Review

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Effective strategies to improve health worker performance in delivering adolescent-friendly sexual and reproductive health services

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Abstract

Background: Despite recognition of the important role of health workers in providing adolescent-friendly sexual and reproductive health services (AFSRHS), evidence on strategies for improving performance is limited. This review sought to address: (1) which interventions are used to improve health worker performance in delivering AFSRHS? and (2) how effective are these interventions in improving AFSRHS health worker performance and client outcomes?

Methods: Building on a 2015 review, a search for literature on 18 previously identified programs was conducted to identify updated literature and data relevant to this review. Data was systematically extracted and analyzed.

Results: Due to the parent review's eligibility criteria, all programs included health worker training. Otherwise, supervision was the most frequently reported intervention used ($n=10$). Components and methods related to quality of trainings and supervision varied considerably in program reports. Nearly half of programs described employing processes to ensure availability of basic medicines and supplies ($n=7$). Other interventions (policies, standards, and job descriptions [$n=5$]; refresher trainings [$n=5$]; job aids or other reference material [$n=3$]) were less commonly reported to

have been employed. No discernible patterns emerged in the relationship between interventions and outcomes of interest.

Conclusions: Multi-faceted complementary strategies are recommended to improve health worker performance to deliver AFSRHS; however, this was uncommonly reported in the programs that we reviewed. Effectiveness and cost-effectiveness evaluations of interventions and intervention packages are needed to guide efficient use of limited resources to enhance health worker capacity to deliver AFSRHS. In the interim, programs should be developed and implemented based on available existing evidence on improving health worker performance within and outside adolescent health.

Implications and contribution: This review is the first to examine the interventions commonly used to improve health worker performance in delivering AFSRHS. The findings indicate a need for additional effectiveness and cost-effectiveness evaluations of such interventions. In the meantime, existing evidence on improving health worker performance within and outside adolescent health must be integrated more thoughtfully into program planning and implementation.

Keywords: adolescent-friendly health services; adolescent sexual and reproductive health; health worker performance.

Introduction

Adolescent-friendly health services (AFHS) are defined as those that are accessible, acceptable, equitable, appropriate, and effective [1]. Adolescent-friendly health workers are a crucial component of AFHS, and require specific competencies (defined as the knowledge and skills to carry out their required roles and responsibilities, as well as judgment on when to do so) and attitudes to provide evidence-based, non-judgmental and non-discriminatory care, especially with regards to sexual and reproductive health (SRH). Specifically, they must be able to consider the evolving cognitive, emotional, and social capacities of adolescents, and

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understand and evaluate each adolescent as an individual at a specific point of development within a unique social context. Furthermore, health workers should have a clear understanding of their roles and responsibilities, be supported to carry them out, and be held accountable for doing so.

Despite numerous systematic reviews of strategies to improve health worker performance in LMICs [2–20], extensive evidence shows that health worker performance in low- and middle-income countries (LMICs) is often inadequate [21–29]. Additionally, despite wide recognition of the important role of health workers in providing AFHS, there is little evidence synthesized on optimal interventions (or packages of interventions) for improving health worker performance in delivering adolescent-friendly SRH services (AFSRHS). Existing reviews typically focus on one intervention, limiting opportunities to compare effectiveness across types of interventions [2]. Meanwhile, decision-makers commonly ask broad questions and want to know, in general terms, which particular interventions (or packages of interventions) will be most cost-effective and have the greatest impact on improving health care worker performance for AFHS, especially AFSRHS.

Therefore, this review aims to examine interventions (or packages of interventions) used to improve health worker performance in delivering AFSRHS. To achieve this aim, this review sought to answer the following research questions: (1) which interventions (or packages of interventions) are used to improve health worker performance in delivering AFSRHS? and (2) how effective are these interventions (or packages of interventions) in improving health worker performance for AFSRHS delivery, client satisfaction, and health outcomes?

Methods

In 2015, our group conducted a review of effective interventions to improve AFSRHS, which identified four important components in improving uptake of SRH services or commodities and related clinical outcomes among adolescents: (1) generating demand among adolescents, (2) sensitizing communities to improve acceptability of SRH services for adolescents, (3) modifying facilities to make them more adolescent-friendly (e.g., expanded out-of-school hours, structural elements to maintain privacy and/or confidentiality), and (4) providing health workers with training to improve their competencies, attitudes, and practices in providing AFSRHS [30]. In this current review, we focused on the last component and closely re-examined the

18 programs in the original review to assess the types and characteristics of trainings that were provided, as well as other interventions used to improve health worker performance, and their effects on outcomes of interest.

Workforce performance is influenced by many factors interacting in a complex fashion at multiple levels – from national policies and regulatory frameworks across sectors (e.g., finance, health, education) to individual health worker characteristics and circumstances [31]. In this review we focus on workplace level interventions that might influence health worker performance.

Dieleman and Harnmeijer noted that there are an “abundance of theories” explaining health worker behaviors and practices, but evidence of the extent to which these theories actually predict behaviors and practices is limited and studies on health worker performance in LMICs are not often based on an individual theory or specific combination [31]. Therefore, we did not limit this review to programs utilizing a specific theory of change and included programs regardless of whether any theoretical approach was used. Our conceptual framework was that interventions that increase health worker competencies (e.g., knowledge and understanding of how to provide evidence-based care, skills in providing such care) and/or attitudes (e.g., non-judgmental attitudes towards adolescent sexuality) could lead to changes in performance¹ (e.g., adherence to evidence-based care guidelines, empathetic communication with clients), which could in turn result in improved client satisfaction, increased health services utilization, and/or improved health outcomes – the latter mediated through increased service utilization and/or improved quality of delivered care.

Search strategy

Information was drawn from existing literature identified in the parent study [30]. In addition to the publications on the programs examined in our 2015 review, PubMed, Google and Google Scholar were searched for more recent literature on these programs, which may have been subsequently published [30]. Specifically, the strategy included search terms for names of programs, authors, and locations.

¹ The World Health Organization defines health worker performance as a workforce that is available, competent, productive and responsive [65]. In this review, we included the latter components, but did not assess availability (e.g., retention, lack of absenteeism). Competency includes provision of care and advice that is adherent to guidelines. Productivity includes number of visits, services, or commodities provided. Responsiveness includes client perceptions of quality of care.

The inclusion and exclusion criteria, as was used in our 2015 review, followed a World Health Organization framework typology for systematic reviews [32].

Data extraction

The health worker performance interventions used by the programs were assessed and classified as: health worker trainings; refresher trainings; job aids/desk references/other written or electronic reference materials; processes to ensure that basic medicines/supplies/equipment are in place; policies/standards/job descriptions; and supervision, including trainings for supervisors. These categories were generated based on groups in existing literature, and were refined based on the descriptions of the interventions used by the programs.

Outcome measures

The outcome measures extracted in this review included several that were included in the original review (and updated for this review), including patient satisfaction, health service and commodity utilization, and biologic outcomes. We also included several new outcome indicators more proximally related to the interventions under study in this paper, including health worker competencies, attitudes, and practices.

Findings

Our original review included 18 programs; one program that was included in the parent review was excluded from this review due to lack of accessibility of the original article [33]. The search for updated information on the programs identified a scale-up follow-on of one of the original studies [34] that differed in approach from the initial project [35]; hence we assessed this as an independent program. Table 1 contains descriptions of the 18 programs included in this review and abstracted evidence on the interventions and outcomes of interest.

Description of study designs

Study designs included: case-control pre- and post-intervention assessments (n=10), case-control post-intervention assessments (n=4), pre- and post-intervention assessments (n=2), post-intervention assessments (n=1), and longitudinal assessments of health service utilization data

(n=6). With regards to methods for assessing health worker performance, adolescent mystery client visits were the most common method reported, followed by in-depth interviews and focus group discussions.

Overview

Due to the content area of the 2015 parent review's eligibility criteria, all of the programs included health worker trainings on AFSRHS [30]. Among the other health worker performance interventions, the most frequently reported was supervision (n=10), followed by processes to ensure that basic medicines/supplies/equipment are in place (n=7), policies/standards/job descriptions (n=5), refresher trainings (n=5), training for supervisors (n=5), and job aid/desk reference/other written or electronic reference material (n=3). The majority (n=14) of the studies reported implementing two or fewer health worker performance interventions beyond trainings, including four that did not report any interventions beyond trainings.

Trainings

Most descriptions of the trainings were limited and did not include specific information of interest to this review. Training content was primarily described as ASRH curriculum (n=12), communication techniques (n=4), and counseling techniques (n=4), while the remainder were not specified (n=3). Only four programs described their trainings as interactive and/or participatory.

Training of trainers (TOT) strategies were reported in seven programs. Of these, one described using a training consultant and another reported using a training group (consisting of Ministry of Health (MOH) staff, program technical officers, and training consultants) to train trainers, while five programs did not specify the training personnel type. The remaining programs delivered trainings directly to health workers by MOH staff (n=1), program staff (n=2), or unspecified personnel (n=8). Training manuals were mentioned in six of the 18 programs, while training manuals for TOTs were mentioned in five of the seven programs using this approach.

