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Engaging adolescents for sexual and reproductive health and rights and family planning advocacy in Pakistan: A qualitative study protocol

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Abstract

Introduction

Adolescents and young people aged 10 to 24 years comprise 32% of the total population of Pakistan. Adolescents and young people are a heterogeneous group–in different stages of development, living in different circumstances, and with differing and changing needs. Neglect of specific adolescents' sexual and reproductive health needs can pose serious challenges and affect physical and mental health, future employment, economic well-being, and adolescents' ability to reach their full potential. Evidence suggests that adolescents in Pakistan have poor access to sexual and reproductive health services including access to contraception and limited knowledge of sexual and reproductive health and rights (SRHR), contributing to unplanned pregnancies, very early childbearing, short birth intervals, pregnancy complications, maternal death, and disability. Despite recognizing adolescence as an important developmental period, research on SRHR needs and access to sexual and reproductive health information among adolescents in Pakistan is scarce. This project will use participatory action research (PAR) approach based on the principles of public engagement in science and innovation to develop a national SRHR and family planning advocacy Toolkit for adolescents in Pakistan.

Methods and Analysis

We will use Participatory Action Research (PAR) framework to guide our study. This research project will be conducted in three stages with cyclical recurring activities involving planning, acting, observing, and reflecting, informed by the PAR framework. The three stages are: 1) establishment of youth advisory groups and identification and prioritization of SRHR concerns, 2) planning and co-designing an appropriate intervention (i.e., SRHR and family planning advocacy Toolkit), and 3) implementation and usability testing of advocacy Toolkit. This project leverages strong, well-established partnerships among researchers, clinicians, lady health workers, and adolescent communities living in rural part of Paksitan.

Ethics and Dissemination

This study has received ethics approval from the University of Alberta Research Ethics Board (Pro00129101_REN1) and Ethics Review Committee at Aga Khan University (2023-8671-26021)**.**We will actively engage AAG members, youth partners, and LHWs in the dissemination of the Toolkit to ensure that it will reach end users in the rural community. In collaboration with governmental platforms, community NGOs, and educational campaigns the Toolkit will be disseminated to ensure SRH knowledge is readily available to young adolescents. We will also publish our study findings for peer-reviewed publications, digital stories, and conference presentations.

Strengths and Limitations

- Our study will advance the limited knowledge base on SRHR knowledge and information needs of adolescents in rural Pakistan as well as the science underpinning PAR methods with adolescents.

- Meaningful adolescent engagement in the co-design and delivery of a knowledge translation Toolkit will promote SRHR awareness and will foster greater social acceptance and encourage the adoption of family planning methods among adolescent in Pakistan.
- Evidence generated in this project will have strong potential to increase SRHR knowledge, social acceptance, and uptake of family planning methods among adolescents in Pakistan.
- The Toolkit we develop will be transferable and scalable to other adolescent groups in Pakistan and similair international contexts and will be a great source of information for young people at the times of national and global crises, such as pandemics and natural disasters occurring due to climate change that risk SRHR of adolescents.

Introduction

World Health Organization defines adolescents as people aged 10 to 19 years [1]. According to the National Institute of Health, adolescence is the time between the beginning of sexual maturation (puberty) and adulthood [2]. The transition from adolescence to adulthood is exciting and complex, as new responsibilities materialize and confidence and independence emerge [3,4]. As part of their physical, psychological, and social development, adolescents commonly explore their sexual identities and feelings through sexual experimentation [5,6,7]. Sexual and reproductive health (SRH) is a fundamental human right, an important aspect of adolescent health and well-being, and interconnects with various physical and mental health issues. Neglecting adolescents' SRHR needs can affect their physical and mental health, social and economic well-being, and ability to reach their full potential [8,9,10].

Pakistan has one of the highest total fertility rates (3.6 children per woman) in South Asia [11,12]. Approximately 50% of all births in Pakistan occur among girls, younger than 20 years of age, residing in rural areas [13]. The prevalence of early marriage among girls contributes to high fertility levels [13], close to 15% of 15- to 19-year-old girls were married in 2018 compared with 3% of boys in Pakistan [11]. Compared with their male counterparts, women in Pakistan typically have little to no decision-making power, fewer educational opportunities, and less control over assets and resources [14]. Unsurprisingly, the country has long been a challenging setting for sexuality education, reproductive health, youth engagement, and women's empowerment programs. Schools rarely include SRHR content in their curricula, lack of knowledge and misconceptions about SRH are common, and adolescent friendly SRH services are largely absent in the public sector [15,16,17]. Religious resistance is a major barrier to implementing SRHR programs [17]. Within the local social context, human sexuality is considered a societal taboo, restricting open discussion [18]. There are misconceptions among lower and middle-income groups that unmarried adolescents are too young to access SRH-related information and services [19]. Furthermore, laws and policies in Paksitan are typically restrictive, creating an environment that does not support the recognition of adolescent sexual and reproductive health and rights (SRHR) for healthy development. [20,21].

A small but growing body of literature suggests that many young people (aged 10 to 24 years) in Pakistan lack SRH knowledge, use fewer sexual and reproductive health services, and receive fewer sexual health education resources [15,16,22,23]. Adolescents in Pakistan possess little to no information on puberty and menstruation, gender equality and empowerment, and gender-based violence and abuse [17,24,25]. Their situation is influenced by a lack of information sources, taboos, fears, and cultural and religious stigmas. In conservative societies, like Pakistan where cultural sensitivities discourage the discussion of SRH and sexuality education is controversial, it is even more challenging for young people to access reproductive health services, especially if they are not married. Access to basic SRH services, such as family planning and sexuality education, remains low, both in urban and rural areas but more often in remote rural areas [15,26].

Government and non-governmental organizations in Pakistan deliver programs addressing various aspects of adolescent SRH (e.g., contraceptive use and SRH literacy) in

different settings (e.g., schools and health facilities). However, these have been implemented mostly in urban areas/cities. Organizations are working in isolation from one another, and very few have comprehensively evaluated their programs using rigorous methods. The lack of information on implementation makes it difficult to determine what works, for whom, and under what circumstances. Despite efforts and progress by organizations and governments in increasing the uptake of SRH services in Pakistan, adolescents in rural areas do not have access to SRH information, resources, and services [15,26,27]. Moreover, there are no programs that engage adolescents in developing and implementing SRHR and family planning interventions, which can improve the quality and responsiveness of SRH programs and policies [28]. Many programs and policies in Pakistan are based on perceptions of what is considered "proper" or "best" for young people, rather than their actual needs [15,29]. There is an "urgent need to empower adolescents to take control of their sexuality through improved knowledge and access to adolescent-centered, culturally safe SRH services, that will support them to make informed sexual and reproductive health decisions" [15,29,26]. In response to this demand, we will engage adolescents to develop a culturally relevant and easy-to-use SRHR and family planning advocacy toolkit to enhance the uptake of evidence-based SRHR and family planning information and services among adolescents in rural Pakistan. Our overarching research question is: 'By understanding SRH knowledge, information needs, and priorities of adolescents in rural Pakistan, how can we improve SRHR and empower adolescents to exercise their reproductive rights?' Our study is unique because we aim to address the SRHR and family planning needs of under served population. The research will be focusing on the full spectrum of gender diversity, including male, female. transgender and gender non-conforming adolescents. By incorporating cultural knowledge and agency, we will develop an adolescent-centered knowledge translation (KT) strategy, creating an SRHR and family planning advocacy toolkit. This toolkit will be co-designed with adolescents to ensure its usability and effectiveness. We will also evaluate the tool's usability, paving the way for future pragmatic effectiveness trials

- Focus on an under-researched population to identify their SRHR and family planning needs.
- Consider voices of the full spectrum of gender diversity (including transgender and gender non-conforming adolescents), cultural knowledge, and agency.
- Develop an adolescent-centered knowledge translation (KT) strategy (i.e., SRHR and family planning advocacy toolkit) by engaging adolescents as partners to ensure they are aware of and know how to use this Toolkit. Development and evaluation of the usability of the tool will lead to future pragmatic effectiveness trials.

Methods and Analysis

A Participatory action research (PAR) approach based on the principles of public engagement in science and innovation will be used to develop a SRHR and family planning advocacy toolkit for adolescents in Pakistan. Our objectives are:

1. To better understand adolescents' information, educational support, and service access needs related to SRHR and family planning.

2. To engage adolescents in the co-design of the SRHR and family planning advocacy Toolkit.
3. To evaluate the Toolkit's usability and usefulness in improving the SRHR of adolescents in Pakistan.
4. To disseminate the research outputs to a variety of stakeholders (such as government and non-government organizations) working to improve the SRHR of youth in Pakistan.

Participatory Action Research (PAR) Framework

PAR is a framework for conducting research and generating knowledge centered on the belief that those who are most impacted by research should be the ones who take the lead in framing the questions, the design, methods, and the modes of analysis [30]. Importantly, PAR legitimizes the active role of the communities in knowledge generation as it can lead to the participants developing abilities to analyze, reflect, and trigger collective action [30]. PAR embraces a dialectic shifting of understandings, subjectivity, and coexistence of multiple realities that depend on context and circumstance [31]. It is responsive and committed to meaningfully engaging and incorporating the end-user's voices into designing and developing interventions that provide solutions to real-world problems. PAR involves recurrent planning, action, reflection, and observation stages [32,33]. In this project, adolescents participants will be meaningfully engaged in all the PAR steps by the study team. The KT tool (SRHR and family planning advocacy toolkit) will reflect the experiences and voices of adolescents and/or communities.

Setting and Participants

The project will be implemented in Matiari, Saeedabad, and Hala rural areas of Sindh province with greater gender disparities. In 2021, 18.6% of adolescent girls were attending school versus 57.6% of adolescent boys based on a survey of 8,920 adolescents [34]. While 63% agreed there should be SRH educational sessions in their areas; 57% had never heard of such sessions available in their community. A third of adolescents reported they found discussing SRH issues with their parents and/or healthcare providers embarrassing; 80.2% agreed with the idea of conducting SRH sessions with strict confidentiality [34]. There are deep-rooted societal, religious, parental and cultural barriers to discussing adolescent SRHR with adolescents, specifically with unmarried adolescents, and we must build community support first.

Lady health workers (LHWs) are an important part of communities in rural Pakistan [35,36,37]. They visit households to increase awareness of reproductive health and nutrition, facilitate registration of births and deaths, distribute contraceptives, support immunize children, and provide maternal and child health services. This allows them to develop rapport and trust with adolescents, women, and community members, vital for ensuring that the community is open, receptive, and accepting of SRHR and family planning for young girls and women. In collaboration with LHWs, we will recruit participants aged 10 to 19 years (married and unmarried) for the various stages of the research project. Moreover, stakeholders, such as service providers, Program Managers, policymakers, and members of the communities' informal support channels (e.g., parents, teachers, and religious leaders) will also be consulted to provide their expertise throughout the development of the advocacy toolkit. Adolescent participants and stakeholders will be approached individually via telephone or in person to introduce the study

objectives and activities and invite them to participate. The details on the participants and recruitment for each stage is mentioned in detail in the following sections.

Study Design

The study will take place in three stages using the PAR framework: 1) Establishing adolescent advisory groups and identifying and prioritizing SRHR concerns, 2) Planning and co-designing the intervention tool (i.e., SRHR and family planning advocacy Toolkit), and 3) Implementing and usability testing of the advocacy Toolkit.

