =8,436		• 8,436 health extension workers trained • 1,382,318 women received contraceptive services, including 1,273,990 contraceptive implants	
Williams et al. (2014) Effectiveness of Train-the-Trainer HIV Education: A Model from Vietnam	HIV	Vietnam	Quantitative Impact & outcome evaluation Pre-experimental: pre-post single group design	2006-2012	Primary = 87 Secondary =67,338	HIV knowledge, self-report of attitudes toward PLWH, self-confidence regarding ability to care for PLWH and self-confidence regarding teaching skills	• 87 nurses participated in training to become HIV trainers • HIV knowledge and teaching self-confidence increased significantly • The 87 nurses reported training over 67,000 health care workers • Health care workers demonstrated increased HIV knowledge and increased willingness to provide nursing care for HIV-infected patients	National

* master trainers
** participants who receive training from master trainer
HIV – human immune deficiency virus, LARC – long acting reversible contraceptive, PLWH – people living with HIV, RCT – randomised controlled trial, SRH – sexual and reproductive health, STI – sexually transmitted infections, TOT – Training of Trainers, TTT – Train The Trainer, VIA – visual inspection with acetic acid.

Many of the studies were conducted in Africa (n=9; three in Zambia, two in Tanzania, one each in Ethiopia, Malawi, Rwanda, and South Africa), four studies were conducted in Asia (India, Jordan, the Thailand-Burma border, and Vietnam), two studies were conducted in Latin America (Mexico and Bolivia) and one study was conducted in multiple countries (Sri Lanka, India, Nepal, Bangladesh, Tanzania, and Kenya). All of the studies involved international collaboration or partnerships between HI countries and LMI countries.

Most of the studies focused on a broader intervention that incorporated a TTT component (n=11), and five studies focused on the TTT model as the intervention itself. Regional or national scaling up of interventions was reported in six studies, and a number of studies reported scale up as the next steps. The level of detail about the application of TTT models varied greatly across the studies.

Almost all studies were program evaluations (n=14) rather than experimental in design, adopting pre-experimental single group study designs with pre-post or post only measures and elements of process evaluation. Three studies compared different TTT delivery modes in uncontrolled settings. Eight studies adopted quantitative methods and six of the studies used mixed methods. Two experimental studies were included in the review: a post hoc analysis of data from a randomised control trial (RCT) and a study reporting the process evaluation component of a RCT. The majority of studies reported on the process of implementation and/or short-term impacts of the TTT on participants such as changes in confidence, awareness, knowledge, attitudes and readiness to deliver training. A number of studies (n=3) examined longer term SRH health outcomes (for example pregnancy outcomes, complication rates following post-partum intrauterine device insertion (PPUID) following implementation of the intervention.

Thematic findings identified from the included studies are summarised and presented here according to three categories:

1. TTT methodology and design
2. Factors that support or inhibit implementation
3. Sustainability and scaling up

1. TTT METHODOLOGY AND DESIGN

TRAINING METHODS AND CONTENT

Training methods were described in most of the studies, with many reporting a mix of didactic and interactive learning methods.[14–24] Numerous studies reported the inclusion of practical training in simulated or clinic settings.[15,16,18–23,25,26] Tilahun et al[15] highlighted the importance of practical sessions during contraceptive implant TTT workshops in Ethiopia; this element was increased from two to three days in the scale up phase as it was considered to be vital to success. Stormo et al[16] also reported competency-based teaching methods that included simulation exercises and practice in clinical settings for a cervical screening and pre-cervical cancer treatment TTT program on visual inspection with acetic acid (VIA) and cryotherapy in Bolivia.

In addition to SRH-focussed workshop content, many studies reported the inclusion of content on pedagogical theory and strategies that would support trainees to successfully deliver their own training sessions.[14,16,20,25] For example, pedagogical strategies (including adult education theory, course planning, learning objective-setting, learner needs assessment, development and delivery of lectures, and management of challenging training situations) contributed to a substantial proportion of a nursing HIV education TTT program in Vietnam and were reported to have enhanced knowledge transfer, educational outreach, and sustainability of nurses competence.[14] Several also described the distribution of material to support trainees to deliver workshops.[20,22] Makins et al[20] reported distribution of a minimum training standards document, workshop slides, training videos, session outlines for practical tasks, and counselling role plays, as well as post-partum uterus models and clinical equipment to practice insertion of PPIUD. Kohi et al[22] reported the distribution of a CD-ROM that included all of the tools needed to deliver a HIV/AIDS nursing preservice workshop.