Training location was noted for 10 programs; only one described conducting the trainings at service providers' work sites, while the remainder were noted as off-site. Training durations were usually not indicated (n=10), but when specified ranged from 3 to 5 days (n=2) or 6 to 10 days (n=4). Only one program specified training group size, with an average of 27 trainees per session, and no program

Table 1: Characteristics and evidence from included studies.

Reference Primary project/program aim and components Target population Location	Overview of health worker performance interventions Study design Sample size	Intervention specifics in the following domains: A: Refresher trainings B: Job aid/reference ma- terials C. Processes to ensure that basic medicines/ supplies/equipment/ser- vices are in place D: Policies/standards/job descriptions E: Supervision	Outcomes related to: A: Health worker compe- tencies B. Health worker attitudes C: Health worker practices D: Patient satisfaction E: Health service and commodity utilization F: Biologic outcomes	Comments Conclusions
African youth alliance (AYA) study [36–37] Improve ASRH and reduce spread of HIV/AIDS and other STIs through multi-pronged package, which included service provider training, facility improvements, youth input, peer edu- cators, and community sensitization. 10–24 year-olds Implementation sites throughout Botswana included four IPPF affil- iated clinics and 16 government clinics.	55 trainers underwent a 10 day training conduct- ed by a team consisting of MOH staff, the pro- gram technical officer for AFHS, and a training consultant hired by AYA, using Pathfinder’s “Adolescent Sexual and Reproductive Health: A Training of Trainers Manual”. Trainers were selected by district ma- trons based on previous experience in working with adolescents and with providing SRHS. 119 service providers un- derwent a 10 day training using “Botswana ASRH Training Manual for Ser- vice Providers”, a manual developed through a participatory process that involved a range of stakeholders. The training was conducted by the same team that trained the trainers. 12 trained 19–23 year olds conducted 22 mystery client visits to 17 pro- gram facilities. Longitudinal assessment of facility health service utilization data.	A: Not reported B: Not reported C: Not reported D: The Botswana ASRH training manual for ser- vice providers was developed to include international cove- nants, national policies, standards of practice, and institutional pro- cedures. E: Quarterly monitoring visits conducted by MOH and AYA staff. Monitoring team dis- cussed with health workers implementa- tion of the quality improvement plan, challenges and how to address them. Training courses held for 33 clinic supervisors. It was noted that this resulted from post- provider training sur- veys demonstrating that providers felt that su- pervisors were the main barriers to implement- ing AFHS strategies and that it was necessary to sensitize supervisors to the need for AFHS and what it included. Su- pervisors were trained using Pathfinder’s “Supportive Supervi- sion for YFS Training Manual.” The training included information on AFHS, QI processes, and supervisory skills (including how to use a YFS supervision checklist).	A: Not reported B: Not reported C & D: Modest positive re- sponses from mystery clients with 75% indi- cating they recommend the facility to peers. Reasons for not recom- mending were varied but were more related to health systems and fa- cilities, such as lack of privacy, confidentiality, and affordability. E. There was a steady in- crease in clinic atten- dance; significance testing was not pro- vided. F. Not reported	Surveys of adolescents were conducted for other AYA country programs, but not in Botswana due to resource constraints and the long lag period between the end of country program opera- tions and the initiation of the survey-based evaluation.

Table 1: (continued)

Reference Primary project/program aim and components Target population Location	Overview of health worker performance interventions Study design Sample size	Intervention specifics in the following domains: A: Refresher trainings B: Job aid/reference ma- terials C. Processes to ensure that basic medicines/ supplies/equipment/ser- vices are in place D: Policies/standards/job descriptions E: Supervision	Outcomes related to: A: Health worker compe- tencies B. Health worker attitudes C: Health worker practices D: Patient satisfaction E: Health service and commodity utilization F: Biologic outcomes	Comments Conclusions
<p>AYA study [37–40]</p> <p>Improve ASRH and reduce spread of HIV/AIDS and other STIs through multi-pronged package, which included service provider training, facility improvements, youth input, peer educators, and community sensitization.</p> <p>10–24 year-olds</p> <p>Implementation in 20 of Ghana's 110 districts; facilities included five IPPF affiliated, 12 Christian health association of Ghana (CHAG), and 51 Ghana Health Service (GHS) public clinics.</p>	<p>186 trainers were trained using either the GHS adolescent health training manual complemented by additional activities from Pathfinder's AFHS curriculum or using Pathfinder's AFHS training manual, which covers ASRH more extensively than the GHS manual, which covered adolescent health more generally. CHAG trainers were trained using Pathfinder's YFS training manual. IPPF staff were trained using IPPF training manuals in the 1st year, while AFHS training manual was used in the 3rd year.</p> <p>Trainers were selected by district matrons based on previous experience and interest in working with adolescents.</p> <p>The CHAG-trained trainers conducted step-down training of CHAG facility-level staff.</p> <p>685 service providers were trained.</p> <p>22 trained 18–24 year-olds conducted 60 mystery client visits to the 14 IPPF and CHAG program facilities.</p> <p>Comparison of post-intervention survey data of 17–22 year-olds in the intervention communities who reported having had exposure to AYA-specific activities, compared to those from control communities.</p>	<p>A: Not reported</p> <p>B: Not reported</p> <p>C: Implementation activities not described; however, during assessments of facilities, they scored highly on provision of a minimum package of services and having sufficient supplies of commodities at baseline and at endline with some improvement in endline scores.</p> <p>D: Not reported</p> <p>E: "Regular supervision by trained supervisors and AYA/Pathfinder staff" to ensure quality of services; also reviewed planned activities and implementation status, discussed new developments, personnel issues, staff time, client attendance, and solicited feedback from clients, if available.</p>	<p>A: Not reported</p> <p>B: Not reported</p> <p>C & D: Qualitative mystery client visit data identified positive facility attributes. Areas found to require improvement included: Service providers with biases against providing services to adolescents and insufficient counseling on STIs, HIV/AIDS, and condom demonstrations.</p> <p>E: Reported use of condoms and contraceptives were assessed among 17–22 year olds. Many baseline reported behaviors regarding SRH commodity use were better among males prior to exposure to intervention. SRH commodity use was significantly higher among intervention exposed compared to control females; no statistically significant difference was found among males. Measure of change from baseline comparing exposed to unexposed was not provided, nor was data from individuals in intervention areas reporting no exposure to the intervention.</p> <p>There was a steady increase in clinic attendance over five quarters, but then a decrease in the final quarter. Significance testing was not provided.</p> <p>F: Not reported</p>	<p>Evaluation data was collected from a subset of program facilities. For example, no mystery client visits of GHS public clinics were conducted.</p> <p>There was some contamination of control communities due to mass media and peer education intervention components.</p>

Table 1: (continued)

Reference Primary project/program aim and components Target population Location	Overview of health worker performance interventions Study design Sample size	Intervention specifics in the following domains: A: Refresher trainings B: Job aid/reference ma- terials C. Processes to ensure that basic medicines/ supplies/equipment/ser- vices are in place D: Policies/standards/job descriptions E: Supervision	Outcomes related to: A: Health worker compe- tencies B. Health worker attitudes C: Health worker practices D: Patient satisfaction E: Health service and commodity utilization F: Biologic outcomes	Comments Conclusions
	<p># Surveyed: “Exposed” (i.e., intervention group): M: 952 F: 1036 “Unexposed” (i.e., control group): M: 628 F: 800 Longitudinal assessment of facility health service utilization data.</p>			
<p>AYA study [37, 39, 41, 42] Improve ASRH and reduce spread of HIV/AIDS and other STIs through multi-pronged package, which included service provider training, facility improvements, youth input, peer educators, and community sensitization. 10–24 year-olds Implementation in 58 facilities across 10 of Tanzania’s 129 districts.</p>	<p>49 trainers were trained using “Pathfinder’s Module 16: Reproductive Health Services for Adolescents”. These trainees were nurses, midwives, and medical officers selected by MOH, Marie Stopes, Tanzania IPPF, and University of Dar es Salaam partners. Participants then trained other service providers on ASRH and AFHS. 522 service providers were trained in ASRH/AFHS. 92 trained adolescents conducted mystery client visits to the 21 program facilities. In addition, 11 in-depth and 1 focus group interviews were conducted with clients from eight facilities and 127 exit interviews were conducted in three clinics among randomly selected interviewees. Comparison of post-intervention survey data of 17–22 year-olds in the intervention communities who reported having had exposure to AYA-specific activities, compared to</p>	<p>A: Not reported B: Not reported, but some service providers who were interviewed recommended that “adequate job aids and tools for AFHS” should be provided. Adolescent mystery clients also noted a lack of job aids. C: AYA/Pathfinder staff visits often dealt with trying to correct stock outs/ shortages. During assessments of facilities, they scored moderately on provision of a minimum package of services and having sufficient supplies of commodities at baseline and at endline with some improvement in endline scores. Providers identified lack of contraceptives, test supplies, educational materials, and demonstration tools as major barriers to providing services. D: Not reported E: “Regular supervision by trained supervisors and AYA/Pathfinder staff” to ensure quality of</p>	<p>A: ToT participants showed gains from pre- to post-test scores in the first round of training – the ranges of scores were 34–95% at pretest and 70–98% at post-test. Average service provider pre- and post-test scores were 46 and 73%, respectively. B: Not reported C & D: Exit interview and mystery client visit results were largely positive; for example, 91% of exit interviewees reported satisfaction with their treatment. E: Reported use of condoms and contraceptives were assessed among 17–22 year olds and were significantly higher among females in intervention areas who reported being exposed to the intervention compared to controls at endline. Many condom and contraceptive use outcomes were also significantly higher among exposed</p>	<p>Evaluation data was collected from a subset of program facilities. There was some contamination of control communities due to mass media and peer education intervention components.</p>