PAR and human-centred design (HCD) principles [32,33,38,39] will be used in the Toolkit design to understand the issues and possible solutions from adolescents' perspectives. Figure 1 presents a summary of the PAR and HCD stages, activities, and session plans for the study. In addition, it is ensured that the Toolkit is culturally appropriate, understandable, usable, and acceptable to end users. HCD of KT products is a well-established method that involves ideation, rapid prototyping, and iterating upon the strengths and weaknesses of prototypes so that innovations may be designed quickly and with the direct input and preferences of actual "end users" [38,39].

		Reach an agreement about the way the Toolkit would be put into operation and how to document observations/usability testing Discuss and research consensus on how the AAG will participate in the Toolkit revisions and continue with the PAR processes on their own
	Observation	Document the revision process by taking detailed field notes, observing, and discussing with AAG members Preliminary analysis and findings of the feasibility evaluation process will be collected Conduct informal interviews with AAG to ascertain their perceptions and experiences of the process of PAR
	Reflection	Conduct evaluation meetings with AAG and collect feedback about the process of the PAR process, and reflect on the process of implementation Identify options for further PAR and action with or without academic researchers

Figure 1. Summary of PAR and HCD stages, activities, and session plans for the proposed study

Stage 1: Establishing adolescent advisory groups and identifying and prioritizing SRHR concerns

Recruitment

To recruit adolescents for the AAGs, we will collaborate with lady health workers (LHWs) and youth champions who work closely with communities. With support form CIHR bridge funding, we identified and recruited five youth champions (3 girls and 2 boys; aged 18-24 years) who will work in areas not served by LHWs. Youth champions will support the recruitment of adolescent participants for the study and also participate in AAG meetings and training sessions.

The project team, LHWs, and participating youth champions will first conduct orientation sessions for the community to discuss adolescent SRHR and family planning needs and to prepare them for youth to participate in our project. We will invite parents, grandparents, teachers, and community and religious leaders. The sessions will address the unique SRHR

needs and how to address those needs and concerns, as well as discuss the purpose of adolescent engagement in SRHR health promotion and awareness programs. The project team members will help LHWs and youth champions organize and lead these sessions. Following the orientation sessions, LHWs and youth champions will map out the population of adolescent males and females in their respective catchment areas in the targeted project districts and compile a list of information relating to adolescents (e.g., name, age, marital status). Youth research assistants in this project will collaborate with LHWs and youth champions to recruit AAG participants. Participants aged 12 to 19 years (married and unmarried) will be invited to participate in the AAG. A significant body of literature will help conceptualize and operationalize the elements of adolescent engagement [7,37,40], and we intend to engage adolescents as collaborators and active participants.

Based on these young people's physiological, psychological, and social developmental stages, we anticipate that younger adolescents may find it difficult to share common cultural beliefs and values. To provide equal opportunity to all participants and engage participants actively in the AAG and the project, we will make separate age and gender groups. We will establish 6–8 AAGs to cover the 18 reporting health facilities in Matiari, with practical considerations (e.g., the number of adolescents who may be interested in participating) and as per the recommendations of research team members with extensive experience working with youth advisory groups in Canada and Pakistan. We anticipate that 8 and 12 adolescents will create meaningful engagement [40,41], and we will meet for two hours every month for approximately 18 to 24 months. This timeline will be adapted reflecting the AAGs' progress and needs.

Training activities

The AAG meetings will take place in LHWs health houses and Village Health Committees (VHCs); these venues serve as safe, inclusive, and private spaces for young girls and boys (in close proximity). AAG members will receive training in SRHR, social determinants of health, and qualitative and quantitative methodologies. The training package will be designed to develop core skills in adolescents, and they will advise on priority problems to improve SRHR from their local community perspectives. We will provide AAG members with an introduction to engage and critically draw on their expertise (See Appendix A for training activities). After the core skills training, AAG will be engaged in the prioritization of SRHR concerns and Toolkit development. The AAG will prioritize the topics for the Toolkit in consultation with the youth research assistants, youth champions, and the research team. Any disagreement between AAG participants about the prioritization list will be resolved through discussion and consensus among the AAG members. The prioritization list will be used in the Toolkit development. AAG participants will be remunerated for their time and contributions ($50-100/person).

Stage 2: Planning and co-designing the intervention

Building on the findings from previous research projects by the nominated principal application and principal applicant [26,27,34,42,43,44] and continuous input from the AAGs, a picture book and story-based SRHR and family planning advocacy Toolkit will be developed for adolescents in the local and national languages (i.e., Sindhi and Urdu) written at the 4th or 5th grade level. This Toolkit will represent a paradigm shift from a risk-based perspective to one that embraces adolescent sexuality as a positive and normative stage of development. The AAG will derive the format and content of the Toolkit to meet their needs and preferences. Some essential elements twill

be included as :: a) healthy sexuality and healthy relationships, b) teenage marriages and pregnancy and its impact on adolescents, c) family planning/contraception, d) integration of sexual health of all young people, including LGBTQ+ youth and youth with disabilities, and e) gender-based violence.f) menstrual hygiene g) unsafe abortions h) cousin marriages and transmission of familial diseases

The Toolkit will be meticulously crafted from a local context perspective to foster an environment of inclusiveness, characterized by profound respect for multifaceted identities and an unwavering commitment to non-discriminatory principles. This strategic design guarantees that both male and female adolescents are equipped with the requisite support and guidance essential for making well-informed decisions on their SRHR. Moreover, the Toolkit will be inclusive and gender-sensitive, aiming to foster adolescents' knowledge in a safe and supportive environment and address their SRHR needs confidently. The Toolkit will separate age-specific information so adolescents of different age groups can easily find appropriate information. Information on accessing SRH services will connect adolescents to those available in their community. The Toolkit will be freely available in physical and online forms and will be a great source of information for young people during national and global crises, such as pandemics or natural disasters that risk the SRHR of adolescents. Because SRHR is a key component of health, we anticipate that the Toolkit will build resilience through the effective delivery of comprehensive SRHR education.

Stage 3: Implementation and usability testing of the advocacy Toolkit

Recruitment

At the end of the project, focus group discussions (FGDs) and/or individual interviews will be conducted to evaluate the usability and acceptability of the Toolkit, seek further input for refining it, assess the effectiveness of the project, and assess directions for future research. Participants will be remunerated for their time and contributions ($10/person). For usability testing of the Toolkit, we will conduct:

• 6–8 FGDs with 5–10 adolescent participants/group (n=60 – 80) in Matiari.
• FGDs and/or individual interviews with stakeholders, such as service providers, policymakers, and members of the communities' informal support channels (e.g., parents, teachers, and religious leaders) (n=40 – 50 participants).

Youth research assistants, AAG members, youth champions, and LHWs will facilitate the recruitment of participants for this stage. Adolescent participants and stakeholders will be approached individually via telephone or in person to introduce the study objectives and activities and invite them to participate. The use of youth research assistants, youth champions, AAG, and LHWs for recruitment has been successful in past projects in rural communities in Pakistan by the NPA and PA [26,34,43]. The snowball (word-of-mouth) technique will connect with potential, isolated participants.

Data collection

Participants will review the Toolkit, . Semi-structured, open-ended questions will be asked during the FGDs that will focus on the Toolkit and usability evaluations [45]. Data collected will pertain to: a) participants' views including ease of use; b) preferences regarding receipt of health information; c) useful attributes; d) unhelpful elements; e) perceptions of the utility to improve an adolescent's SRHR; and f) recommended revisions and additions. Each

aspect of the Toolkit (e.g., narrative, visual appeal, health information, engagement, and interactivity) will be explored in the FGDs. Interviews will be conducted in the participants' local language (i.e. Sindhi).

Findings will be integrated into the Toolkit revision, and the final version will be disseminated through AAGs, youth partners, LHWs, and community midwives. The Toolkit will also be disseminated through informal channels such as community health workers and NGOs working actively in the community (e.g., HANDS, MARVI Rural Development Organization). And to schools by invoving teachers.social media platforms like TikTok, "X" formerly Twitter, and Instagram will also be used to disseminate . The AAG members will participate in dissemination activities. Pragmatic trials to evaluate the effectiveness of Toolkit in improving SRHR outcomes in adolescents are also planned for sustainability .

Data analysis

In accordance with PAR, we will use the DEPICT model for participatory analysis [46] (see Appendix B). Data analysis will occur in four steps and be concurrent with data collection: (1) Transcripts will be digitally recorded and transcribed verbatim by a professional transcriptionist in the Sindhi language and translated into English. (2) Two research assistants (RAs) and PAs and two Co-As will read the transcripts in detail several times to familiarize themselves with the content. (3) The NPA and PA will lead the team in the open coding of all transcripts. They will then group the codes into preliminary themes. Themes will be presented to the team and AAGs for feedback and additional comments, which will then be incorporated into the analysis. (4) Themes across interviews will be grouped into an organizational framework.

Rigor:

To achieve reliability and validity and ensure rigor, the team will achieve the following as discrete milestones: (1) methodological coherence, ensuring congruence between the research questions; (2) appropriate sampling to ensure efficient and effective saturation of categories with optimal quality; (3) collect and analyze data concurrently; (4) develop a coding system that will be discussed and verified with team and AAG members; (5) maintain a detailed audit trail and field notes in a central repository [47]; and (6) AAG member checks, we will share the de-identified, results, analyses, and reports with participants so they may review and provide feedback. All analyses will include an exploration of how sex, gender, and other diversity characteristics may influence, equity, experiences and attitudes at individual and system levels, using social world mapping. NVIVO® version 12 software will be used to manage the data analysis process.

Ethics and Dissemination

Ethics approval has been obtained from the University of Alberta Research Ethics Board (Pro00129101_REN1). We will abide by the Tri-Council Policy Statement (TCPS 2): Ethical Conduct for Research Involving Humans [48], which does not specify an age of consent for children. Adolescent (aged 10-19 years) participants will sign a consent and/or assent form and will not be forced to participate if their parents oppose their participation. Since the reseatch is

implementing in Pakistan so approval was also sought from Ethics Review Committee at Aga Khan University (2023-8671-26021).

Active engagement of AAG members, youth partners, and LHWs in the dissemination of the Toolkit is crucial to approach end users in every household in the rural community. . The NPA currently employs four RAs who are women, and migrated from Pakistan who will participate and mentor trainees. We will organize SRH education campaigns and youth fairs and disseminate the Toolkit at faith-based events empowered by Collaborators (i.e., Department of Health, government of Sindh, and National Youth Assembly). We will collaborate with LHVs, CMWs, community NGOs, primary care facilities and gynecologists, and school teachers to enhance awareness. This will ensure SRH knowledge is readily available to young adolescents. Social media outputs (mini-informational videos, documentary, infographics) will be created by AAGs and trainees. activities to advance access to SRHR Toolkit, including policy briefs, media reports, infographic factsheets, community reports, digital stories, graphic novels, peer-reviewed conference presentations, 3-4 journal publications, and a KT summit that brings together stakeholders to advance policy, practice, and action. Our research team has extensive links with organizations locally, nationally, and internationally that can assist with the dissemination.