TRAINING LENGTH

A few studies compared shorter sessions to longer sessions and all favoured the longer training sessions.[19,25,26] Nyathami et al[25] compared a HIV/AIDS TTT program delivered to homeopathy and Ayurveda practitioners and educators in India over one day versus three days. The one day program adopted a case-study approach and covered HIV epidemiology, transmission, and clinical presentation. The three day training included additional sessions relating to the HIV related social, ethical and legal issues, and role plays. Although improvements in knowledge were recorded for both groups, improvements were higher in participants of the three-day training.[25] Darras and van der Heide[26] compared the delivery of legal and psychosocial awareness training in response to high levels of gender-based violence in a community in Jordan via 2x2.5-hour sessions and 2x1 hour sessions, and reported slightly better outcomes following the longer sessions. Renju et al[19] compared the delivery of a TTT intervention for the scale up of youth friendly SRH services in Tanzania using two different manuals (one with a duration of six days and one with a duration of 12 days), and found greater improvement on health worker knowledge and attitudes in participants of the 12-day training.

2. FACTORS THAT SUPPORT OR INHIBIT IMPLEMENTATION

LOCAL STAKEHOLDER ENGAGEMENT

A number of studies highlight the importance of building ownership and engaging health officials in development and implementation of interventions.[14,15,18,22,24,25] Nyamathi et al[25] described the importance of extensive relationship building over several years with Indian Systems of Medicine and Homeopathy (ISM&H) collaborators, to inform development of a TTT program on HIV prevention for physicians of homeopathy and Ayurveda.[25] Williams et al[14] suggest that it is essential to involve individuals who can influence local and national policy from the beginning to

enable the policy change required to support implementation of large scale programs, based on their experience establishing a national network of nurse trainers that adopted a TTT model to build nursing HIV competence in Vietnam. Jones et al[24] attributed the success of a HIV risk reduction intervention in Zambian Community Health Centres, that adopted a TTT model, in part, on the pre-planning and support from health officials at District, Regional and Provincial levels, who were driven to reduce HIV seroprevalance in their communities and supported the integration of the intervention into health service delivery. The authors suggest that this ownership is also essential for sustainability of programs.[24] A number of authors highlighted the importance of early, local stakeholder engagement in development of culturally appropriate TTT programs.[22,23] For example, community stakeholders were described as critical in providing feedback on the development of culturally appropriate case studies and practices for a Tanzanian national nursing curriculum, to be disseminated to nursing students through a TTT model.[22] This importance was also highlighted via a number of studies that detailed failures of cultural tailoring.[19,23] For example, in the scaling up of training and implementation of a youth friendly SRH service in Tanzania, facilitators had to translate the content from the English training manuals into Swahili in real time during training sessions, which led to confusion and variation in key messages.[19]

RESOURCE CONSTRAINTS

Resource constraints inherent to LMI country settings were described as a challenge to establishing TTT programs in most studies.[15,19,21,22,24,27] A number of studies reported that lack of access to commodities and supplies required to deliver services following training limited the impact of training, and therefore highlighted the importance of ensuring that required commodities and supplies are included in planning and budgeting for TTT models.[15,19,21,22,27] A number of studies that involved clinical training reported challenges relating to the training facilities available to deliver TTT programs.[16,21] Labrecque et al[21] reported delays to a vasectomy TTT program due to organizational issues such as training location changes, limited availability of sterile equipment and delays in the arrival of patients from remote villages. Training centres were highlighted as potential solutions to these organizational barriers by a number of studies.[21,24] Labreque et al[21] suggests that training centres would offer trainers support from laboratory technicians and staff to sterilise equipment and access to adequate numbers of patients to practice vasectomy techniques. Training centres were used to deliver clinical elements of TTT programs successfully in a number of studies.[16]