Table 1: (continued)

Reference Primary project/program aim and components Target population Location	Overview of health worker performance interventions Study design Sample size	Intervention specifics in the following domains: A: Refresher trainings B: Job aid/reference ma- terials C. Processes to ensure that basic medicines/ supplies/equipment/ser- vices are in place D: Policies/standards/job descriptions E: Supervision	Outcomes related to: A: Health worker compe- tencies B. Health worker attitudes C: Health worker practices D: Patient satisfaction E: Health service and commodity utilization F: Biologic outcomes	Comments Conclusions
	those from control com- munities. # Surveyed: “Exposed” (i.e., intervention group): M: 492 F: 843 “Unexposed” (i.e., control group): M: 229 F: 336 Longitudinal assessment of facility health service utili- zation data.	services; also reviewed planned activities and implementation status, discussed new de- velopments, personnel issues, staff time, client attendance, and solicited feedback from clients, if available. Timing of visits was in accordance with the trained supervisors’ schedules. Additionally, a minimum of one monitoring visit by AYA/Pathfinder staff was conducted; included collection and analysis of facility service statistics. Training was provided to approx. 75 supervisors using Pathfinder’s “Su- pervision Training Manual”. Supervision guidance tools were also provided to facilitate comprehensive monitoring of AFHS. Su- pervisor training was oriented to provide “in- formation and skills needed to help their providers adopt positive attitudes and practices for providing AFHS, un- derstand and improve ASRH care, and learn monitoring and evalua- tion skills.”	males. Change from baseline not reported, nor was data from in- dividuals in interven- tion areas reporting no exposure to the inter- vention. Increase in clinic atten- dance in first quarter and then a leveling off for subsequent quar- ters. Significance testing was not pro- vided. F: Not reported	
AYA study [37, 39, 43, 44] Improve ASRH and reduce spread of HIV/AIDS and other STIs through multi-pronged package, which included service	20 trainers were trained by a consultant from Path- finder on planning, con- ducting, and evaluating trainings, and addressed aspects of training	A: Not reported B: Not reported C: See C above. Addition- ally, it was noted that, during assessments of five facilities, they	A: Average service pro- vider pre- and post-test scores were 50 and 70%, respectively. B: Not reported outside mention of one service	Evaluation data was collected from a subset of program facilities. There were data limitations due to lack of service statistics, lack of

Table 1: (continued)

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provider training, facil- ity improvements, youth input, peer edu- cators, and community sensitization. 10–24 year-olds Implementation in 96 fa- cilities across 20 of Uganda's 56 districts. (The various citations unreferenced either 76 or 96 program facilities across 13 or 20 dis- tricts.) implementation of activities varied, e.g., in 20 facilities imple- mentation was limited to training.	management. These trainers plus addi- tional AYA-trained trainers from Botswana then participated in a seven day training on ASRH/AFHS. 28 district trainers were also trained. 202 service providers un- derwent training using MOH's "National Training Curriculum for Health Workers on Adolescent Health and Develop- ment". Districts selected a mini- mum of six service pro- viders for training—at least one from each of the program facilities. Selec- tion criteria included having a minimum edu- cation level of four years of secondary school and previous training in reproductive health. Trainings focused on ASRH knowledge, skills, and positive attitudes. Trained 10–24 year-olds conducted 99 mystery client visits to 22 pro- gram facilities. Comparison of post- intervention survey data of 17–22 year-olds in the intervention commu- nities who reported hav- ing had exposure to AYA-specific activities, compared to those from control communities. # Surveyed: "Exposed"	scored moderately on provision of a minimum package of services at baseline and at endline, with modest improve- ment. D: Not reported E: Monthly supervision visits by the district su- pervisory teams looked at services being pro- vided, availability of supplies and procure- ment plans, records prepared by the service providers, and progress on other planned activities.	provider training eval- uation, which noted improved attitudes to- ward serving adoles- cents. C & D: Mystery client visit results were largely positive; for example, 82% reported being satisfied with the ser- vices overall. E: Reported use of con- doms and contracep- tives were assessed among 17–22 year olds and rates were signifi- cantly higher among fe- males in intervention areas who reported be- ing exposed to the intervention compared to controls at endline; no statistically signifi- cant difference was found among males. Change from baseline not reported, nor was data from individuals in intervention areas reporting no exposure to the intervention. There was a steady in- crease in clinic atten- dance over five quarters, followed by a decrease in the final quarter. Sig- nificance testing was not provided and data was incomplete across all quarters and all fa- cilities. F: Not reported	analysis of data, and critical staff turnover at the end of project. Baseline data was retroac- tively scored from quali- tative data and the scoring of the initial assessment of facilities was not done at the time of the baseline assess- ments. There was some contami- nation of control com- munities due to mass media and peer educa- tion intervention components.

Table 1: (continued)

Reference	Overview of health worker performance interventions	Intervention specifics in the following domains:	Outcomes related to:	Comments
Primary project/program aim and components	Study design	A: Refresher trainings	A: Health worker competencies	Conclusions
Target population	Sample size	B: Job aid/reference materials	B: Health worker attitudes	
Location		C: Processes to ensure that basic medicines/supplies/equipment/services are in place	C: Health worker practices	
		D: Policies/standards/job descriptions	D: Patient satisfaction	
		E: Supervision	E: Health service and commodity utilization	
			F: Biologic outcomes	
	(i.e., intervention group): M: 995 F: 1933 “Unexposed” (i.e., control group): M: 633 F: 615 Longitudinal assessment of facility health service utilization data.			
Bhuiya et al. [45] Make existing health services more accessible and enable adolescents to manage their reproductive health by providing a reproductive health curriculum for out-of-schools adolescents, as well as health worker AFHS training, non-clinical staff AFHS orientation, and community sensitization activities. The research also aimed to evaluate the incremental impact of school-based reproductive health education and referrals to health services. 13–19 year-olds Urban communities in northwestern Bangladesh	On-the-job training covered being welcoming, maintaining non-judgmental attitudes, offering minimal waiting time, privacy, confidentiality and affordable services. Quasi-experimental with longitudinal assessments comparing two intervention sites and one control site. I 1: Reproductive health education to out-of-school adolescents linked with AFHS. 25 service providers trained. I 2: As per I 1 + school-based education and linkage with health facility. 20 service providers trained. C: Control Before and after household-based survey of adolescents intended to represent sample of adolescents in the sites. 6073 adolescents (~1000 from each intervention and control sites before and after intervention) interviewed. Also facility service utilization data.	A: The project’s health provider training was considered to be refresher training because the providers had already received AFHS training. Therefore, the project training served to reinforce prior training. B: A flip chart on ASRH was developed and distributed to health service providers (six each in intervention clinics) as well as to teachers (I 2) and adolescent facilitators (I 1 and I 2). C: Not reported D: Not reported E: Not explicitly described in regard to health providers, but it appears that clinic managers were involved in monitoring and supervising the school-based component.	A: Not reported B: Not reported C: Not reported D: There was no clear pattern of differences between intervention and control sites in terms of attitudes toward health facility contraceptive and STI services among adolescents (regardless of whether they had attended the health facilities); in some instances, control participants’ attitudes toward services were better than intervention participants. Authors only presented endline attitudes; changes over time were not reported. E: Condom use among unmarried adolescent males did not improve; data not presented among female participants. Utilization of SRH services increased more in the intervention clinics (especially in I 2) compared to the control clinic but statistical testing was not provided. F: Not reported	The study’s primary aim was to assess out-of-school and in-school reproductive health education. Since health worker training was included in both intervention groups along with the education, it is not possible to determine what contribution the health worker performance interventions had on the outcomes compared to the education and community sensitization components.