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Appendix A
Adolescent Advisory Group Training Activities
(Subject to change based on AAG member's needs)

Information about training:
The training for the adolescent advisory group (AAG) includes a mix of group training sessions and individual study/practice. There will be 14 separate group training sessions. Training sessions range in length from 1.5- 2 hours and will all take place in person. The training sessions will be led by NPA, PA, youth/graduate research assistants, and trainees. The training sessions will include group discussions and opportunities to inform the actual study. While the facilitators will be there to provide AAG with important information, there will also be an opportunity for all to learn together and to improve the study as a team. AAG group members will be encouraged to ask questions, provide feedback and comments, and join in the discussions. At the end of this training, if AAG members feel that there are things we have missed or there are some topics they would like more information on, there will be an opportunity for them to inform the facilitators and we will explore different options for addressing those needs.

Training Schedule

Training Session 1: Introduction
Date/Time: TBD
Topics Covered:
- Welcome to training session #1 – Introduction
- The AAG position (roles and responsibilities).
- Training structure and ground rules
- Participant privacy and confidentiality forms.

Training Sessions 2 -7: Adolescent sexual and reproductive health*
Date/Time: TBD
Topics Covered:
- Ice breaker.
- What are Human Rights?
- What is sexual and reproductive health and rights (SRHR) and why knowledge about SRHR is important for adolescents? What are the challenges adolescents face related to SRHR? (topics covered under this module will be):

- What is the difference between gender and sex?
- Knowing about changes during puberty?
- Early marriage and consequences of early marriages
- Gender-based violence
- How the project will help to understand the adolescent's SRHR information needs?
- Any other topic identified by AAG

Training Session 8: Share the PA qualitative research findings

Date/Time: TBD

Topics Covered:

- Ice breaker
- Share the qualitative research findings
- Open discussion: how to use these findings in developing a priority list of SHRH concerns and the development of Toolkit prototype
- Debrief

Training Sessions 9-11: Identification and prioritization of SRHR concerns

Date/Time: TBD

Topics Covered:

- Ice breaker
- Participants will be actively engaged in developing a priority list of SHRH concerns
- Open discussion/personal story
- Debrief - Group discussion

Training Session 12-17: Design Thinking workshops/Co-design the Toolkit

Date/Time: TBD

Topics Covered:

- Ice breaker
- Participants will be actively engaged in Toolkit development
- Open discussion and feedback on the prototype
- Debrief - Group discussion

Training Sessions 18-20: Share the refined Toolkit prototype

Date/Time: TBD

Topics Covered:

- Ice breaker
- Share the revised Toolkit prototype with AAG participants
- Open discussion and feedback on the prototype
- Debrief - Group discussion

Appendix B: DEPICT steps, roles, and guiding questions

DEPICT step	Coordination functions	Team member roles	Questions to ask
Dynamic reading	Collate, assign and distribute a subset of transcripts to each team member. Set deadlines and meeting times.	Review a subset of assigned transcripts—record notes on important concepts.	What ideas seem to be important in these texts? (inductive)
Engaged codebook development	Assemble supplies (e.g., post-it notes, pens) and arrange for team meetings. Ensure skilled meeting facilitation. Ensure that a preliminary codebook is developed. Coordinate pilot testing and refining of the codebook.	List important ideas for categorizing data. As a group, organize categories into clusters. Come to a consensus around a preliminary codebook. Participate in pilot testing.	What is our agreed-upon list of categories and sub-categories we will use for our codebook? Do we have the right categories? Do we all understand what they mean and how to apply them? Do any require further refinement?
Participatory coding	Assign and distribute a subset of transcripts for coding to each team member—set deadlines and meeting times. Provide training and support for novices. Coordinate a strategy for managing the data.	Review and code each assigned transcript. Return coding work to the coordinator (in paper or electronic form).	Which sections of the transcript fit into which categories of our codebook?
Inclusive reviewing and summarizing of categories	Generate a list of quotes associated with each category. Assign team members a sub-set of categories to summarize. Distribute guiding worksheets for summarizing categories.	Work alone or in pairs to develop category summaries. Return work to the coordinator.	What are the main ideas? Where is there disagreement? What are some key quotes? Are there silences worth noting? What else is important to note that might help in the analysis of the larger project?
Collaborative analyzing	Arrange for one or more team meetings. Ensure skilled meeting facilitation. Select a note-taker in advance. Prior to the meeting, disseminate summaries for review. Ensure that consensus is reached and recorded on new understandings of the data.	Review summaries prior to the meeting. Participate in a collaborative meeting to make sense of data. Graphically depict or create a figure that illustrates findings. Come to a consensus on new understandings emerging from the data and what needs to be shared.	What does it all mean? What were our most important findings? What do we need to share, and with whom? What questions do we still have? For critical analyses, what structural factors may help us understand why people chose to tell us their shared stories (e.g., homophobia, neoliberalism).
Translating	Arrange for team meeting(s). Ensure skilled meeting facilitation Circulate meeting report with clear action items.	Develop a knowledge translation and exchange plan to share research results with relevant stakeholders. Create a plan for equitably distributing this work.	Who needs to know what? How do they need to hear it? Who are the best messengers? How do we get the word out? Who on our team will be responsible for what and by when?

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Engaging adolescents for sexual and reproductive health and rights and family planning advocacy in Pakistan: A qualitative study protocol

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Abstract

Introduction

Adolescents and young people aged 10 to 24 years comprise 32% of the total population of Pakistan. Adolescents and young people are a heterogeneous group–in different stages of development, living in different circumstances, and with differing and changing needs. Neglect of specific adolescents' sexual and reproductive health needs can pose serious challenges and affect physical and mental health, future employment, economic well-being, and adolescents' ability to reach their full potential. Evidence suggests that adolescents in Pakistan have poor access to sexual and reproductive health services including access to contraception and limited knowledge of sexual and reproductive health and rights (SRHR), contributing to unplanned pregnancies, very early childbearing, short birth intervals, pregnancy complications, maternal death, and disability. Despite recognizing adolescence as an important developmental period, research on SRHR needs and access to sexual and reproductive health information among adolescents in Pakistan is scarce. This project will use participatory action research (PAR) approach based on the principles of public engagement in science and innovation to develop a national SRHR and family planning advocacy Toolkit for adolescents in Pakistan.

Methods and Analysis

We will use Participatory Action Research (PAR) framework to guide our study. This research project will be conducted in three stages with cyclical recurring activities involving planning, acting, observing, and reflecting, informed by the PAR framework. The three stages are: 1) establishment of youth advisory groups and identification and prioritization of SRHR concerns, 2) planning and co-designing an appropriate intervention (i.e., SRHR and family planning advocacy Toolkit), and 3) implementation and usability testing of advocacy Toolkit. This project leverages strong, well-established partnerships among researchers, clinicians, lady health workers, and adolescent communities living in rural part of Paksitan.

Ethics and Dissemination

This study has received ethics approval from the University of Alberta Research Ethics Board (Pro00129101_REN1) and Ethics Review Committee at Aga Khan University (2023-8671-26021)**.**We will actively engage Adolescent Advisory Group (AAG) members, youth partners, and LHWs in the dissemination of the Toolkit to ensure that it will reach end users in the rural community. In collaboration with governmental platforms, community NGOs, and educational campaigns the Toolkit will be disseminated to ensure SRH knowledge is readily available to young adolescents. We will also publish our study findings for peer-reviewed publications, digital stories, and conference presentations.

Strengths and Limitations

- Our study will advance the limited knowledge base on SRHR knowledge and information needs of adolescents in rural Pakistan as well as the science underpinning PAR methods with adolescents.

- Meaningful adolescent engagement in the co-design and delivery of a knowledge translation Toolkit will promote SRHR awareness and will foster greater social acceptance and encourage the adoption of family planning methods among adolescent in Pakistan.
- Evidence generated in this project will have strong potential to increase SRHR knowledge, social acceptance, and uptake of family planning methods among adolescents in Pakistan.
- The Toolkit we develop will be transferable and scalable to other adolescent groups in Pakistan and similar international contexts and will be a great source of information for young people at the times of national and global crises, such as pandemics and natural disasters occurring due to climate change that risk SRHR of adolescents.
- However, PAR is inherently time-intensive, requiring extensive efforts to establish trust and engagement. Cultural resistance, particularly in conservative settings, may limit the scope of the research. Additionally, resource limitations and the restricted generalizability of findings (beyond specific contexts) will also be one of the limitations of current research.

Introduction

World Health Organization defines adolescents as people aged 10 to 19 years [1]. According to the National Institute of Health, adolescence is the time between the beginning of sexual maturation (puberty) and adulthood [2]. The transition from adolescence to adulthood is exciting and complex, as new responsibilities materialize and confidence and independence emerge [3,4]. As part of their physical, psychological, and social development, adolescents commonly explore their sexual identities and feelings through sexual experimentation [5,6,7]. Sexual and reproductive health (SRH) is a fundamental human right, an important aspect of adolescent health and well-being, and interconnects with various physical and mental health issues. Neglecting adolescents' SRHR needs can affect their physical and mental health, social and economic well-being, and ability to reach their full potential [8,9,10].

Pakistan has one of the highest total fertility rates (3.6 children per woman) in South Asia [11,12]. Approximately 50% of all births in Pakistan occur among girls, younger than 20 years of age, residing in rural areas [13]. The prevalence of early marriage among girls contributes to high fertility levels [13], close to 15% of 15- to 19-year-old girls were married in 2018 compared with 3% of boys in Pakistan [11]. Compared with their male counterparts, women in Pakistan typically have little to no decision-making power, fewer educational opportunities, and less control over assets and resources [14]. Unsurprisingly, the country has long been a challenging setting for sexuality education, reproductive health, youth engagement, and women's empowerment programs. Schools rarely include SRHR content in their curricula, lack of knowledge and misconceptions about SRH are common, and adolescent friendly SRH services are largely absent in the public sector [15,16,17]. Religious resistance is a major barrier to implementing SRHR programs [17]. Within the local social context, human sexuality is considered a societal taboo, restricting open discussion [18]. There are misconceptions among lower and middle-income groups that unmarried adolescents are too young to access SRH-related information and services [19]. Furthermore, laws and policies in Paksitan are typically restrictive, creating an environment that does not support the recognition of adolescent sexual and reproductive health and rights (SRHR) for healthy development. [20,21].

A small but growing body of literature suggests that many young people (aged 10 to 24 years) in Pakistan lack SRH knowledge, use fewer sexual and reproductive health services, and receive fewer sexual health education resources [15,16,22,23]. Adolescents in Pakistan possess little to no information on puberty and menstruation, gender equality and empowerment, and gender-based violence and abuse [17,24,25]. Their situation is influenced by a lack of information sources, taboos, fears, and cultural and religious stigmas. In conservative societies, like Pakistan where cultural sensitivities discourage the discussion of SRH and sexuality education is controversial, it is even more challenging for young people to access reproductive health services, especially if they are not married. Access to basic SRH services, such as family planning and sexuality education, remains low, both in urban and rural areas but more often in remote rural areas [15,26].