3. SUSTAINABILITY AND SCALING UP

SUSTAINABILITY

Sustainability was identified in the literature as critical, and often a key challenge, to the success of TTT programs. Ongoing funding and stakeholder engagement (as discussed above) were reported as key enablers for sustainability. In addition to this, a number of other elements that supported the sustainability of interventions incorporating TTT were reported in the literature. The inclusion of formal or informal peer support or networking to foster ongoing learning following TTT programs were common in the literature.[14,18,22,28,29] In a RCT that utilised TTT to support middle-cadre health care workers in Malawi to deliver a lung health plus HIV/AIDS intervention, Sodhi et al[18] reported that the ability to contact more experienced peers for advice when unsure how to manage a patient through formal and informal networks supported sustained trainer engagement. Continuous education was described as essential for sustainability of a HIV education TTT program for nurses, as the field of HIV nursing rapidly evolves and staying up to date with the most recent international developments is crucial for providing care.[22] Other considerations in the literature for building sustainability included community engagement and promotion activities to create ongoing demand for services taught in TTT program[16,21,27] and the identification of 'champion' trainers, who could contribute to the sustainability TTT programs by providing continuity during changes in leadership and priorities at the Ministry of Health.[16]

SCALING UP

A number of studies reported key considerations for scaling up of TTT programs.[15,18,19,21,22,24] Jones et al[24] and Stormo et al[16] highlight the importance of a measured approach to scale up, cautioning that rushed scale up can lead to the over extension of personnel and resources. In an evaluation of the scale up of a youth friendly SRH service in Tanzania, Renju et al[19] propose that the process of scaling up the intervention may reduce the intervention quality and suggest that training more staff per participating facility may counter the reduction in quality and negative impact of contextual factors such as staff turnover. A number of studies suggest gradual scale up focussing on specific geographical areas or a limited number of intervention sites at a time; and including ongoing consideration of program objectives are still meaningful to the new context.[16,20,24] Jones et al[24] describe their plan to expand their HIV prevention intervention from six clinics to over 300 clinics in Zambia one province at a time over a five year period, following the successful implementation in four out of ten Zambian provinces.[24] Renju et al[19] suggests that adaptations need to be made to programmes as they are scaled up, for example expanding the eligibility criteria for training to include lower-cadre health professionals, who may be less likely to leave posts, and will build culture that supports youth friendly services.

DISCUSSION

This scoping review confirmed a paucity of recently published literature available on SRH TTT programs in LMI countries' settings. Despite this, insights from the literature provide practical considerations for practitioners considering implementing TTT programs as a means for building the capacity and up-skilling the SRH workforce in LMI coun-

tries.

The use of pedagogical strategies and techniques in SRH TTT programs highlighted in this scoping review reflects trends in higher education and clinical teaching. The Organisation for Economic Co-operation and Development (OECD) proposes that content design, learning context variety (including a mix of didactic and interactive methods), open feedback channels, assessment of learning outcomes, effective learning environments and learner support as key pedagogical elements correlated with quality teaching in high education settings.[30] In line with OECD recommendations, a study assessing the effect of pedagogy in training at a teaching hospital in Ethiopia, found that the absence of pedagogical methods led to unplanned, unwieldly and unstandardized course content, poor teacher time management and limited opportunities for students to participate in their own learning.[31] The authors propose that training in pedagogical techniques would result in a higher quality learning that produced competent graduates for the health workforce.[31] A pedagogical technique that was highlighted in this review was the preference for adopting a mix of didactic and interactive training methods. These findings align with findings of a 2012 systematic review that found that using a combination of teaching methods supports effective training in a sample of TTT studies on health and social care workers from a diverse range of LMI and HI countries.[11] The importance of including interactive training is unsurprising given many of the SRH TTT programs involved teaching a clinical skill, which requires practice. Clinical skill mastery requires demonstration and deconstruction by the trainer, followed by demonstration by the learner with plenty of opportunities to repeat the skill under supervision to reinforce learning and correct errors.[32]

The preferences for longer training sessions found in this scoping review aligned with previous literature reports. Pearce et al[11] also noted that the majority of TTT programs analysed were days or longer in their systematic literature review of health and social care worker TTT three programs in both HI and LMI countries. Despite these preferences, Pearce et al[11] reported that shorter training sessions were found to be just as effective. This may be related to the complexity of the training topic. Mormina and Pinder[9] suggest that longer training timeframes are required for topics that require trainee behaviour change, time is needed to enable trainees to learn and digest the new material and feel ready to deliver training to others.