Table 1: (continued)

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Cowan et al. [46, 47] Reduce HIV and HSV-2 prevalence and change SRH-related behaviors among young people via YFHS training for clinic providers and staff and school- and community-based in- terventions. Youth with mean age of 15 years South-eastern provinces in Zimbabwe	Five day residential adolescent-friendly clinic training for at least one nurse in each interven- tion clinic. On-site training provided for remaining intervention clinic staff. Cluster randomized trial with baseline and end-of- study (at four years) sur- veys of the population within the communities. 15 intervention and 15 control communities	A: Refresher training pro- vided after two years. B: Not reported C: Not reported D: Standards for adolescent-friendly ser- vices provision were developed by clinic nurses. They were inde- pendently assessed by these standards at six month intervals and clinics received detailed independent perfor- mance feedback. Prizes were awarded to well-performing clinics. The district nursing lead- ership was an integral part of this process. E: Monthly support visits by project staff: key features of clinic acces- sibility were assessed and provision of on-site training tailored to any deficiencies noted.	A: Not reported B: Not reported C: Not reported D: Not reported E & F: There was strong evidence of a slight in- crease in reported contraception seeking behavior among fe- males and a moderate reduction in reported pregnancies as a result of the intervention. Otherwise, no signifi- cant change in any of the other outcomes (clinic attendance, condom use, HIV or HSV-2 prev- alence) were observed.	
Diop et al. [48] Improve reproductive health among adoles- cents by creating a supportive environment via community sensiti- zation activities, school-based educa- tional activities, and AFHS through health provider training and facility improvement. 10–19 year-olds Urban communities in northern Senegal	MOH was responsible for the health service component of the proj- ect. Training of trainers: WHO curriculum “Orientation of Health Providers on Adolescent Reproductive Health” was used. Service providers working in study clinics were then trained. Training was interactive and partici- patory, including games, visualization exercises, debates, and group work. An additional 5 school nurses underwent the	A: Not reported B: Not reported C: Not reported D: Not reported E: Health clinic supervi- sion mentioned, but details not provided.	A: Not reported B: Not reported C: Not reported D: There was a significant increase in perceptions among adolescents about how well they would be received for STI care in almost all groups, including con- trol sites. Similar results were observed regarding perceptions about seeking contra- ceptive care at pharma- cies – this may have been influenced by health education and	There was contamination of the control site – i.e., mass media messaging reached the control site and some school interventions reached I 1. There did not appear to be contamina- tion of health service in- terventions. Perceptions regarding con- traceptive care at health facilities and STI services at pharmacies were not reported.

Table 1: (continued)

Reference Primary project/program aim and components Target population Location	Overview of health worker performance interventions Study design Sample size	Intervention specifics in the following domains: A: Refresher trainings B: Job aid/reference ma- terials C. Processes to ensure that basic medicines/ supplies/equipment/ser- vices are in place D: Policies/standards/job descriptions E: Supervision	Outcomes related to: A: Health worker compe- tencies B. Health worker attitudes C: Health worker practices D: Patient satisfaction E: Health service and commodity utilization F: Biologic outcomes	Comments Conclusions
	same training as service providers. I 1: Clinic and community interventions I 2: As per I 1 + school- based intervention C: Control Pre- and post- (approxi- mately 2 years after baseline) surveys of 2893 (pre) and 2738 (post) adolescents from intervention and control sites using robust household-based sam- pling framework.		community sensiti- zation activities (rather than health worker per- formance interventions, as pharmacists and pharmacy vendors did not receive this training) or may have reflected the different attitudes toward STI vs. contra- ceptive care services. E: Reported use of contra- ception declined signifi- cantly at all sites. The authors speculate that the decrease in contra- ceptive use can be partially explained by a shift toward more regu- lar sexual partners and adolescents' perceived risk of STIs, including HIV/AIDS, decreasing compared to baseline when they reported more casual sexual en- counters. Use of health services was very low at baseline and did significantly in- crease, but levels of use remained low. F: Not reported	
Doyle et al., Hayes et al., Larke et al., Ross et al. [35, 49–51] Improve SRH outcomes via a multipronged pro- gram known as MEMA kwa Vijana (MkV), which included school- based SRH education, YFHS training and ca- pacity building, com- munity condom	Two to four health workers from 18 government health units (and always including the staff mem- ber in charge of facilities, total of 54 trained) received a six day, participatory training, which emphasized “adopting a welcoming and non-judgmental atti- tude to adolescents, and	A: Three day refresher training provided one year after initial training “in the light of factors identified during super- vision and other pro- cess evaluation.” B: Not reported C: Regular supplies of STI drugs were ensured in both the intervention and control sites.	A: Not reported B: Not reported C: Mystery client visit analysis was not quan- titative, but generally showed that interven- tion health workers ten- ded to engage in adolescent-friendly practices more often than control health workers, including	

Table 1: (continued)

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promotion and distri- bution, and community promotion activities. Focus on 14–19 year-olds who were enrolled in school at start of study (followed even if out-of- school at follow-up). Mwanza Region, Tanzania	ensuring privacy and confidentiality”. Training was conducted by local NGO staff. A training manual was developed. Training on syndromic management of STIs was provided to both the intervention and control sites’ health workers. Well-designed cluster ran- domized trial with base- line, 10 intervention, and 10 control communities 3524 attendees of inter- vention and 3516 at- tendees of control schools surveyed at three years. 7083 intervention and 6731 control at- tendees surveyed at nine years. Health worker interactions were assessed via mys- tery client visits to health facilities in 9 intervention and 10 control sites.	D: Not reported E: Quarterly supervisor visit by trained adolescent-friendly SRH supervisor in interven- tion sites. All sites received quarterly visits for supervision of STI treatment.	being more responsive and respectful toward simulated patients and being less judgmental and informative in providing condom- related services. D: Not reported E & F: No improvement in biologic outcomes or statistically significant increase in reported use of SRHS or commodities, except for strong evi- dence of a modest in- crease in initiation of condom use prevalence among males and females.	
Hainsworth et al. [52, 53] Improve adolescent SRHS and reduce unwanted pregnancy, STI, HIV, and unsafe abortion incidence by establish- ing a network of quality services, which included facility im- provements, training health workers, training peer activists, and developing and disseminating IEC ma- terials. 15–24 year-olds Maputo, Mozambique	Pre-service: ASRH incorpo- rated into curriculum at Maputo Nursing Insti- tute. TOT: Pathfinder Interna- tional and the MOH translated Pathfinder’s AFHS curriculum. During the pilot phase (4 prov- inces—Gaza, Maputo, Maputo City, Zambezia), 11 trainers were trained via two TOT sessions. Trainers then conducted step-down training for service providers. By 2006, 82 TOTs were trained nationally.	A: Not reported B: Not reported C: Attention was paid to ensuring that essential equipment was avail- able. D: Not reported E: Monthly supervisory meetings were held be- tween service providers and MOH supervisory team. Difficulties encountered were dis- cussed and monthly service statistics were reviewed. In Maputo, two psychologists from the central hospital	A: Not reported B: Not reported C: Not reported D: Varied findings regarding indicators of adolescent satisfaction with visit to health fa- cilities. For example, more than two-thirds of adolescents across the 3 provinces reported satisfaction with pro- viders’ discussion of importance of condom use but less than half were satisfied with pro- viders’ discussion of gender-based violence.	No control sites. Signifi- cance testing not pro- vided. The authors speculate that the initial increase in pregnancy rates was due to “girls ... having un- protected sex with older people during the school long vacation. As a response, the program” introduced student edu- cation on intergenera- tional sex as a health threat. Average number of preg- nancies per female stu- dent population not

Table 1: (continued)

Reference	Overview of health worker performance interventions	Intervention specifics in the following domains:	Outcomes related to:	Comments
Primary project/program aim and components	Study design	A: Refresher trainings	A: Health worker competencies	Conclusions
Target population	Sample size	B: Job aid/reference materials	B: Health worker attitudes	
Location		C. Processes to ensure that basic medicines/supplies/equipment/services are in place	C: Health worker practices	
		D: Policies/standards/job descriptions	D: Patient satisfaction	
		E: Supervision	E: Health service and commodity utilization	
			F: Biologic outcomes	
	<p>Trainings included theory and practice. Topics covered adolescent development, STI prevention and treatment, HIV prevention, AIDS, counseling, contraceptive options, pregnancy, gender-based violence, and making services more adolescent-friendly.</p> <p>Service providers were selected for trainings if they were willing to work with adolescents, willing to learn, friendly, open, able to communicate, and able to treat people with respect.</p> <p>Longitudinal comparison of clinic attendance records at program start in eight clinics in three provinces at one and two years post-implementation.</p> <p>Additionally a satisfaction survey in 14 AFHS facilities was conducted; 1400 adolescents were interviewed by trained peer educators.</p> <p>Program then scaled up nationally over the subsequent six years.</p>	<p>attended the monthly meetings to provide technical assistance on counseling.</p> <p>It was noted that technical assistance at both the central and provincial levels was continuously provided; further information not reported.</p>	<p>Overall, 29 and 66% reported a great and a good deal of satisfaction with the health service provider, respectively.</p> <p>E: Weak evidence of increased use of services and distribution of condoms.</p> <p>F: Average pregnancy rates per program school initially increased during the first couple of years of scale up but then showed a steady decline in the three years after scale up.</p>	<p>provided. It was noted that school enrollment grew at an average annual rate of 25%, while average pregnancies per school decreased at an average annual rate of 26%.</p>
Kim et al. [54, 55]	Trained FP providers in communication and counseling skills.	A: Not reported	A: Not reported	There was contamination at control sites.
Adoption of behaviors and utilization of services among young people in order to reduce the risk of pregnancy and HIV and other STIs, primarily through a multi-media campaign to promote sexual	One week course; one health worker from each of 26 clinics in the intervention area were trained by the Zimbabwe National Family Planning Council in interpersonal	B: Not reported	B: Not reported	
		C: Not reported	C: Not reported	
		D: Not reported	D: Not reported	
		E: Not reported	E: Higher prevalence of reported use of services and condom use among those in intervention areas who reported being exposed to the	