Government and non-governmental organizations in Pakistan deliver programs addressing various aspects of adolescent SRH (e.g., contraceptive use and SRH literacy) in different settings (e.g., schools and health facilities). However, these have been implemented mostly in urban areas/cities. Organizations are working in isolation from one another, and very

few have comprehensively evaluated their programs using rigorous methods. The lack of information on implementation makes it difficult to determine what works, for whom, and under what circumstances. Despite efforts and progress by organizations and governments in increasing the uptake of SRH services in Pakistan, adolescents in rural areas do not have access to SRH information, resources, and services [15,26,27]. Moreover, there are no programs that engage adolescents in developing and implementing SRHR and family planning interventions, which can improve the quality and responsiveness of SRH programs and policies [28]. Many programs and policies in Pakistan are based on perceptions of what is considered "proper" or "best" for young people, rather than their actual needs [15,29]. There is an "urgent need to empower adolescents to take control of their sexuality through improved knowledge and access to adolescent-centered, culturally safe SRH services, that will support them to make informed sexual and reproductive health decisions" [15,29,26]. In response to this demand, we will engage adolescents to develop a culturally relevant and easy-to-use SRHR and family planning advocacy toolkit to enhance the uptake of evidence-based SRHR and family planning information and services among adolescents in rural Pakistan. Our overarching research question is: 'By understanding SRH knowledge, information needs, and priorities of adolescents in rural Pakistan, how can we improve SRHR and empower adolescents to exercise their reproductive rights?' Our study is unique because we aim to address the SRHR and family planning needs of under served population. The research will be focusing on the full spectrum of gender diversity, including male, female. transgender and gender non-conforming adolescents. By incorporating cultural knowledge and agency, we will develop an adolescent-centered knowledge translation (KT) strategy, creating an SRHR and family planning advocacy toolkit. This toolkit will be co-designed with adolescents to ensure its usability and effectiveness. We will also evaluate the tool's usability, paving the way for future pragmatic effectiveness trials

- Focus on an under-researched population to identify their SRHR and family planning needs.
- Consider voices of the full spectrum of gender diversity (including transgender and gender non-conforming adolescents), cultural knowledge, and agency.
- Develop an adolescent-centered knowledge translation (KT) strategy (i.e., SRHR and family planning advocacy toolkit) by engaging adolescents as partners to ensure they are aware of and know how to use this Toolkit. Development and evaluation of the usability of the tool will lead to future pragmatic effectiveness trials.

Methods and Analysis

A Participatory action research (PAR) approach based on the principles of public engagement in science and innovation will be used to develop a SRHR and family planning advocacy toolkit for adolescents in Pakistan. Our objectives are:

1. To better understand adolescents' information, educational support, and service access needs related to SRHR and family planning.
2. To engage adolescents in the co-design of the SRHR and family planning advocacy Toolkit.

3. To evaluate the Toolkit's usability and usefulness in improving the SRHR of adolescents in Pakistan.
4. To disseminate the research outputs to a variety of stakeholders (such as government and non-government organizations) working to improve the SRHR of youth in Pakistan.

Participatory Action Research (PAR) Framework

PAR is a framework for conducting research and generating knowledge centered on the belief that those who are most impacted by research should be the ones who take the lead in framing the questions, the design, methods, and the modes of analysis [30]. Importantly, PAR legitimizes the active role of the communities in knowledge generation as it can lead to the participants developing abilities to analyze, reflect, and trigger collective action [30]. PAR embraces a dialectic shifting of understandings, subjectivity, and coexistence of multiple realities that depend on context and circumstance [31]. It is responsive and committed to meaningfully engaging and incorporating the end-user's voices into designing and developing interventions that provide solutions to real-world problems. PAR involves recurrent planning, action, reflection, and observation stages [32,33]. In this project, adolescents participants will be meaningfully engaged in all the PAR steps by the study team. The KT tool (SRHR and family planning advocacy toolkit) will reflect the experiences and voices of adolescents and/or communities.

Setting and Participants

The project will be implemented in Matiari, Saeedabad, and Hala rural areas of Sindh province with greater gender disparities. In 2021, 18.6% of adolescent girls were attending school versus 57.6% of adolescent boys based on a survey of 8,920 adolescents [34]. While 63% agreed there should be SRH educational sessions in their areas; 57% had never heard of such sessions available in their community. A third of adolescents reported they found discussing SRH issues with their parents and/or healthcare providers embarrassing; 80.2% agreed with the idea of conducting SRH sessions with strict confidentiality [34]. There are deep-rooted societal, religious, parental and cultural barriers to discussing adolescent SRHR, specifically with unmarried adolescents, and we must build community support first.

Lady health workers (LHWs) are an important part of communities in rural Pakistan [35,36,37]. They visit households to increase awareness of reproductive health and nutrition, facilitate registration of births and deaths, distribute contraceptives, support immunize children, and provide maternal and child health services. This allows them to develop rapport and trust with adolescents, women, and community members, vital for ensuring that the community is open, receptive, and accepting of SRHR and family planning for young girls and women. In collaboration with LHWs, we will recruit participants aged 10 to 19 years (married and unmarried) for the various stages of the research project. Moreover, stakeholders, such as service providers, Program Managers, policymakers, and members of the communities' informal support channels (e.g., parents, teachers, and religious leaders) will also be consulted to provide their expertise throughout the development of the advocacy toolkit. Adolescent participants and stakeholders will be approached individually via telephone or in person to introduce the study objectives and activities and invite them to participate. The details on the participants and recruitment for each stage is mentioned in detail in the following sections.

Study Design

The study will take place in three stages using the PAR framework: 1) Establishing adolescent advisory groups and identifying and prioritizing SRHR concerns, 2) Planning and co-designing the intervention tool (i.e., SRHR and family planning advocacy Toolkit), and 3) Implementing and usability testing of the advocacy Toolkit.

PAR and human-centred design (HCD) principles [32,33,38,39] will be used in the Toolkit design to understand the issues and possible solutions from adolescents' perspectives. Table 1 presents a summary of the PAR and HCD stages, activities, and session plans for the study. In addition, it is ensured that the Toolkit is culturally appropriate, understandable, usable, and acceptable to end users. HCD of KT products is a well-established method that involves ideation, rapid prototyping, and iterating upon the strengths and weaknesses of prototypes so that innovations may be designed quickly and with the direct input and preferences of actual "end users" [38,39].

Table 1. Summary of PAR and HCD stages, activities, and session plans for the proposed study

PAR and HCD Stages	Cyclical activities	Descriptions
Stage 1 (Empathize & Define) — Establishment of adolescent advisory groups and identification and prioritization of SRHR concerns	Planning	Project team members work with LHWs to identify and establish AAGs that serve as reference groups and work with project team members Getting AAG members and agreeing on a time and place for regular sessions Develop training sessions on SRHR Develop a summary of findings from projects completed by NPA and Co-PIs.
	Action	Deliver training sessions on SRHR in collaboration with Youth Research Assitants and Youth Champions Present and discuss foundational studies in a consultative workshop with AAGs Systematically identify thematic concerns through small homogenous AAGs and heterogeneous AAGs, Identify and prioritize top thematic concerns
	Observation	Collect key thematic concerns and priorities generated through AAG discussions, through audio-recording, capture minutes, field notes A research assistant will record field notes on AAG dynamics and interactions and the discussion's context.
	Reflection	Reflect within AAGs, compare the reports of each group The AAGs make sense of what has happened by thinking about how it fits with their experiences and local contexts using criteria
Stage 2 (Ideate & Prototype) — Planning and Co-design the intervention	Planning	Reach a common understanding between AAG and the researchers and assistants on what the research involves and ensure consent to participate AAG agrees on the time, place, number of sessions per week, and duration of the design thinking workshops. Review the thematic priorities identified in Stage 1, discuss, select, and prioritize thematic concerns for action as the trial of proof of concepts Generate a set of solutions and design intervention strategies (i.e Toolkit)
	Action	Conduct design thinking workshops with AAG and develop viable and realistic Toolkit design and content considering their local realities and culture; set evaluation strategies for actions
	Observation	Observe and document the process through notes, and audio-recordings

		Evaluate participation and representation
	Reflection	Continuous reflection throughout the action planning phase on data from observation and field notes and reflection on the action options Examine whether the proposed improvement methods (i.e., Toolkit) are feasible in terms of time, additional resources availability, and local experiences
Stage 3 (Test) — Implementation and usability testing	Planning	Review of the plan action with AAG and reach an agreement about the way strategies would be put into operation and how to document observations Designing implementation strategies and action Discuss and set implementation indicators Discuss and research consensus on how the AAG will continue with the PAR processes on own
	Action	Implementation meeting with AAG Reach an agreement about the way the Toolkit would be put into operation and how to document observations/usability testing Discuss and research consensus on how the AAG will participate in the Toolkit revisions and continue with the PAR processes on their own
	Observation	Document the revision process by taking detailed field notes, observing, and discussing with AAG members Preliminary analysis and findings of the feasibility evaluation process will be collected Conduct informal interviews with AAG to ascertain their perceptions and experiences of the process of PAR
	Reflection	Conduct evaluation meetings with AAG and collect feedback about the process of the PAR process, and reflect on the process of implementation Identify options for further PAR and action with or without academic researchers

Stage 1: Establishing adolescent advisory groups and identifying and prioritizing SRHR concerns

Recruitment

To recruit adolescents for the Adolescent advisory group (AAG) we will collaborate with lady health workers (LHWs) and youth champions who work closely with communities. With support form CIHR bridge funding, we identified and recruited five youth champions (3 girls and 2 boys; aged 18-24 years) who will work in areas not served by LHWs. Youth champions will support the recruitment of adolescent participants for the study and also participate in AAG meetings and training sessions.

The project team, LHWs, and participating youth champions will first conduct orientation sessions for the community to discuss adolescent SRHR and family planning needs and to prepare them for youth to participate in our project. We will invite parents, grandparents, teachers, and community and religious leaders. The sessions will address the unique SRHR needs and how to address those needs and concerns, as well as discuss the purpose of adolescent engagement in SRHR health promotion and awareness programs. The project team members will help LHWs and youth champions organize and lead these sessions. Following the orientation sessions, LHWs and youth champions will map out the population of adolescent males and females in their respective catchment areas in the targeted project districts and compile a list of information relating to adolescents (e.g., name, age, marital status). Youth research assistants in

this project will collaborate with LHWs and youth champions to recruit AAG participants. Participants aged 12 to 19 years (married and unmarried) will be invited to participate in the AAG. A significant body of literature will help conceptualize and operationalize the elements of adolescent engagement [7,37,40], and we intend to engage adolescents as collaborators and active participants.

Based on these young people's physiological, psychological, and social developmental stages, we anticipate that younger adolescents may find it difficult to share common cultural beliefs and values. To provide equal opportunity to all participants and engage participants actively in the AAG and the project, we will make separate age and gender groups. We will establish 6–8 AAGs to cover the 18 reporting health facilities in Matiari, with practical considerations (e.g., the number of adolescents who may be interested in participating) and as per the recommendations of research team members with extensive experience working with youth advisory groups in Canada and Pakistan. We anticipate that 8 and 12 adolescents will create meaningful engagement [40,41], and we will meet for two hours every month for approximately 18 to 24 months. This timeline will be adapted reflecting the AAGs' progress and needs.

Training activities

The AAG meetings will take place in LHWs health houses and Village Health Committees (VHCs); these venues serve as safe, inclusive, and private spaces for young girls and boys (in close proximity). AAG members will receive training in SRHR, social determinants of health, and qualitative and quantitative methodologies. The training package will be designed to develop core skills in adolescents, and they will advise on priority problems to improve SRHR from their local community perspectives. We will provide AAG members with an introduction to engage and critically draw on their expertise (See Appendix A for training activities). After the core skills training, AAG will be engaged in the prioritization of SRHR concerns and Toolkit development. The AAG will prioritize the topics for the Toolkit in consultation with the youth research assistants, youth champions, and the research team. Any disagreement between AAG participants about the prioritization list will be resolved through discussion and consensus among the AAG members. The prioritization list will be used in the Toolkit development. AAG participants will be remunerated for their time and contributions ($50-100/person).