Given that all of the studies included in the review involved collaboration or partnerships between HI countries and LMI countries, it is unsurprising that the importance of local stakeholder engagement came through strongly in the studies. This reflects a key principle of global health partnerships; that the LMI countries should lead and have ownership of programs aimed at improving health outcomes of their populations, with the HI country partners in a support role.[33] As highlighted in Nyamathi et al's[25] TTT program for physicians of homeopathy and Ayurveda in India, early relationship building is not only important to ensure TTT content is culturally appropriate, but it is important in defining the local issues that are to be addressed through the training. Establishing understanding of the local context and developing a program that addresses local needs,

is culturally appropriate, and aligns with local organisation priorities, will ensure greater buy-in and longevity of global health programs.[9]

The results of this review relating to resource constraints highlight that TTT programs cannot be assumed to be an inherently cost-effective and sustainable option for capacity building and up-skilling the health workforce in LMI countries, and lack of resources (both financial and material) can impede the cascading of training.[9] In their conceptual framework for TTT programs in global health settings, Mormina and Pinder[9] report the importance of establishing transparent financial arrangements between HI and LMI country partners and ensuring all ongoing costs, however small (i.e. catering, teaching materials, travel costs, etc.), are accounted for.[9] The authors suggest that integrating TTT within local strategic plans and focusing on embedding training at individual, organisation and supra-organisation levels can support sustainable resourcing of TTT programs,[9] re-iterating the importance of strong engagement with local stakeholders in the development of successful TTT programs.

The sustainability themes identified in this review reflect those found in the broader literature - strong local stakeholder engagement, local ownership, and negotiation of financial responsibilities (as discussed above) are all identified as vital to sustainability.[9] The importance of ongoing professional development and peer networks are also discussed in the broader literature. Mormina and Pinder[9] report that sustainable upskilling requires the integration of long-term continuous professional development, including one-to-one peer support, access to relevant literature, further training and networking opportunities within and beyond the global health partnership.

This review highlighted the importance of a considered and gradual scaling up of programs to increase the impact of training, and to reach a wider audience. Drawing on experiences of scaling up complex health interventions in Africa, Barker et al[34] developed a framework for scaling up health intervention, propose four steps for successful scale ups: (1) set up, which involves clearly defining the intervention and identifying pilot sites, early adopters, and champions; (2) develop the scalable unit, which involves early testing in small units of the system you wish to upscale to (i.e. a single health centre, clinical ward or a district); (3) test of scale up, where the intervention is tested in a number of settings in difference contexts; and (4) go full scale, where a larger number of sites replicate the intervention.[34]

A number of gaps were evident in the literature that warrant further attention: the need for outcome evaluation to determine effectiveness; the need for research that investigates TTT model's application across a broader range of SRH topics; and the need for research that investigates SRH TTT model's application across a more representative range of LMI countries. **Table 3** provides a summary of key research priorities relating to these findings.

Almost all studies were program evaluations, adopting pre-experimental single group study designs with pre-post or post only measures and elements of process evaluation. These evaluation designs focused on recording the process of intervention implementation and collecting immediate impacts of the TTT intervention on participants. Immediate

Table 3. Research priorities

Findings	Research priority
Almost all studies were program evaluations rather than experimental in design	Research that adopts stronger outcome evaluation methodology to determine effectiveness of TTT programs
Limited geographical spread of SRH TTT programs represented, with the majority of studies reported being conducted in African countries	Research that investigates SRH TTT model's application across a more representative range of LMI countries; including the Pacific
Lack of diversity of SRH issues covered in the literature with the majority of studies focused on TTT programs addressing HIV	Research that investigates TTT model's application across a broader range of SRH topics; including STIs, gender equality, gender-based violence, unintended pregnancies, and unsafe abortion