Table 1: (continued)

Reference Primary project/program aim and components Target population Location	Overview of health worker performance interventions Study design Sample size	Intervention specifics in the following domains: A: Refresher trainings B: Job aid/reference ma- terials C. Processes to ensure that basic medicines/ supplies/equipment/ser- vices are in place D: Policies/standards/job descriptions E: Supervision	Outcomes related to: A: Health worker compe- tencies B. Health worker attitudes C: Health worker practices D: Patient satisfaction E: Health service and commodity utilization F: Biologic outcomes	Comments Conclusions
responsibility. Also included a health worker component to improve access to reproductive health services. 10–24 year olds Zimbabwe (urban Mutare, as well as four towns in rural districts)	communication and adolescent counseling skills using a newly developed manual. Health workers were ex- pected to return and train remaining clinic health staff. Before and after with one intervention and two control community sites; community surveys of ~1400 10–24 year-olds at baseline three months after the end of the six- month campaign.		intervention compared to controls. Baseline data was not provided. Modest increase in con- traceptive prevalence in the intervention site. Control data was not provided, but the au- thors note that “use of modern methods did not change significantly in comparison areas”. F: Not reported	
LaVake et al., Neukom et al. [56, 57] Prevent HIV/AIDS and un- planned pregnancies by encouraging youth to reduce sexual activity and/or use condoms and seek treatment for STIs through fran- chising clinics into a network (“Top Réseau”) of youth-friendly clinics meeting minimal stan- dards, subsidizing ser- vices, peer educators, community-based ac- tivities and mass me- dia. 15–24 year-olds, although target groups were expanded to vulnerable populations outside this age group four years into the pro- gram and in the past four years the program has been expanded to include all low and middle income men and	Doctors and other clinic staff receive training, education, and support services from Top Réseau/Population Ser- vices International (PSI) staff Program evaluation, including field visits, document reviews and interviews with “program and senior management, field managers and staff, outreach workers, network doctors, and a client”. Before and after compari- son of clinic attendance records at participating clinics. Program started with 30 providers in 17 private clinics (mostly for-profit). Expanded to a total of 170 providers and 140 clinics (latest figures available as of 2010).	A: Opportunities provided for continuing educa- tion to motivate pro- viders to comply with franchise requirements. Additional opportu- nities for ongoing training to further improve services quality noted as a lesson learned. Doctors also “benefit from regular interface, exchange and support from program team members such as regional supervisors, medical delegates, interpersonal communi- cation agents ... [and] opportunities to meet and share technical ideas ... on at least a semester basis.” B: Top Réseau developed a curriculum and hand- book for training pro- viders on AFHS, as well as operations manuals, client kits, technical	A: Not reported B: Quantitative data was not reported on this outcome measure; how- ever, it was noted that providers saw disad- vantages to joining the franchise, such as loss of autonomy including due to the program su- pervisors. This was offset somewhat by reg- ular feedback, and pro- viders identified the training opportunity as a major benefit to mem- bership. C: Not reported D: Exit interviews and mystery clients were used to ensure adher- ence to franchise stan- dards, but results were not reported. E: Numbers of adolescent visits to the franchise clinics increased as the franchise expanded (from less than 5000	No control data. Mystery client data not provided. Clinic attendance data esti- mated from figures. In year 9, the program created a parallel fran- chise to serve non- adolescents with SRHS. This resulted in parallel supervisory systems which program manage- ment and doctors found complicated and cumbersome. This, along with other factors, led to the expansion of the scope of Top Réseau.

Table 1: (continued)

Reference	Overview of health worker performance interventions	Intervention specifics in the following domains:	Outcomes related to:	Comments
Primary project/program aim and components	Study design	A: Refresher trainings	A: Health worker competencies	Conclusions
Target population	Sample size	B: Job aid/reference materials	B: Health worker attitudes	
Location		C: Processes to ensure that basic medicines/supplies/equipment/services are in place	C: Health worker practices	
		D: Policies/standards/job descriptions	D: Patient satisfaction	
		E: Supervision	E: Health service and commodity utilization	
			F: Biologic outcomes	
women of reproductive age. Tamatave, Madagascar and surrounding rural areas, later expanding to eight regions by 2011.		newsletters, and job aids, including “flip charts, checklists, posters, and the patient register, [to] serve as tools for assuring client informed choice and following protocols and procedures.” C: PSI ensures starter stocks of products (e.g., the pill, injectables, condoms, STI treatment kits, IUD insertion kits, and disinfection equipment) for free to the clinics. As a condition of membership, the clinics must ensure sufficient stock of FP methods, condoms, and condom demonstration models and meet minimum equipment stipulations. D: “All franchise clinics meet minimum ‘youth-friendly’ standards relating to facilities, administrative systems, and staff and providers —latter characteristics included: Trained to serve youth, respect for youth, maintain confidentiality and privacy, allow enough time to receive and engage in exchange with clients, and serves young men as well as young women.” E: Monthly (at a minimum) regional supervisor	adolescent visits in year one to over 110,000 in year 10). Data regarding visits per clinic were not reported. F: Not reported	

Table 1: (continued)

Reference	Overview of health worker performance interventions	Intervention specifics in the following domains:	Outcomes related to:	Comments
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		E: Supervision	E: Health service and commodity utilization	
			F: Biologic outcomes	
		visits; more often “depending on the needs of the provider”. Quarterly supervisory visits by centrally based quality assurance staff for health workers who provide HIV counseling and testing or long acting contraceptive methods. PSI supervision required as a condition of membership.		
Lou et al. [58]	FP staff trained on improving SRHS and counseling skills for unmarried adolescents and providing youth-friendly interactions.	A: Not reported B: Not reported C: Not reported D: Not reported E: Not reported	A: Not reported B: Not reported C: Not reported D: Not reported E: Moderate evidence of increased reported use of condoms and contraceptives as a result of the intervention.	Statistical analysis did not take into account clustering.
Increase contraceptive and condom use among unmarried youth via SRH counseling and services as well as community-based information dissemination and community sensitization activities.	Before and after surveys of all unmarried 15–24 year-olds, who reported being sexually active, in one intervention and one control community.		A follow-up was also conducted 28 months after the program ended. The longer-term effect at the community level (i.e., including those who were not exposed to the intervention (especially younger adolescents who “aged into” the assessment age range)) on contraceptive use did not persist. However, the increased contraceptive use effect was retained among the sub-set of adolescents who were exposed to the intervention (albeit with a diminished but still	Number of health workers trained and number of clinics in control and intervention sites not reported.
15–24 year-old unmarried youth	Number of adolescents surveyed: Baseline: I: 1220 C: 1007 Endline: 94 and 89% of the baseline I and C participants, respectively 28 months post-endline*: I: 1157 C: 1092 *Including 15–24 year olds who were included at baseline as well as newly eligible unmarried adolescents.			Ability to evaluate long term impact was hampered by the non-program related SRH IEC activities that were introduced in both the intervention and control communities.
Suburban Songjiang District, Shanghai, China				

Table 1: (continued)