Stage 2: Planning and co-designing the intervention

Building on the findings from previous research projects by the nominated principal application and principal applicant [26,27,34,42,43,44] and continuous input from the AAGs, a picture book and story-based SRHR and family planning advocacy Toolkit will be developed for adolescents in the local and national languages (i.e., Sindhi and Urdu) written at the 4th or 5th grade level. This Toolkit will represent a paradigm shift from a risk-based perspective to one that embraces adolescent sexuality as a positive and normative stage of development. The AAG will derive the format and content of the Toolkit to meet their needs and preferences. Some essential elements twill be included as :: a) healthy sexuality and healthy relationships, b) teenage marriages and pregnancy and its impact on adolescents, c) family planning/contraception, d) integration of sexual health of all young people, including LGBTQ+ youth and youth with disabilities, and e) gender-based violence.f) menstrual hygiene g) unsafe abortions h) cousin marriages and transmission of familial diseases

The Toolkit will be meticulously crafted from a local context perspective to foster an environment of inclusiveness, characterized by profound respect for multifaceted identities and an unwavering commitment to non-discriminatory principles. This strategic design guarantees that both male and female adolescents are equipped with the requisite support and guidance essential for making well-informed decisions on their SRHR. Moreover, the Toolkit will be inclusive and gender-sensitive, aiming to foster adolescents' knowledge in a safe and supportive environment and address their SRHR needs confidently. The Toolkit will separate age-specific information so adolescents of different age groups can easily find appropriate information. Information on accessing SRH services will connect adolescents to those available in their community. The Toolkit will be freely available in physical and online forms and will be a great source of information for young people during national and global crises, such as pandemics or natural disasters that risk the SRHR of adolescents. Because SRHR is a key component of health, we anticipate that the Toolkit will build resilience through the effective delivery of comprehensive SRHR education.

Stage 3: Implementation and usability testing of the advocacy Toolkit

Recruitment

At the end of the project, focus group discussions (FGDs) and/or individual interviews will be conducted to evaluate the usability and acceptability of the Toolkit, seek further input for refining it, assess the effectiveness of the project, and assess directions for future research. Participants will be remunerated for their time and contributions ($10/person). For usability testing of the Toolkit, we will conduct:

- 6–8 FGDs with 5–10 adolescent participants/group (n=60 – 80) in Matiari.
- FGDs and/or individual interviews with stakeholders, such as service providers, policymakers, and members of the communities' informal support channels (e.g., parents, teachers, and religious leaders) (n=40 – 50 participants).

Youth research assistants, AAG members, youth champions, and LHWs will facilitate the recruitment of participants for this stage. Adolescent participants and stakeholders will be approached individually via telephone or in person to introduce the study objectives and activities and invite them to participate. The use of youth research assistants, youth champions, AAG, and LHWs for recruitment has been successful in past projects in rural communities in Pakistan by the NPA and PA [26,34,43]. The snowball (word-of-mouth) technique will connect with potential, isolated participants.

Data collection

Participants will review the Toolkit, . Semi-structured, open-ended questions will be asked during the FGDs that will focus on the Toolkit and usability evaluations [45]. Data collected will pertain to: a) participants' views including ease of use; b) preferences regarding receipt of health information; c) useful attributes; d) unhelpful elements; e) perceptions of the utility to improve an adolescent's SRHR; and f) recommended revisions and additions. Each aspect of the Toolkit (e.g., narrative, visual appeal, health information, engagement, and interactivity) will be explored in the FGDs. Interviews will be conducted in the participants' local language (i.e. Sindhi).

Findings will be integrated into the Toolkit revision, and the final version will be disseminated through AAGs, youth partners, LHWs, and community midwives. The Toolkit will also be disseminated through informal channels such as community health workers and NGOs working actively in the community (e.g., HANDS, MARVI Rural Development Organization). And to schools by invoving teachers.social media platforms like TikTok, "X" formerly Twitter, and Instagram will also be used to disseminate . The AAG members will participate in dissemination activities. Pragmatic trials to evaluate the effectiveness of Toolkit in improving SRHR outcomes in adolescents are also planned for sustainability .

The protocol addresses potential resistance to introduce sexual and reproductive health (SRH) education to adolescents in conservative settings through a structured and culturally sensitive approach. A robust community engagement strategy will involve proactive consultations with key stakeholders, including community health care worker, parents, community stakeholders, to align project objectives with sociocultural norms. A participatory methodology will ensure that intervention design is informed by community input, fostering ownership and acceptance. A step-by-step implementation approach will introduce foundational health topics as an entry point, progressively incorporating SRH content. These strategies aim to ensure the cultural appropriateness and feasibility of the intervention while advancing adolescent health outcomes.

Data analysis

In accordance with PAR, we will use the DEPICT model for participatory analysis [46] (see Appendix B). Data analysis will occur in four steps and be concurrent with data collection: (1) Transcripts will be digitally recorded and transcribed verbatim by a professional transcriptionist in the Sindhi language and translated into English. (2) Two research assistants (RAs) and PAs and two Co-As will read the transcripts in detail several times to familiarize themselves with the content. (3) The NPA and PA will lead the team in the open coding of all transcripts. They will then group the codes into preliminary themes. Themes will be presented to the team and AAGs for feedback and additional comments, which will then be incorporated into the analysis. (4) Themes across interviews will be grouped into an organizational framework.

Rigor:

To achieve reliability and validity and ensure rigor, the team will achieve the following as discrete milestones: (1) methodological coherence, ensuring congruence between the research questions; (2) appropriate sampling to ensure efficient and effective saturation of categories with optimal quality; (3) collect and analyze data concurrently; (4) develop a coding system that will be discussed and verified with team and AAG members; (5) maintain a detailed audit trail and field notes in a central repository [47]; and (6) AAG member checks, we will share the de-identified, results, analyses, and reports with participants so they may review and provide feedback. All analyses will include an exploration of how sex, gender, and other diversity characteristics may influence, equity, experiences and attitudes at individual and system levels, using social world mapping. NVIVO® version 12 software will be used to manage the data analysis process.

Ethics and Dissemination

Ethics approval has been obtained from the University of Alberta Research Ethics Board (Pro00129101_REN1). We will abide by the Tri-Council Policy Statement (TCPS 2): Ethical Conduct for Research Involving Humans [48], which does not specify an age of consent for children. Adolescent (aged 10-19 years) participants will sign a consent and/or assent form and will not be forced to participate if their parents oppose their participation. As the research is being conducted in Pakistan, ethics approval was obtained from the University of Alberta Ethics Review Board (Pro00129101). Additionally, approval was secured from the Ethics Review Committee at Aga Khan University (2023-8671-26021).

Active engagement of AAG members, youth partners, and LHWs in the dissemination of the Toolkit is crucial to approach end users in every household in the rural community. . The NPA currently employs four RAs who are women, and migrated from Pakistan who will participate and mentor trainees. We will organize SRH education campaigns and youth fairs and disseminate the Toolkit at faith-based events empowered by Collaborators (i.e., Department of Health, government of Sindh, and National Youth Assembly). We will collaborate with LHVs, CMWs, community NGOs, primary care facilities and gynecologists, and school teachers to enhance awareness. This will ensure SRH knowledge is readily available to young adolescents. Social media outputs (mini-informational videos, documentary, infographics) will be created by AAGs and trainees. activities to advance access to SRHR Toolkit, including policy briefs, media reports, infographic factsheets, community reports, digital stories, graphic novels, peer-reviewed conference presentations, 3-4 journal publications, and a KT summit that brings together stakeholders to advance policy, practice, and action. Our research team has extensive links with organizations locally, nationally, and internationally that can assist with the dissemination.

Patient and Public Involvement

Members of the AAG and youth champions will actively participate in all phases of the research. They will receive comprehensive training to facilitate their meaningful and effective involvement throughout the project. (See appendix A for AAG training activities).

Study strength, limitations and future research

Pparticipatory action research (PAR) in adolescent sexual and reproductive health (SRH) places significant emphasis on community engagement and the inclusion of young advisors for knowledge sharing and health advocacy. This approach ensures that discussions and knowledge dissemination are culturally relevant, context-specific, and aligned with local needs. By fostering trust within communities and empowering stakeholders, PAR promotes sustainable change and provides rich, qualitative insights into the beliefs and barriers that influence SRH outcomes. However, PAR is inherently time-intensive, requiring extensive efforts to establish trust and engagement. Cultural resistance, particularly in conservative settings, may limit the scope of the research. Additionally, resource limitations and the restricted generalizability of findings (beyond specific contexts) will also be one of the limitations of current research.

Future research should prioritize the development of scalable participatory approaches, and adaptable SRH research frameworks tailored to diverse cultural settings. Exploring digital tools for engaging adolescents while preserving privacy could enhance participation and data collection. Moreover, longitudinal studies are essential to assess the long-term impacts and sustainability of PAR interventions. Comparative research across regions can help identify universal and localized determinants of SRH outcomes. Most importantly, embedding PAR findings into policy and program design can amplify their broader impact.

Competing Interests

All other authors have no competing interest to declare.

Contribution Statement

Salima Meherali (SM) is the guarantor of this project. SM conceived the idea for this project and received the project funding from CIHR. SM developed the research protocol, which was revised with contributions by ZM and ZL. ZM, ZL, and HN substantively contributed to subsequent version of the protocol, including the finalized version of this manuscript. All authors reviewed the final version of the manuscript.

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Appendix A
Adolescent Advisory Group Training Activities
(Subject to change based on AAG member's needs)

Information about training:
The training for the adolescent advisory group (AAG) includes a mix of group training sessions and individual study/practice. There will be 14 separate group training sessions. Training sessions range in length from 1.5- 2 hours and will all take place in person. The training sessions will be led by NPA, PA, youth/graduate research assistants, and trainees. The training sessions will include group discussions and opportunities to inform the actual study. While the facilitators will be there to provide AAG with important information, there will also be an opportunity for all to learn together and to improve the study as a team. AAG group members will be encouraged to ask questions, provide feedback and comments, and join in the discussions. At the end of this training, if AAG members feel that there are things we have missed or there are some topics they would like more information on, there will be an opportunity for them to inform the facilitators and we will explore different options for addressing those needs.

Training Schedule

Training Session 1: Introduction
Date/Time: TBD
Topics Covered:

- Welcome to training session #1 – Introduction
- The AAG position (roles and responsibilities).
- Training structure and ground rules
- Participant privacy and confidentiality forms.