HIV – human immune deficiency virus, SRH – sexual and reproductive health, STI – sexually transmitted infections, TTT – Train The Trainer.

impacts or 'health promotion outcomes' represent modifiable individual factors (i.e. changes to awareness, knowledge, confidence) that are expected to contribute longer term change.[35] In the absence of longer term outcome measures it's not possible to know if positive immediate impacts of TTT programs actually led to effective cascading of training and ultimately had an impact on the SRH health issue they were designed to address. The lack of evidence regarding effectiveness gained through controlled research designs clearly represents a gap in the literature, although highly controlled experimental studies will very rarely be feasible in these practice settings. Although the scientific evidence for SRH TTT program effectiveness is lacking, the evaluations of the process of implementation and immediate impacts as discussed above, provide a rich source of information for SRH health practitioners and planners who seek practical guidance for implementing TTT programs in real world conditions.[35]

Limited geographical spread of SRH TTT programs represented another gap in the literature, with the majority of studies reported being conducted in African countries. The World Bank classifies 138 countries as LMI countries,[36] and this review included studies set in only 17 LMI countries. Some LMI regions were not represented at all; this review did not identify any published SRH TTT studies conducted in the Pacific region, which has some of the poorest reproductive and sexual health outcomes globally, including disproportionally high rates of maternal and infant mortality; unintended and teenage pregnancies; sexual violence, and cervical cancer deaths.[37,38] Another gap identified in this scoping review was the lack of diversity of SRH issues covered in the literature. The majority of studies focused on TTT programs addressing HIV. Although this is not surprising given the strong focus on HIV/AIDS in international aid and donor funding,[39] other key SRH issues in LMI countries were less represented in the literature, including STIs, gender equality, gender-based violence, unintended pregnancies, and unsafe abortion.[1] Only one study included in the review focused on youth SRH, even though young people are particularly vulnerable and often face barriers to accessing SRH information and care.[1] These gaps relating to location and SRH topic are unlikely to reflect a complete absence of SRH TTT programs in these regions and on these topics, but may reflect the absence of a means for sharing learnings across projects, organisations, and countries through peer reviewed publications.[33] When publication is

not appropriate or feasible, practitioners should consider sharing their learnings of SHR TTT programs in LMI countries through networks or communities of practice, and making reports available online regardless of the success of a program.

LIMITATIONS

Almost all studies included in this review were program evaluations rather than experimental studies, thus the quality of studies may be diverse. Scoping reviews, however, are designed to provide a narrative description of research and as such this review does not provide an assessment of the quality of evidence or provide a synthesis of evidence to determine effectiveness of SRH TTT models in LMI country settings. The review applied Arksey and O'Malley's[12] methodological framework for scoping reviews, however it is possible that relevant studies were not captured due to limitations in search strategy. Although several reviewers provided input to the study selection (a strength of the current study), the collation, summarizing, and reporting of results was undertaken by a single author and therefore may be subject to bias. This review only considered papers that were published from 2010-2020. Given the paucity of literature, inclusion of papers from 2000 may have increased the sample size for analysis. Furthermore, relevant learnings may have been missed from TTT programs in LMI countries that focused on health topics beyond SRH. Finally given the resource and logistical constraints in which SRH TTT programs are often implemented in LMI countries, it is likely that many TTT program evaluations are not published. An examination of grey literature may therefore be useful to supplement the findings of this scoping review.

CONCLUSIONS

This scoping review identified a paucity of recent peer-reviewed literature available on SRH TTT programs in LMI country settings. Despite this, a number of practical considerations for practitioners wishing to implement SRH TTT programs in LMI countries relating to TTT methodology and design; factors that support or inhibit implementation; and sustainability and scaling up were identified. Future research should focus on adopting stronger outcome evaluation methodology to determine effectiveness of TTT pro-

grams; and investigate the application of TTT models across a range of SRH topics in a diverse range of LMI countries. Practitioners wishing to implement SRH TTT programs in LMI countries should also consider learnings from grey literature.

COMPETING INTERESTS

The authors completed the Unified Competing Interest form at www.icmje.org/coi_disclosure.pdf, and declare no conflicts of interest.

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