Reference Primary project/program aim and components Target population Location	Overview of health worker performance interventions Study design Sample size	Intervention specifics in the following domains: A: Refresher trainings B: Job aid/reference ma- terials C. Processes to ensure that basic medicines/ supplies/equipment/ser- vices are in place D: Policies/standards/job descriptions E: Supervision	Outcomes related to: A: Health worker compe- tencies B. Health worker attitudes C: Health worker practices D: Patient satisfaction E: Health service and commodity utilization F: Biologic outcomes	Comments Conclusions
Magnani et al. [59] Reduce high adolescent pregnancy rates and number of new HIV in- fections among young adults via pilot project consisting of health and education sector inte- grated interventions, including provision of SRH education and referral by teachers to “partner” public health clinics. 11–19 year olds Bahia state, Brazil	“Training courses in repro- ductive health services for adolescents for pro- viders who were already delivering FP services ... were carried out ... in 19 training sessions” in the two years prior to the study observational period. 300 physicians, nurses, and social workers, attended the sessions with others trained (number not pro- vided) subsequently. Quasi-experimental, with clinics and schools from same area grouped into intervention and control groups. Six intervention clinic/ school pairs evaluated, schools not participating in the pilot served as controls. Control schools matched to intervention schools on SES factors and school size. Further- more, data from 258 non- participating public clinics served were compared to intervention clinics. Service standards and pa- tient satisfaction with clinic services were assessed via 385 adolescent exit	A: Not reported B: Not reported C: Not reported D: Not reported E: Not reported	large magnitude compared to immedi- ately at the end of the intervention). Condom use was not reported at the long-term follow-up. F: Not reported A: Not reported B: Not reported C: Not reported D: >90% of adolescents at exit interview respon- ded positively to ques- tions regarding service providers’ confidential- ity, attentiveness, responsiveness, respectfulness, and competence; and re- ported that they plan- ned to return to the clinic at some time in the future and that they would recommend the clinic to a friend. No comparison data was reported for control sites. E: Among clinic adolescent attendees, new contra- ceptive user prevalence increased two years af- ter project start, but there was no difference between intervention and control sites. F: Not reported	Intervention clinics were chosen based on being a reproductive health training center, evidence of demand for adolescent reproductive health ser- vices, and health worker interest in adolescent reproductive health services.

Table 1: (continued)

Reference Primary project/program aim and components Target population Location	Overview of health worker performance interventions Study design Sample size	Intervention specifics in the following domains: A: Refresher trainings B: Job aid/reference ma- terials C. Processes to ensure that basic medicines/ supplies/equipment/ser- vices are in place D: Policies/standards/job descriptions E: Supervision	Outcomes related to: A: Health worker compe- tencies B. Health worker attitudes C: Health worker practices D: Patient satisfaction E: Health service and commodity utilization F: Biologic outcomes	Comments Conclusions
	interviews conducted at four of the intervention clinics 18 months into the project, representing 89% of the adolescents attending these clinics during the month that the interviews were conducted.			
Mbonye et al. [60] Reduce unwanted preg- nancies, and HIV and other STIs through a pi- lot YFHS program con- sisting of trainings and reorganization of health centers to cater to ado- lescents. 10–19 year-olds Jinja, Uganda	Trained district health management teams and four health workers per health facility in ASRH, communication, and counseling. In total 16 health workers were trained. Quasi-experimental, with four intervention and four control health centers.	A: The “Delivery for Improved Health Service Project” provided technical supervision to the project team, which included three technical supervisors. The project team worked closely with the district health team to implement the project. Training was provided to the “district health team to build their capacity for further training and supervision within the district”, based on training modules that were developed on ARH, supervision, communication, and counseling guidelines. B: Not reported C: Health units were equipped with basic SRH materials, contraceptives, supplies, and STI drugs. D: MOH provided policies, guidelines, standards and overall project supervision. E: Not reported	A: Weak evidence for improved health worker knowledge sustained at two years after the baseline survey as result of the interven- tion. B: Not reported C: Weak evidence for improved health worker skills as a result of the intervention. D: Not reported E: Weak evidence for increase in reported use of services and commod- ities as a result of the intervention. F: Not reported	Control health centers were comparable in terms of level of service delivery, catchment size, and population characteris- tics. Statistical analysis did not take into account adjust- ing for potential con- founding or clustering.
Mmari and Magnani [61] Improve youth health and well-being by providing	All intervention sites trained health workers to communicate with	A: Not reported B: Not reported C: Not reported	A: Not reported B, C & D: Endline scores based on interview	This study was not designed to assess effectiveness of health

Table 1: (continued)

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YFHS, training health workers and peer edu- cators, and conducting community sensitiza- tion activities. 11–24 year olds Lusaka, Zambia	adolescents about reproductive health is- sues. Major difference between intervention sites was extent of com- munity involvement. Longitudinal study with control clinics I 1: 3 intervention clinics I 2: 3 intervention clinics I 3: 2 intervention clinics C: 2 control clinics Interviews regarding adolescent friendliness: 30 nurse, 20 staff, 10 manager interviews, as well as 60 client exit in- terviews. 200 adoles- cents who had not received services took part in focus group discussions.	D: Not reported E: Quarterly supervisory visits by trained adolescent-friendly SRH supervisor.	responses were gener- ally higher among inter- vention than control clinics, although statis- tical testing was not provided. E: No substantial increased utilization of services in intervention versus control clinics. F: Not reported	worker training or other performance in- terventions, because these interventions were generally delivered in intervention as well as control sites (differences in interventions were generally related to com- munity engagement).
Coplan et al., Okonofua et al. [62, 63] Improve STI treatment- seeking among adoles- cents by providing school- and community- based education and by training STI diagnosis and treatment for pri- vate providers identi- fied as sources of STI treatment by youth dur- ing formative research. This included medical practitioners, patent medicine dealers, and pharmacists. 14–20 year-olds attending school Edo State, Nigeria	45 patent medicine dealers, 29 pharmacists, and 28 private practi- tioners received separate training based on WHO syndromic management, with emphasis on condom promotion and partner tracing and treatment. A total of 30 h of “lectures, demonstrations and practicals” in STI diag- nosis and management was provided. Training was simplified for the pharmacists and patent medicine dealers, whereas the physician training was in standard WHO protocols. Cluster randomized by	A: Not reported B: Not reported C: Not reported D: Not reported (although it was mentioned that lists of private clinics with trained providers were distributed to peer educators to use when counseling adolescents with STI symptoms.) E: Not reported	A: Not reported B: Not reported C: Not reported D: Not reported E: Reported use of con- doms increased, but this was not significant compared to controls. The program did demonstrate strong evi- dence for increased re- ported use of STI services from private providers. A similar in- crease in reported use of STI services in hospitals and clinics presumably not included in the intervention was not seen. F: The program demon- strated a decreased	Statistical analysis did not take into account clustering.

Table 1: (continued)

Reference	Overview of health worker performance interventions	Intervention specifics in the following domains:	Outcomes related to:	Comments
Primary project/program aim and components	Study design	A: Refresher trainings	A: Health worker competencies	Conclusions
Target population	Sample size	B: Job aid/reference materials	B: Health worker attitudes	
Location		C: Processes to ensure that basic medicines/supplies/equipment/services are in place	C: Health worker practices	
		D: Policies/standards/job descriptions	D: Patient satisfaction	
		E: Supervision	E: Health service and commodity utilization	
			F: Biologic outcomes	
	school, with one treatment site consisting of STI treatment providers near the school. Students randomly selected within schools to complete surveys: 1896 completed pre- and 1858 completed post-survey.		reported prevalence of STI symptoms.	
	I: 4 schools C 1: 4 schools C 2: 4 schools			
Renju et al. [34]	Phased scale-up using a cascade model whereby local government officials, who had themselves been trained, conducted the training in two rounds. Rounds one and two were six days (7 h/day) and 12 days (9 h/day) in duration, respectively. On average, 27 health workers were trained/session – 429 total covering 177 (99%) of the health units in the program area.	A: None (as compared to initial intervention (see Doyle et al. above)). B: Round two trainings included handouts for participants. C: Not reported D: Not reported E: Not reported	A: The scaled up training was associated with slight improvements in health worker knowledge on HIV/AIDS and puberty in both training rounds comparing pre- to post-training multiple-choice questionnaires. Knowledge on STIs only improved among round two participants. B: The scaled-up training was associated with slight to modest improvements in health worker adolescent-friendly attitudes, comparing pre- to post-training multiple-choice questionnaires, with statistically significant or nearly statistically significant differences. Interviews supported these findings; intervention health workers reported themselves to be more aware of the importance of	This follow-up study is included as a separate listing in this evidence table, because the scale-up process differed from the initial procedures as followed in the RCT (see Doyle et al. above) Authors report that “the scale up faced challenges in the selection and retention of trained health workers and was limited by various contextual factors and structural constraints” including shortages of resources and time constraints. They particularly noted that “the effect of the overall intervention was limited by the small number and high turnover of trained health workers at each facility.” The interview responses between untrained health workers in intervention health units and those from control health units differed little. The
Scale-up of MkV from 18 health units in original RCT (see Doyle et al. above).				
Young people, with a focus on 13–16 year-olds.				
Mwanza Region, Tanzania				

Table 1: (continued)