Training Sessions 2 -7: Adolescent sexual and reproductive health*
Date/Time: TBD
Topics Covered:

- Ice breaker.
- What are Human Rights?
- What is sexual and reproductive health and rights (SRHR) and why knowledge about SRHR is important for adolescents? What are the challenges adolescents face related to SRHR? (topics covered under this module will be):
    - What is the difference between gender and sex?
    - Knowing about changes during puberty?
    - Early marriage and consequences of early marriages
    - Gender-based violence
    - How the project will help to understand the adolescent's SRHR information needs?
    - Any other topic identified by AAG

Training Session 8: Share the PA qualitative research findings
Date/Time: TBD
Topics Covered:

- Ice breaker

- Share the qualitative research findings
- Open discussion: how to use these findings in developing a priority list of SHRH concerns and the development of Toolkit prototype
- Debrief

Training Sessions 9-11: Identification and prioritization of SRHR concerns
Date/Time: TBD
Topics Covered:

- Ice breaker
- Participants will be actively engaged in developing a priority list of SHRH concerns
- Open discussion/personal story
- Debrief - Group discussion

Training Session 12-17: Design Thinking workshops/Co-design the Toolkit
Date/Time: TBD
Topics Covered:

- Ice breaker
- Participants will be actively engaged in Toolkit development
- Open discussion and feedback on the prototype
- Debrief - Group discussion

Training Sessions 18-20: Share the refined Toolkit prototype
Date/Time: TBD
Topics Covered:

- Ice breaker
- Share the revised Toolkit prototype with AAG participants
- Open discussion and feedback on the prototype
- Debrief - Group discussion

Appendix B: DEPICT steps, roles, and guiding questions

DEPICT step	Coordination functions	Team member roles	Questions to ask
Dynamic reading	Collate, assign and distribute a subset of transcripts to each team member. Set deadlines and meeting times.	Review a subset of assigned transcripts—record notes on important concepts.	What ideas seem to be important in these texts? (inductive)
Engaged codebook development	Assemble supplies (e.g., post-it notes, pens) and arrange for team meetings. Ensure skilled meeting facilitation. Ensure that a preliminary codebook is developed. Coordinate pilot testing and refining of the codebook.	List important ideas for categorizing data. As a group, organize categories into clusters. Come to a consensus around a preliminary codebook. Participate in pilot testing.	What is our agreed-upon list of categories and sub-categories we will use for our codebook? Do we have the right categories? Do we all understand what they mean and how to apply them? Do any require further refinement?
Participatory coding	Assign and distribute a subset of transcripts for coding to each team member—set deadlines and meeting times. Provide training and support for novices. Coordinate a strategy for managing the data.	Review and code each assigned transcript. Return coding work to the coordinator (in paper or electronic form).	Which sections of the transcript fit into which categories of our codebook?
Inclusive reviewing and summarizing of categories	Generate a list of quotes associated with each category. Assign team members a sub-set of categories to summarize. Distribute guiding worksheets for summarizing categories.	Work alone or in pairs to develop category summaries. Return work to the coordinator.	What are the main ideas? Where is there disagreement? What are some key quotes? Are there silences worth noting? What else is important to note that might help in the analysis of the larger project?
Collaborative analyzing	Arrange for one or more team meetings. Ensure skilled meeting facilitation. Select a note-taker in advance. Prior to the meeting, disseminate summaries for review. Ensure that consensus is reached and recorded on new understandings of the data.	Review summaries prior to the meeting. Participate in a collaborative meeting to make sense of data. Graphically depict or create a figure that illustrates findings. Come to a consensus on new understandings emerging from the data and what needs to be shared.	What does it all mean? What were our most important findings? What do we need to share, and with whom? What questions do we still have? For critical analyses, what structural factors may help us understand why people chose to tell us their shared stories (e.g., homophobia, neoliberalism).
Translating	Arrange for team meeting(s). Ensure skilled meeting facilitation Circulate meeting report with clear action items.	Develop a knowledge translation and exchange plan to share research results with relevant stakeholders. Create a plan for equitably distributing this work.	Who needs to know what? How do they need to hear it? Who are the best messengers? How do we get the word out? Who on our team will be responsible for what and by when?

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Engaging adolescents for sexual and reproductive health and rights and family planning advocacy in Pakistan: A qualitative study protocol

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Abstract

Introduction

Adolescents and young people aged 10 to 24 years comprise 32% of the total population of Pakistan. Adolescents and young people are a heterogeneous group–in different stages of development, living in different circumstances, and with differing and changing needs. Neglect of specific adolescents' sexual and reproductive health (SRH) needs can pose serious challenges and affect physical and mental health, future employment, economic well-being, and adolescents' ability to reach their full potential. Evidence suggests that adolescents in Pakistan have poor access to sexual and reproductive health services, including access to contraception and limited knowledge of sexual and reproductive health and rights (SRHR), contributing to unplanned pregnancies, very early childbearing, short birth intervals, pregnancy complications, maternal death, and disability. Despite recognizing adolescence as an important developmental period, research on SRHR needs and access to sexual and reproductive health information among adolescents in Pakistan is scarce. This project will use a participatory action research (PAR) approach based on the principles of public engagement in science and innovation to develop a national SRHR and family planning advocacy Toolkit for adolescents in Pakistan.

Methods and Analysis

We will use the PAR framework to guide our study. This research project will be conducted in three stages with cyclical recurring activities involving planning, acting, observing, and reflecting, as informed by the PAR framework. The three stages are: 1) establishment of youth advisory groups and identification and prioritization of SRHR concerns, 2) planning and co-designing an appropriate intervention (i.e., SRHR and family planning advocacy Toolkit), and 3) implementation and usability testing of advocacy Toolkit. This project leverages strong, well-established partnerships among researchers, clinicians, lady health workers, and adolescent communities living in rural parts of Pakistan.

Ethics and Dissemination

This study has received ethics approval from the University of Alberta Research Ethics Board (Pro00129101_REN1) and the Ethics Review Committee at Aga Khan University (2023-8671-26021)**.** We will actively engage Adolescent Advisory Group (AAG) members, youth partners, and lady health workers (LHWs) in the dissemination of the Toolkit to ensure that it will reach end users in the rural community. In collaboration with governmental platforms, community NGOs, and educational campaigns, the Toolkit will be disseminated to ensure SRH knowledge is readily available to young adolescents. We will also publish our study findings for peer-reviewed publications, digital stories, and conference presentations.

Strengths and Limitations

- This study will strengthen the limited knowledge base on PAR methods, highlighting their effectiveness in engaging adolescents to co-create solutions for SRH and adolescent health research.

- Meaningful adolescent engagement in the co-design and delivery of a KT Toolkit will promote SRHR awareness, foster greater social acceptance, and encourage the adoption of family planning methods among adolescents in Pakistan.
- The collaborative nature of PAR strengthens trust between researchers and adolescents, creating a safe space for open dialogue and addressing sensitive SRHR issues more effectively. The use of PAR in this project will foster active participation from adolescents, empowering them to contribute directly to the research process and ensuring the findings reflect their lived experiences and needs in SRHR.
- However, the PAR method is inherently time-intensive, requiring significant efforts to build trust and engagement, and may face challenges such as cultural resistance, resource limitations, and limited generalizability beyond specific contexts.

Introduction

World Health Organization defines adolescents as people aged 10 to 19 years [1]. According to the National Institute of Health, adolescence is the time between the beginning of sexual maturation (puberty) and adulthood [2]. The transition from adolescence to adulthood is exciting and complex, as new responsibilities materialize and confidence and independence emerge [3,4]. As part of their physical, psychological, and social development, adolescents commonly explore their sexual identities and feelings through sexual experimentation [5,6,7]. Sexual and reproductive health (SRH) is a fundamental human right, an important aspect of adolescent health and well-being, and interconnects with various physical and mental health issues. Neglecting adolescents' sexual and reproductive health and rights (SRHR) needs can affect their physical and mental health, social and economic well-being, and ability to reach their full potential [8,9,10].

Pakistan has one of the highest total fertility rates (3.6 children per woman) in South Asia [11,12]. Approximately 50% of all births in Pakistan occur among girls younger than 20 years of age residing in rural areas [13]. The prevalence of early marriage among girls contributes to high fertility levels [13]. Close to 15% of 15- to 19-year-old girls were married in 2018, compared with 3% of boys in Pakistan [11]. Compared with their male counterparts, women in Pakistan typically have little to no decision-making power, fewer educational opportunities, and less control over assets and resources [14]. Unsurprisingly, the country has long been a challenging setting for sexuality education, reproductive health, youth engagement, and women's empowerment programs. Schools rarely include SRHR content in their curricula, lack of knowledge and misconceptions about SRH are common, and adolescent-friendly SRH services are largely absent in the public sector [15,16,17]. Religious resistance is a major barrier to implementing SRHR programs [17]. Within the local social context, human sexuality is considered a societal taboo, restricting open discussion [18]. There are misconceptions among lower and middle-income groups that unmarried adolescents are too young to access SRH-related information and services [19]. Furthermore, laws and policies in Pakistan are typically restrictive, creating an environment that does not support the recognition of adolescent SRHR for healthy development [20,21].

A small but growing body of literature suggests that many young people (aged 10 to 24 years) in Pakistan lack SRH knowledge, use fewer sexual and reproductive health services, and receive fewer sexual health education resources [15,16,22,23]. Adolescents in Pakistan possess little to no information on puberty and menstruation, gender equality and empowerment, and gender-based violence and abuse [17,24,25]. Their situation is influenced by a lack of information sources, taboos, fears, and cultural and religious stigmas. In conservative societies like Pakistan, where cultural sensitivities discourage the discussion of SRH and sexuality education is controversial, it is even more challenging for young people to access reproductive health services, especially if they are not married. Access to basic SRH services, such as family planning and sexuality education, remains low, both in urban and rural areas but more often in remote rural areas [15,26].

Government and non-governmental organizations in Pakistan deliver programs addressing various aspects of adolescent SRH (e.g., contraceptive use and SRH literacy) in different settings (e.g., schools and health facilities). However, these have been implemented

mostly in urban areas/cities. Organizations are working in isolation from one another, and very few have comprehensively evaluated their programs using rigorous methods. The lack of information on implementation makes it difficult to determine what works, for whom, and under what circumstances. Despite efforts and progress by organizations and governments in increasing the uptake of SRH services in Pakistan, adolescents in rural areas do not have access to SRH information, resources, and services [15,26,27]. Moreover, there are no programs that engage adolescents in developing and implementing SRHR and family planning interventions, which can improve the quality and responsiveness of SRH programs and policies [28]. Many programs and policies in Pakistan are based on perceptions of what is considered "proper" or "best" for young people rather than their actual needs [15,29]. There is an "urgent need to empower adolescents to take control of their sexuality through improved knowledge and access to adolescent-centered, culturally safe SRH services, that will support them to make informed sexual and reproductive health decisions" [15,29,26]. In response to this demand, we will engage adolescents to develop a culturally relevant and easy-to-use SRHR and family planning advocacy toolkit to enhance the uptake of evidence-based SRHR and family planning information and services among adolescents in rural Pakistan. Our overarching research question is: 'By understanding SRH knowledge, information needs, and priorities of adolescents in rural Pakistan, how can we improve SRHR and empower adolescents to exercise their reproductive rights?' Our study is unique because we aim to address the SRHR and family planning needs of under served population. The research will focus on the full spectrum of gender diversity, including male, female, transgender and gender non-conforming adolescents. By incorporating cultural knowledge and agency, we will develop an adolescent-centered knowledge translation (KT) strategy, creating an SRHR and family planning advocacy toolkit. This toolkit will be co-designed with adolescents to ensure its usability and effectiveness. We will also evaluate the tool's usability, paving the way for future pragmatic effectiveness trials

- Focus on an under-researched population to identify their SRHR and family planning needs.
- Consider voices of the full spectrum of gender diversity (including transgender and gender non-conforming adolescents), cultural knowledge, and agency.
- Develop an adolescent-centered KT strategy (i.e., SRHR and family planning advocacy toolkit) by engaging adolescents as partners to ensure they are aware of and know how to use this Toolkit. Development and evaluation of the usability of the tool will lead to future pragmatic effectiveness trials.

Methods and Analysis

A Participatory action research (PAR) approach based on the principles of public engagement in science and innovation will be used to develop a SRHR and family planning advocacy toolkit for adolescents in Pakistan. Our objectives are:

1. To better understand adolescents' information, educational support, and service access needs related to SRHR and family planning.
2. To engage adolescents in the co-design of the SRHR and family planning advocacy Toolkit.