Reference Primary project/program aim and components Target population Location	Overview of health worker performance interventions Study design Sample size	Intervention specifics in the following domains: A: Refresher trainings B: Job aid/reference ma- terials C. Processes to ensure that basic medicines/ supplies/equipment/ser- vices are in place D: Policies/standards/job descriptions E: Supervision	Outcomes related to: A: Health worker compe- tencies B. Health worker attitudes C: Health worker practices D: Patient satisfaction E: Health service and commodity utilization F: Biologic outcomes	Comments Conclusions
	round one and 221 in round two. Surveys were conducted in a sample of eight health units. Interviews were conducted with all health workers at these units at baseline, 6.5, and 10 months after the training. Mystery client visits were conducted by trained ad- olescents blinded to intervention/control sta- tus of clinic. Two pre- intervention (control) and two post-intervention health units were selected per district, including nine dispen- saries, three health cen- ters, and four hospitals.		confidentiality, privacy, and respect for adoles- cents. C: Mystery client visits demonstrated improved health worker perfor- mance in condom request and FP sce- narios, but lower per- formance scores in the STI scenario in inter- vention compared to control sites (pre- and post-intervention data was not compared). D: Not reported E: Not reported F: Not reported	authors note that this lack of difference sug- gests that there was little transfer of knowledge between the intervention-trained health workers and their colleagues. The authors conclude that these fac- tors suggest that more frequent refresher training would further enhance impact. Authors also note that while the MkV and MoHSW trainings both improved health workers' knowl- edge and attitudes, the effect was greatest with the MoHSW manual which was more lengthy and detailed and pro- vided a stronger focus on key technical areas (e.g., STIs and HIV prevention, counseling and stages of adolescence).
Sovd et al. [64] Improve access to quality SRHS for adolescents by training staff in adolescent health and development, provision of basic equipment and supplies, facility im- provements, setting adolescent-friendly quality standards, community mobiliza- tion with adults and adolescents, and adolescent participa- tion in the in- terventions. 10–19 year-olds	Staff trained on adolescent health and development. Training included communication and counseling skills. Quasi-experimental, with comparison service utili- zation data and client exit surveys. All 10–19 year olds visiting the clinics (982 at 51 inter- vention clinics and 310 at 31 control clinics) over a one week period were approached for partici- pation; 982 and 310 participated at interven- tion and control clinics,	A: Not reported B: Not reported C: Basic equipment (e.g., weight scales and con- traceptives) was pro- vided to health facilities. D: Standards of quality of care were developed based on finding from a review of Mongolian health services and a WHO global consulta- tion on AFHS. Policies and procedures on confidentiality were developed and	A: Intervention facility staff were statistically signif- icantly more likely to feel that their practices are adolescent-friendly and that they have competencies to deliver ASRHS. There was no difference in how they responded to questions about their ability to deliver other types of adolescent health ser- vices (e.g., general health, mental health). B, C & D: Adolescents visiting intervention fa- cilities were generally	Pre-intervention data not provided; comparison only made between intervention and control sites. Statistical methods did not take into account differ- ences in adolescent pop- ulation size in control vs. intervention (~1.4 times greater) communities. Health worker characteris- tics were related to client satisfaction; however, facility characteristics such as privacy of and adequacy of physical environment were more

Table 1: (continued)

Reference Primary project/program aim and components Target population Location	Overview of health worker performance interventions Study design Sample size	Intervention specifics in the following domains: A: Refresher trainings B: Job aid/reference ma- terials C: Processes to ensure that basic medicines/ supplies/equipment/ser- vices are in place D: Policies/standards/job descriptions E: Supervision	Outcomes related to: A: Health worker compe- tencies B: Health worker attitudes C: Health worker practices D: Patient satisfaction E: Health service and commodity utilization F: Biologic outcomes	Comments Conclusions
Districts in the capital and rural districts, Mongolia	respectively. Program evaluation, including facility obser- vations, service provider interviews, and adoles- cent client exit surveys, conducted ~1 year after program began.	implemented. E: Not reported	more likely to feel that provider practices were adolescent-friendly; clinic staff surveys asking about clinic pro- viders generally (i.e., not specific to the interviewee) corrobo- rated this. D: There were no statisti- cally significant differ- ences in health provider characteristics that ad- olescents visiting inter- vention facilities liked best and least about fa- cility staff. Overall, adolescent clients were three-fold more likely to report satisfaction with services at intervention compared to control fa- cilities. E: Weak evidence of in- crease in service utili- zation as a result of the intervention. F: Not reported	strongly associated with client satisfaction.

reported on the composition of trainee groups (e.g., by health worker cadre). Only one program indicated that its curriculum was also integrated into pre-service provider training.

Refresher trainings

The five programs that reported refresher trainings indicated a variety of approaches. One program based their one year training-to-refresher training interval based on process evaluations, including supervisory assessments. One

program provided refresher trainings after two years but did not specify the rationale for the interval. A different program considered their initial trainings to be a refresher training, as the health workers had previously received AFHS training. Another program provided various opportunities for health workers to access continuing education as an incentive mechanism for complying with program requirements. Finally, one program provided refresher trainings as part of the ongoing supervision technical support. Meanwhile, qualitative information from the reports reiterated the need for refresher trainings. For example, one report noted that while half of “nurses had

received some type of adolescent-friendly health service training ... all indicated that they needed more training in working with adolescents” [61]. Another program noted that ongoing training needs assessments could be used to identify specific areas of weakness, which could then be emphasized in periodic refresher trainings [42].

Job aids/reference materials

Of the three programs that reported providing job aids/reference materials, one provided flipcharts to service providers. Another provided handouts to participants during refresher trainings. The other provided an assortment of materials, including flip charts, checklists, and posters.

Processes to ensure that basic medicines/supplies/equipment are in place

Of the seven programs that reported processes to ensure that basic medicines/supplies/equipment are in place, three used facility assessments to determine whether a sufficient supply of a minimum package of services were available. With regard to the specific medicines/supplies assessed, three programs focused on essential SRH equipment and supplies and one focused on STI medicines. Another program provided clinics with an initial starter kit of necessary supplies and equipment and subsequently used assessments of basic medicines, supplies, equipment, and services as a condition for membership in the program.

Policies/standards/job descriptions

Of the five programs that reported providing policies/standards/job descriptions, one developed a training manual for health workers, which included international covenants, national policies, standards of practice, and institutional procedures. The other four programs mentioned standards for the provision of AFHS; one of these specified that the standards were developed by the MOH and one specified that the standards were developed by nurses and then independently assessed.

Supervision, including trainings for supervisors

Ten programs reported supervisory activities using a range of approaches. All reported the frequency of supervisory visits,

which occurred on a quarterly (n=4), monthly (n=4), and “regular” (n=2) basis. The supervisors themselves were described as program staff (n=5), trained supervisors (n=5), MOH personnel (n=2), regional/district supervisory teams (n=2), and/or health clinic staff/managers (n=2). The focus of the supervisory visits in five of the 10 programs was to review implementation of planned activities and identify challenges and corresponding solutions. Additionally, one of these programs provided technical assistance for the provision of counseling by trained psychologists during the supervision visits. The focus of the visits in two other programs was to assess clinic accessibility in another program, and to monitor national standards and document satisfaction of clients. Two programs did not specify the focus of the visits.

Associations between strategies and outcomes of interest

To attempt to link health worker performance interventions to outcomes (health worker competencies, attitudes, and practices; patient satisfaction; health service and commodity utilization; and biological outcomes), we used a number of analytic strategies. These strategies included frequency tables, heat maps by positive and negative outcomes, and cross-tabulation. However, no discernible patterns emerged in terms of the number or types of interventions and their relationship to outcomes of interest.

Discussion

No discernible patterns between health worker performance interventions and outcomes could be extracted through this review. The wide variety of measurement tools and techniques, time frames, and outcome indicators used in the reports prohibits direct comparisons between interventions and outcomes. Additionally, the differences in type and strength of the study designs, and the corresponding strength of the evidence, varied tremendously across programs. However, several important themes can be drawn from this analysis when considered alongside evidence from the literature on the efficacy and effectiveness of specific health worker performance interventions.

Trainings

Training of health workers is one of the most commonly used interventions to improve health worker performance

[2]. It is also one of the most effective interventions for doing so, as determined by the health-care provider performance review (HCPPR), a recent systematic review of strategies to improve health-care provider performance in LMICs [2]. However, evidence clearly suggests that certain types of trainings do not substantially or sustainably improve the competencies or attitudes of health workers [2, 65]. Careful consideration must be given to the training methodologies, preparation of trainers, location, duration, and group size and composition.

With regard to training methodologies, there is good evidence that participatory and interactive methodologies are much more effective in improving health worker competencies [2, 65]. It is thus highly concerning that only four of the 18 programs explicitly described participatory and/or interactive training methodologies. Although it is possible that more of the programs used participatory and/or interactive training methodologies without reporting them, this absence of information suggests an urgent need to reassess the factors involved in health worker performance interventions that we consider important enough to report on in studies. For example, without active learning opportunities to practice knowledge and skills in response to real-life problems, health workers are less likely to develop confidence in their abilities and transfer the knowledge and skills into practice [66, 67].

Preparation of trainers has important implications for the quality of trainings [68]. The majority of programs that we reviewed did not provide any information as to how trainers were trained to carry out their duties. Further, because one-third of the programs did not specify their training personnel, let alone the preparation that was provided to them, there are major barriers to assessing the quality of the training that was delivered. However, the fact that more than half of the programs described used training manuals of some sort may have encouraging implications for the quality and consistency of trainings.

With regard to training location, evidence suggests that while off-site trainings may be more convenient for programs, on-site trainings may be more effective in building health worker competencies [65, 69, 70]. It is thus logical, but perhaps concerning, that the vast majority of the programs that reported on this aspect of trainings held them in off-site locations.

With regard to training duration, evidence supports longer durations for multi-topic trainings with interactive methodologies; however, there are practical implications. Extended durations risk drop-out and place extra burden on the health centers where the trainees work [70]. These trade-offs were reflected by the fact that that durations of

trainings among the programs that specified this information ranged from three to 10 days. Evidence also suggests smaller groups allow for more participatory engagement [65, 66, 69]. Meanwhile, there is a need for more research regarding when mixed gender and mixed cadre trainings should or should not be used. It is thus disappointing that only one of the 18 programs reported training group sizes and no programs reported information on group composition.

Taken together, these findings are discouraging both in terms of the design of training interventions and the lack of information included in program reports on important features of trainings. However, these findings are also not surprising; the pressure to train large numbers of health workers within short time periods with limited financial and human resources often requires concessions, and publication standards often limit the information that can be presented in journal articles.

Refresher trainings

Lack of opportunities to practice newly acquired knowledge and skills will result in waning of these competencies [71–73]. With regard to AFSRHS, this may be especially relevant in clinical environments with limited adolescent patient volumes. As such, regular refresher trainings are critical for ensuring retention of skills and knowledge [73, 74]. It was thus disappointing that only five of the 18 programs reviewed reported refresher trainings, despite the recurring theme in many of the reports regarding the need for refresher trainings.

Job aids/reference materials

It is well-established that disseminating job aids/reference materials as a solo intervention is generally ineffective at improving health worker performance [2]. However, combined with other interventions (such as trainings, peer group discussions, or supportive supervision) these materials can support health worker performance – if the information is accessible and relevant and if health workers are confident that the information is accurate [65]. It is worth noting that only three of the 18 programs in this review reported this potentially useful to ensure that basic medicines/supplies/equipment are in place

Lack of medicines, supplies, equipment, infrastructure, and essential amenities such as water supply, sanitation and electricity are common problems that impede the ability of health workers to provide health services, including AFSRHS [31]. These health systems factors are often overlooked during program design and

implementation. Our findings echoed this problem, as less than half of programs reported processes to ensure that basic medicines/supplies/equipment/services were in place.

Policies/standards/job descriptions

Policies and standards communicate approved norms to health workers, and job descriptions clarify their roles and responsibilities. When they are communicated and applied, these types of guidance can help health workers be clear about what they are and are not responsible for, and may help improve job satisfaction [65, 74]. As only five of the 18 programs reported developing and/or providing policies, standards, and job descriptions, this appears to be an under-utilized intervention.

Supervision

Supervision can be a powerful tool to support health workers to carry out their roles and responsibilities and hold them accountable for doing so. While supervision on its own has been shown to have only moderate effects on performance, evidence suggests that alongside additional interventions, supervision can improve performance, increase motivation, and enhance job satisfaction [2]. The increasing attention to supervision in the health sector was reflected in the findings of this review; supervision was the most frequently reported health worker performance intervention after training.

Supervision style is critically important to its success. If supervision is supportive, consistent, educational, and specific, it can have a large positive impact on health worker motivation, job satisfaction, and performance [64]. On the other hand, when supervision is purely administrative, or worse yet fault-finding or punitive, it can result in more negative than positive effects [64]. Unfortunately, supervisory systems are often of poor quality, and supervisors commonly lack the skills, tools, and time with health workers required for a supportive style of supervision. Furthermore, the focus of supervision may be less on health worker performance and health worker support and motivation and more on behaviors such as obedience, punctuality, and respectfulness [75]. While some reports included in this review mentioned the frequency and focus of supervisory visits, information was insufficient to assess the style and quality of supervision.

Just as with trainers, the preparation of supervisors is critical for delivering quality supportive supervision. Supervisors are often selected based on seniority or strong

performance in a previous role (i.e., health worker, administrator), which may or may not translate into strong performance as a supervisor [31]. As such, supervisors themselves also require training and support. This was reiterated in the findings of this review; for example, one program noted that health workers identified lack of support from and competing priorities of supervisors as a primary barrier to providing AFSRHS [36].

Group problem solving and collaborative learning

Although not addressed in this review, two health worker performance interventions that have potential to support AFSRHS are group problem solving and collaborative learning. While group problem solving can be used as a participatory methodology within trainings, it can also be used as a separate intervention to improve health worker performance on an ongoing basis. Delivering AFSRHS requires health workers to respond to nuanced and complex social, ethical, and legal situations – such as an adolescent who becomes pregnant but does not want her parents to know, or one who presents with abortion-related complications in a context where abortion is illegal and sexual activity at her age (even when consensual) is considered statutory rape – with sensitivity and empathy. Health workers must apply specific competencies in a specific manner and, where relevant, must recognize and put aside their own biases and beliefs to serve the best interests of their patients. Group problem solving and collaborative learning, whereby peers engage in bottom-up problem identification on an ongoing basis, share their experiences and learn from each other, can promote contextualized problem-solving and creation of communities of practice whereby quality AFSRHS becomes normalized and expected within the local health system's environment. The HCPPR identified group problem solving as one of the most effective interventions for improving health worker performance [2].

Multi-intervention approaches

Despite being one of the most commonly used interventions, there is good evidence that the effect of training alone on health worker performance is minimal for lay health workers and only moderate for professional health workers [2]. Furthermore, while trainings may improve health worker competencies or attitudes in

the short-term (e.g., as evidenced in post-training assessments), they do not guarantee retention or translation of these new competencies or attitudes into practice in the workplace [31]. Meanwhile, evidence also suggests that multi-intervention approaches addressing multiple determinants or levers of performance, especially at various levels of the health system, may be more effective at improving health worker performance than single interventions, including training [2, 31]. However, the majority of the studies in this review reportedly used two or fewer health worker performance interventions beyond training, including four that did not report any interventions beyond training. While it is important to consider using multi-intervention approaches to take advantage of their synergies, decision-makers should be cautioned against the assumption that increasing the number of interventions will automatically increase the effectiveness of the approach in improving health worker performance [2]. Especially where resources are limited, approaches that contain fewer interventions, but which strategically select the interventions based on evidence and context and deliver them with quality and fidelity, may have greater potential to achieve the desired result.

Limitations

This review is limited in that it is not a systematic review; instead, we re-examined the programs assessed in the parent 2015 review [30]. Additionally, we were unable to identify associations between the types and combinations of health worker performance interventions and the outcomes of interest, due to a number of challenges described previously. Attempts to determine whether relationships between improved knowledge and attitudes among health workers and patient-level outcomes (e.g., patient satisfaction, health service and commodity utilization, and biologic outcomes) are mediated through improved health worker performance were similarly constrained for these reasons. Furthermore, the data included is limited to the information reported in the studies. It is possible that programs may have used interventions or achieved outcomes that were not reported, especially in journal articles which may have been constrained by publication standards which limit the information that can be presented. This may have challenged our ability to identify and describe the strategies that were employed and associate them with outcomes of interest. The lack of reported information on costs of interventions similarly hindered our ability to examine intervention cost-effectiveness.

Additionally, this review is restricted to workplace level interventions and does not address wider health systems and community factors that either help or hinder health workers' abilities and/or motivation to apply their competencies in practice. For example, staff shortages and turnover can impact health workers' workloads and the time available for clinical interactions with individual patients [31]. Low pay, lack of opportunity for career progression, and limited recognition has consequences for health worker motivation and retention [76]. Likewise, if there is lack of recognition of, or opposition to, the need for adolescent SRH services by the community, health workers may be unwilling to risk their reputation, or even their personal security, by providing AFSRHS [77]. Health systems and community factors are important considerations, especially given that job satisfaction and motivation can be adversely affected if health workers have the required competencies to provide AFSRHS and are obliged to do so, but are unable to because of issues outside their control. Lastly, we did not examine accountability mechanisms (i.e., that hold health workers responsible for their performance) outside of supervision. We recognize, though, that regulation through professional associations or civil society/community groups or by means of regulatory frameworks may also influence health worker performance [78].

Despite these limitations, to our knowledge this paper is the first to review the health worker performance interventions commonly used to support AFSRHS. AFSRHS require competent, confident and empathic health workers who can deliver quality services. Thus, efforts to improve health worker performance in AFSRHS need to be maximized. The findings of this review indicate that there is a critical need for ongoing and systematic evaluations of interventions to improve health worker performance to build an evidence-base for effective – and cost-effective – strategies in diverse settings. In the meantime, the evidence we do have on improving health worker performance within and outside adolescent health must be integrated more thoughtfully and concertedly into program planning and decision-making.

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