3. To evaluate the Toolkit's usability and usefulness in improving the SRHR of adolescents in Pakistan.
4. To disseminate the research outputs to a variety of stakeholders (such as government and non-government organizations) working to improve the SRHR of youth in Pakistan.

Participatory Action Research (PAR) Framework

PAR is a framework for conducting research and generating knowledge centered on the belief that those who are most impacted by research should be the ones who take the lead in framing the questions, the design, methods, and the modes of analysis [30]. Importantly, PAR legitimizes the active role of the communities in knowledge generation as it can lead to the participants developing abilities to analyze, reflect, and trigger collective action [30]. PAR embraces a dialectic shifting of understandings, subjectivity, and coexistence of multiple realities that depend on context and circumstance [31]. It is responsive and committed to meaningfully engaging and incorporating the end-user's voices into designing and developing interventions that provide solutions to real-world problems. PAR involves recurrent planning, action, reflection, and observation stages [32,33]. In this project, adolescent participants will be meaningfully engaged in all the PAR steps by the study team. The KT tool (SRHR and family planning advocacy toolkit) will reflect the experiences and voices of adolescents and/or communities.

Setting and Participants

The project will be implemented in Matiari, Saeedabad, and Hala, rural areas of Sindh province that have greater gender disparities. In 2021, 18.6% of adolescent girls were attending school versus 57.6% of adolescent boys, based on a survey of 8,920 adolescents [34]. While 63% agreed there should be SRH educational sessions in their areas, 57% had never heard of such sessions available in their community. A third of adolescents reported they found discussing SRH issues with their parents and/or healthcare providers embarrassing; 80.2% agreed with the idea of conducting SRH sessions with strict confidentiality [34]. There are deep-rooted societal, religious, parental, and cultural barriers to discussing adolescent SRHR, specifically with unmarried adolescents, and we must build community support first.

Lady health workers (LHWs) are an important part of communities in rural Pakistan [35,36,37]. They visit households to increase awareness of reproductive health and nutrition, facilitate registration of births and deaths, distribute contraceptives, support children's immunization, and provide maternal and child health services. This allows them to develop rapport and trust with adolescents, women, and community members, which is vital for ensuring that the community is open, receptive, and accepting of SRHR and family planning for young girls and women. In collaboration with LHWs, we will recruit participants aged 10 to 19 years (married and unmarried) for the various stages of the research project. Moreover, stakeholders, such as service providers, Program Managers, policymakers, and members of the communities' informal support channels (e.g., parents, teachers, and religious leaders), will also be consulted to provide their expertise throughout the development of the advocacy toolkit. Adolescent participants and stakeholders will be approached individually via telephone or in-person to introduce the study objectives and activities and invite them to participate. The details on the participants and recruitment for each stage are mentioned in detail in the following sections.

Study Design

The study will take place in three stages using the PAR framework: 1) Establishing adolescent advisory groups and identifying and prioritizing SRHR concerns, 2) Planning and co-designing the intervention tool (i.e., SRHR and family planning advocacy Toolkit), and 3) Implementing and usability testing of the advocacy Toolkit.

PAR and human-centred design (HCD) principles [32,33,38,39] will be used in the Toolkit design to understand the issues and possible solutions from adolescents' perspectives. Table 1 presents a summary of the PAR and HCD stages, activities, and session plans for the study. In addition, it is ensured that the Toolkit is culturally appropriate, understandable, usable, and acceptable to end users. HCD of KT products is a well-established method that involves ideation, rapid prototyping, and iterating upon the strengths and weaknesses of prototypes so that innovations may be designed quickly and with the direct input and preferences of actual "end users" [38,39].

Table 1. Summary of PAR and HCD stages, activities, and session plans for the proposed study

PAR and HCD Stages	Cyclical activities	Descriptions
Stage 1 (Empathize & Define) — Establishment of adolescent advisory groups and identification and prioritization of SRHR concerns	Planning	Project team members work with LHWs to identify and establish AAGs that serve as reference groups and work with project team members Getting AAG members and agreeing on a time and place for regular sessions Develop training sessions on SRHR Develop a summary of findings from projects completed by NPA and Co-PIs.
	Action	Deliver training sessions on SRHR in collaboration with Youth Research Assistants and Youth Champions Present and discuss foundational studies in a consultative workshop with AAGs Systematically identify thematic concerns through small homogenous AAGs and heterogeneous AAGs, Identify and prioritize top thematic concerns
	Observation	Collect key thematic concerns and priorities generated through AAG discussions, through audio-recording, capture minutes, field notes A research assistant will record field notes on AAG dynamics and interactions and the discussion's context.
	Reflection	Reflect within AAGs, compare the reports of each group The AAGs make sense of what has happened by thinking about how it fits with their experiences and local contexts using criteria
Stage 2 (Ideate & Prototype) — Planning and Co-design the intervention	Planning	Reach a common understanding between AAG and the researchers and assistants on what the research involves and ensure consent to participate AAG agrees on the time, place, number of sessions per week, and duration of the design thinking workshops. Review the thematic priorities identified in Stage 1, discuss, select, and prioritize thematic concerns for action as the trial of proof of concepts Generate a set of solutions and design intervention strategies (i.e Toolkit)
	Action	Conduct design thinking workshops with AAG and develop viable and realistic Toolkit design and content considering their local realities and culture; set evaluation strategies for actions
	Observation	Observe and document the process through notes and audio-recordings Evaluate participation and representation

	Reflection	Continuous reflection throughout the action planning phase on data from observation and field notes and reflection on the action options Examine whether the proposed improvement methods (i.e., Toolkit) are feasible in terms of time, additional resources availability, and local experiences
Stage 3 (Test) — Implementation and usability testing	Planning	Review of the plan action with AAG and reach an agreement about the way strategies would be put into operation and how to document observations Designing implementation strategies and action Discuss and set implementation indicators Discuss and research consensus on how the AAG will continue with the PAR processes on own
	Action	Implementation meeting with AAG Reach an agreement about the way the Toolkit would be put into operation and how to document observations/usability testing Discuss and research consensus on how the AAG will participate in the Toolkit revisions and continue with the PAR processes on their own
	Observation	Document the revision process by taking detailed field notes, observing, and discussing with AAG members Preliminary analysis and findings of the feasibility evaluation process will be collected Conduct informal interviews with AAG to ascertain their perceptions and experiences of the process of PAR
	Reflection	Conduct evaluation meetings with AAG and collect feedback about the process of the PAR process, and reflect on the process of implementation Identify options for further PAR and action with or without academic researchers

Stage 1: Establishing adolescent advisory groups (AAG) and identifying and prioritizing SRHR concerns

Recruitment

To recruit adolescents for the AAG we will collaborate with LHWs and youth champions who work closely with communities. With support from CIHR bridge funding, we identified and recruited five youth champions (3 girls and 2 boys; aged 18-24 years) who will work in areas not served by LHWs. Youth champions will support the recruitment of adolescent participants for the study and also participate in AAG meetings and training sessions.

The project team, LHWs, and participating youth champions will first conduct orientation sessions for the community to discuss adolescent SRHR and family planning needs and to prepare them for youth to participate in our project. We will invite parents, grandparents, teachers, and community and religious leaders. The sessions will address the unique SRHR needs, how to address those needs and concerns, and the purpose of adolescent engagement in SRHR health promotion and awareness programs. The project team members will help LHWs and youth champions organize and lead these sessions. Following the orientation sessions, LHWs and youth champions will map out the population of adolescent males and females in their respective catchment areas in the targeted project districts and compile a list of information relating to adolescents (e.g., name, age, marital status). Youth research assistants in this project will collaborate with LHWs and youth champions to recruit AAG participants. Participants aged

12 to 19 years (married and unmarried) will be invited to participate in the AAG. A significant body of literature will help conceptualize and operationalize the elements of adolescent engagement [7,37,40], and we intend to engage adolescents as collaborators and active participants.

Based on these young people's physiological, psychological, and social developmental stages, we anticipate that younger adolescents may find it difficult to share common cultural beliefs and values. To provide equal opportunity to all participants and engage participants actively in the AAG and the project, we will make separate age and gender groups. We will establish 6–8 AAGs to cover the 18 reporting health facilities in Matiari, with practical considerations (e.g., the number of adolescents who may be interested in participating) and as per the recommendations of research team members with extensive experience working with youth advisory groups in Canada and Pakistan. We anticipate that 8 and 12 adolescents will create meaningful engagement [40,41], and we will meet for two hours every month for approximately 18 to 24 months. This timeline will be adapted reflecting the AAGs' progress and needs.

Training activities

The AAG meetings will take place in LHWs health houses and Village Health Committees (VHCs); these venues serve as safe, inclusive, and private spaces for young girls and boys (in close proximity). AAG members will receive training in SRHR, social determinants of health, and qualitative and quantitative methodologies. The training package will be designed to develop core skills in adolescents, and they will advise on priority problems to improve SRHR from their local community perspectives. We will provide AAG members with an introduction to engage and critically draw on their expertise (See Appendix A for training activities). After the core skills training, AAG will be engaged in the prioritization of SRHR concerns and Toolkit development. The AAG will prioritize the topics for the Toolkit in consultation with the youth research assistants, youth champions, and the research team. Any disagreement between AAG participants about the prioritization list will be resolved through discussion and consensus among the AAG members. The prioritization list will be used in the Toolkit development. AAG participants will be remunerated for their time and contributions ($50-100/person).

Stage 2: Planning and co-designing the intervention

Building on the findings from previous research projects by the nominated principal application and principal applicant [26,27,34,42,43,44] and continuous input from the AAGs, a picture book and story-based SRHR and family planning advocacy Toolkit will be developed for adolescents in the local and national languages (i.e., Sindhi and Urdu) written at the 4th or 5th grade level. This Toolkit will represent a paradigm shift from a risk-based perspective to one that embraces adolescent sexuality as a positive and normative stage of development. The AAG will derive the format and content of the Toolkit to meet their needs and preferences. Some essential elements will be included as: a) healthy sexuality and healthy relationships, b) teenage marriages and pregnancy and its impact on adolescents, c) family planning/contraception, d) integration of sexual health of all young people, including LGBTQ+ youth and youth with disabilities, and e) gender-based violence.f) menstrual hygiene, g) unsafe abortions, h) cousin marriages and transmission of familial diseases

The Toolkit will be meticulously crafted from a local context perspective to foster an environment of inclusiveness, characterized by profound respect for multifaceted identities and

an unwavering commitment to non-discriminatory principles. This strategic design guarantees that both male and female adolescents are equipped with the requisite support and guidance essential for making well-informed decisions on their SRHR. Moreover, the Toolkit will be inclusive and gender-sensitive, aiming to foster adolescents' knowledge in a safe and supportive environment and address their SRHR needs confidently. The Toolkit will separate age-specific information so adolescents of different age groups can easily find appropriate information. Information on accessing SRH services will connect adolescents to those available in their community. The Toolkit will be freely available in physical and online forms and will be a great source of information for young people during national and global crises, such as pandemics or natural disasters that risk the SRHR of adolescents. Because SRHR is a key component of health, we anticipate that the Toolkit will build resilience through the effective delivery of comprehensive SRHR education.

Stage 3: Implementation and usability testing of the advocacy Toolkit

Recruitment

At the end of the project, focus group discussions (FGDs) and/or individual interviews will be conducted to evaluate the usability and acceptability of the Toolkit, seek further input for refining it, assess the effectiveness of the project, and assess directions for future research. Participants will be remunerated for their time and contributions ($10/person). For usability testing of the Toolkit, we will conduct:

- 6–8 FGDs with 5–10 adolescent participants/group (n=60 – 80) in Matiari.
- FGDs and/or individual interviews with stakeholders, such as service providers, policymakers, and members of the communities' informal support channels (e.g., parents, teachers, and religious leaders) (n=40 – 50 participants).

Youth research assistants, AAG members, youth champions, and LHWs will facilitate the recruitment of participants for this stage. Adolescent participants and stakeholders will be approached individually via telephone or in-person to introduce the study objectives and activities and invite them to participate. The use of youth research assistants, youth champions, AAG, and LHWs for recruitment has been successful in past projects in rural communities in Pakistan by the NPA and PA [26,34,43]. The snowball (word-of-mouth) technique will connect with potential, isolated participants.

Data collection

Participants will review the Toolkit. Semi-structured, open-ended questions will be asked during the FGDs that will focus on the Toolkit and usability evaluations [45]. Data collected will pertain to: a) participants' views, including ease of use; b) preferences regarding receipt of health information; c) useful attributes; d) unhelpful elements; e) perceptions of the utility to improve an adolescent's SRHR; and f) recommended revisions and additions. Each aspect of the Toolkit (e.g., narrative, visual appeal, health information, engagement, and interactivity) will be explored in the FGDs. Interviews will be conducted in the participants' local language (i.e. Sindhi).

Findings will be integrated into the Toolkit revision, and the final version will be disseminated through AAGs, youth partners, LHWs, and community midwives. The Toolkit will also be disseminated through informal channels such as community health workers and NGOs

working actively in the community (e.g., HANDS, MARVI Rural Development Organization). And to schools by involving teachers. Social media platforms like TikTok, "X", formerly Twitter, and Instagram, will also be used to disseminate. The AAG members will participate in dissemination activities. Pragmatic trials to evaluate the effectiveness of Toolkit in improving SRHR outcomes in adolescents are also planned for sustainability.

The protocol addresses potential resistance to introducing SRH education to adolescents in conservative settings through a structured and culturally sensitive approach. A robust community engagement strategy will involve proactive consultations with key stakeholders, including community healthcare workers, parents, and community stakeholders, to align project objectives with sociocultural norms. A participatory methodology will ensure that intervention design is informed by community input, fostering ownership and acceptance. A step-by-step implementation approach will introduce foundational health topics as an entry point, progressively incorporating SRH content. These strategies aim to ensure the cultural appropriateness and feasibility of the intervention while advancing adolescent health outcomes.

Data analysis

In accordance with PAR, we will use the DEPICT model for participatory analysis [46] (see Appendix B). Data analysis will occur in four steps and be concurrent with data collection: (1) Transcripts will be digitally recorded and transcribed verbatim by a professional transcriptionist in the Sindhi language and translated into English. (2) Two research assistants (RAs) and PAs and two Co-As will read the transcripts in detail several times to familiarize themselves with the content. (3) The NPA and PA will lead the team in the open coding of all transcripts. They will then group the codes into preliminary themes. Themes will be presented to the team and AAGs for feedback and additional comments, which will then be incorporated into the analysis. (4) Themes across interviews will be grouped into an organizational framework. This is a five-year project scheduled to commence in June 2023 and conclude in May 2028.

Rigor

To achieve reliability and validity and ensure rigor, the team will achieve the following as discrete milestones: (1) methodological coherence, ensuring congruence between the research questions; (2) appropriate sampling to ensure efficient and effective saturation of categories with optimal quality; (3) collect and analyze data concurrently; (4) develop a coding system that will be discussed and verified with team and AAG members; (5) maintain a detailed audit trail and field notes in a central repository [47]; and (6) AAG member checks, we will share the de-identified, results, analyses, and reports with participants so they may review and provide feedback. All analyses will include an exploration of how sex, gender, and other diversity characteristics may influence equity, experiences, and attitudes at individual and system levels, using social world mapping. NVIVO® version 12 software will be used to manage the data analysis process.

Ethics and Dissemination

Ethics approval has been obtained from the University of Alberta Research Ethics Board (Pro00129101_REN1). We will abide by the Tri-Council Policy Statement (TCPS 2): Ethical

Conduct for Research Involving Humans [48], which does not specify an age of consent for children. Adolescent (aged 10-19 years) participants will sign a consent and/or assent form and will not be forced to participate if their parents oppose their participation. As the research is being conducted in Pakistan, ethics approval was obtained from the University of Alberta Ethics Review Board (Pro00129101). Additionally, approval was secured from the Ethics Review Committee at Aga Khan University (2023-8671-26021).

Active engagement of AAG members, youth partners, and LHWs in the dissemination of the Toolkit is crucial to approach end users in every household in the rural community. . The NPA currently employs four RAs who are women and have migrated from Pakistan. They will participate and mentor trainees. We will organize SRH education campaigns and youth fairs and disseminate the Toolkit at faith-based events empowered by Collaborators (i.e., the Department of Health, Government of Sindh, and National Youth Assembly). We will collaborate with LHVs, community midwives, community NGOs, primary care facilities and gynaecologists, and school teachers to enhance awareness. This will ensure that SRH knowledge is readily available to young adolescents. Social media outputs (mini-informational videos, documentaries, infographics) will be created by AAGs and trainees. activities to advance access to SRHR Toolkit, including policy briefs, media reports, infographic factsheets, community reports, digital stories, graphic novels, peer-reviewed conference presentations, 3-4 journal publications, and a KT summit that brings together stakeholders to advance policy, practice, and action. Our research team has extensive links with organizations locally, nationally, and internationally that can assist with the dissemination.

Patient and Public Involvement

Members of the AAG and youth champions will actively participate in all phases of the research. They will receive comprehensive training to facilitate their meaningful and effective involvement throughout the project. (See Appendix A for AAG training activities).

Competing Interests

All other authors have no competing interest to declare.

Contribution Statement

Salima Meherali (SM) is the guarantor of this project. SM conceived the idea for this project and received the project funding from CIHR. SM developed the research protocol, which was revised with contributions by ZM and ZL. ZM, ZL, and HN substantively contributed to subsequent version of the protocol, including the finalized version of this manuscript. All authors reviewed the final version of the manuscript.

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Appendix A
Adolescent Advisory Group Training Activities
(Subject to change based on AAG member's needs)

Information about training:
The training for the adolescent advisory group (AAG) includes a mix of group training sessions and individual study/practice. There will be 14 separate group training sessions. Training sessions range in length from 1.5- 2 hours and will all take place in person. The training sessions will be led by NPA, PA, youth/graduate research assistants, and trainees. The training sessions will include group discussions and opportunities to inform the actual study. While the facilitators will be there to provide AAG with important information, there will also be an opportunity for all to learn together and to improve the study as a team. AAG group members will be encouraged to ask questions, provide feedback and comments, and join in the discussions. At the end of this training, if AAG members feel that there are things we have missed or there are some topics they would like more information on, there will be an opportunity for them to inform the facilitators and we will explore different options for addressing those needs.

Training Schedule

Training Session 1: Introduction
Date/Time: TBD
Topics Covered:

- Welcome to training session #1 – Introduction
- The AAG position (roles and responsibilities).
- Training structure and ground rules
- Participant privacy and confidentiality forms.

Training Sessions 2 -7: Adolescent sexual and reproductive health*
Date/Time: TBD
Topics Covered:

- Ice breaker.
- What are Human Rights?
- What is sexual and reproductive health and rights (SRHR) and why knowledge about SRHR is important for adolescents? What are the challenges adolescents face related to SRHR? (topics covered under this module will be):
    - What is the difference between gender and sex?
    - Knowing about changes during puberty?
    - Early marriage and consequences of early marriages
    - Gender-based violence
    - How the project will help to understand the adolescent's SRHR information needs?
    - Any other topic identified by AAG

Training Session 8: Share the PA qualitative research findings
Date/Time: TBD
Topics Covered:

- Ice breaker

- Share the qualitative research findings
- Open discussion: how to use these findings in developing a priority list of SHRH concerns and the development of Toolkit prototype
- Debrief

Training Sessions 9-11: Identification and prioritization of SRHR concerns
Date/Time: TBD
Topics Covered:

- Ice breaker
- Participants will be actively engaged in developing a priority list of SHRH concerns
- Open discussion/personal story
- Debrief - Group discussion

Training Session 12-17: Design Thinking workshops/Co-design the Toolkit
Date/Time: TBD
Topics Covered:

- Ice breaker
- Participants will be actively engaged in Toolkit development
- Open discussion and feedback on the prototype
- Debrief - Group discussion

Training Sessions 18-20: Share the refined Toolkit prototype
Date/Time: TBD
Topics Covered:

- Ice breaker
- Share the revised Toolkit prototype with AAG participants
- Open discussion and feedback on the prototype
- Debrief - Group discussion

Appendix B: DEPICT steps, roles, and guiding questions

DEPICT step	Coordination functions	Team member roles	Questions to ask
Dynamic reading	Collate, assign and distribute a subset of transcripts to each team member. Set deadlines and meeting times.	Review a subset of assigned transcripts—record notes on important concepts.	What ideas seem to be important in these texts? (inductive)
Engaged codebook development	Assemble supplies (e.g., post-it notes, pens) and arrange for team meetings. Ensure skilled meeting facilitation. Ensure that a preliminary codebook is developed. Coordinate pilot testing and refining of the codebook.	List important ideas for categorizing data. As a group, organize categories into clusters. Come to a consensus around a preliminary codebook. Participate in pilot testing.	What is our agreed-upon list of categories and sub-categories we will use for our codebook? Do we have the right categories? Do we all understand what they mean and how to apply them? Do any require further refinement?
Participatory coding	Assign and distribute a subset of transcripts for coding to each team member—set deadlines and meeting times. Provide training and support for novices. Coordinate a strategy for managing the data.	Review and code each assigned transcript. Return coding work to the coordinator (in paper or electronic form).	Which sections of the transcript fit into which categories of our codebook?
Inclusive reviewing and summarizing of categories	Generate a list of quotes associated with each category. Assign team members a sub-set of categories to summarize. Distribute guiding worksheets for summarizing categories.	Work alone or in pairs to develop category summaries. Return work to the coordinator.	What are the main ideas? Where is there disagreement? What are some key quotes? Are there silences worth noting? What else is important to note that might help in the analysis of the larger project?
Collaborative analyzing	Arrange for one or more team meetings. Ensure skilled meeting facilitation. Select a note-taker in advance. Prior to the meeting, disseminate summaries for review. Ensure that consensus is reached and recorded on new understandings of the data.	Review summaries prior to the meeting. Participate in a collaborative meeting to make sense of data. Graphically depict or create a figure that illustrates findings. Come to a consensus on new understandings emerging from the data and what needs to be shared.	What does it all mean? What were our most important findings? What do we need to share, and with whom? What questions do we still have? For critical analyses, what structural factors may help us understand why people chose to tell us their shared stories (e.g., homophobia, neoliberalism).
Translating	Arrange for team meeting(s). Ensure skilled meeting facilitation Circulate meeting report with clear action items.	Develop a knowledge translation and exchange plan to share research results with relevant stakeholders. Create a plan for equitably distributing this work.	Who needs to know what? How do they need to hear it? Who are the best messengers? How do we get the word out? Who on our team will be responsible for what and by when?