Original Article

Assessment of Sexual and Reproductive Health Interventions in Rural Sindh: A Community-Based Cross-Sectional Study

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Abstract

Background: Pakistan faces significant sexual and reproductive health (SRH) challenges, with an annual population growth rate of 2.55%. Particularly in rural Sindh, the SRH and FP uptake condition is poor due to inadequate health literacy and awareness.

Objective: To examine the current status of SRH knowledge, contraceptive use, and practices in rural Sindh household surveys.

Methods: A cross-sectional study was conducted in four rural districts of Sindh, Pakistan (Sanghar, Dadu, Umerkot, and Ghotki), between October-December 2024, using a structured questionnaire. 1400 Married Women of Reproductive Age (MWRAs) with age (16-49) and 214 Community Health Workers (Marvi workers) were identified and included in the study. Ethical clearance and informed consent were acquired before the start of the study. SPSS version 24 was used for statistical data analysis.

Results: The findings revealed that modern CPR (mCPR) was 31.1%, with considerable variation across districts. Among contraceptive methods, injectable contraceptives and oral pills were the most commonly used methods among MWRAs, while uptake remained lower among young women and MWRAs with a smaller number of children (small family size). Furthermore, the study identified Marvi workers as the primary source of verified SRH awareness and contraceptive access, with high community trust. However, low access to formal healthcare facilities and ongoing socio-cultural barriers and gaps in services still remain that need to be addressed.

Conclusion: The study concludes that SRH education and accessible FP services are effective interventions to improve the knowledge and perception, and to reduce unintended pregnancies among MWRAs.

Keywords: Sexual and reproductive health; MWRA; family planning; CPR, Lady health workers, Rural communities, contraceptives

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Introduction

Approximately one billion women require family planning services worldwide, 842 million women are currently using modern contraceptives, and 80 million are using traditional contraceptive methods for family planning (FP).[1] SRH awareness and health education can significantly impact women's knowledge of family planning and services. The remote areas of Pakistan have limited knowledge of sexual and reproductive health issues.[2] SRH and family planning encompass informed and voluntary practices adopted by individuals and couples, grounded in knowledge, attitudes, and responsible decision-making. It is a conscious effort of a couple to limit the number of children, unwanted pregnancies, and abortions, through the use of contraceptive methods.[3] Eventually, this also lowers the risk of sexually transmitted diseases, *e.g.*, HIV, and leads to healthier and more committed families with healthy children. Currently, Pakistan is the 5th most populous country globally, where SRH and knowledge are among the highest priority issues of the country. Population scientists (demographers) reported that if the population of Pakistan is increased at the same rate, Pakistan would be the 3rd most populous country (over 285 million) by 2050.[4] The total population in Pakistan is predicted to continuously increase between 2024-2029 by a total of 23.9 million people (+10.13 percent).[5] This will greatly impact Pakistan's socioeconomic growth and its ability to achieve its Sustainable Development Goals (SDGs), especially SDG 3 (good

health and well-being).[6] In Sindh Province, particularly in rural and interior regions, low literacy levels substantially hinder the comprehension and adoption of SRH practices. This limitation contributes to a range of adverse outcomes, including unintended pregnancies, unsafe abortions, a high burden of STIs, and various gynecological disorders. Comparable patterns, marked by elevated prevalence of STIs and reproductive health conditions, have been consistently reported across other low-income settings globally. Collectively, evidence indicates that advancements in education, women's empowerment, and supportive socio-environmental conditions, facilitated through FP interventions, render FP as a highly effective and practical strategy for addressing interconnected development challenges. These include poverty reduction, improved health and well-being, and the promotion of gender equality.[9]

Health and Nutrition Development Society (HANDS) is a registered non-governmental organization (NGO) that serves underprivileged communities in rural areas of Pakistan. It is working on a larger scale through community-based programs that address the necessities of life and (SDGs) initiatives. One of the largest activities of HANDS is family planning and SRH awareness and services.[4] The current study aimed to improve family planning services using local households in four districts of rural Sindh, facilitating discussions on family planning, and improving access to modern contraceptive meth-ods.[10] Previous research on FP and mCPR uptake has highlighted evidence derived from controlled household-level surveys conducted in Matlab, Bangladesh, and Navrongo, Ghana, exhibitted a positive outcome in family planning services that reduced fertility rate and enhanced gap in consecutive pregnancies, leading to betterment in maternal health and mortality. In Matlab study, findings showed that women's earnings, assets, and body mass index (BMI), as well as children's schooling and BMI, significantly improved with improved access to family planning services as compared to control areas.[11] Among Asian countries, Pakistan is the first country to start the national program for FP uptake and general awareness to increase the CPR up to 50%. To achieve this aim, well-trained women, Lady Health Workers (LHWs), who visit remote areas to interact and provide essential guidelines and materials for improved health, including SRH.[12] Marvi is a HANDS Welfare Foundation's specified LHWs who works in communities to create awareness for SRH and family planing. Contraceptive use is reported to increase rapidly in rural settings when trained LHWs disseminate awareness among the community.[13] According to Pakistan's national aim, the CPR is to be raised to 50% by 2030, which is currently hindered at around 30–35%.[14] Literature indicates that regular engagements of LHWs result in positive outcomes in rural areas, such as community-based health education, improved maternal-child health, increased literacy rates, reduced non-communicable diseases, and particularly services to family planning and contraception. It is also observed in previous studies that MWRAs of rural Sindh lack the information about family planning methods, how to use them, and where to get them.[3] Currently, approximately 11.26 million MWRAs use any one of the reported methods, 8.22 million used a recent method, and 4.94 million acknowledged such a facility in the last year.[6]

Therefore, the current cross-sectional study was conducted to assess the accessibility and level of awareness about SRH and FP interventions in four rural districts of Sindh Province: Sanghar, Dadu, Umerkot, and Ghotki. In addition, the study generated comprehensive demographic and reproductive health data across the selected districts, offering a valuable resource for understand-ding the local SRH situation and patterns of family planning method utilization in rural Sindh. Yet, more effort is required to address the challenges and gaps to ensure that SRH services reach all low-resource communities across Pakistan, especially in rural settings.

Study Rationale

Despite sustained national efforts and substantial investment in FP programs, contraceptive uptake in Pakistan remains low, particularly in rural and underserved communities. Current estimates indicate a CPR of approximately 32–34%, with a national target of achieving 50% CPR by 2030. Persistent myths and misconceptions, misinformation, gendered decision-making dynamics, and limited access to modern contraceptive methods continue to impede FP adoption. In this context, the present study was designed to assess the situation of SRH and FP services across four districts of Sindh, Pakistan.

Methods

The present study employed a community-based cross-sectional study design that assesses the current situation of SRH awareness, contraceptive use, and access to FP services among MWRAs across four districts of rural Sindh (Umerkot, Dadu, Ghotki, and Sanghar). MWRAs between the ages of 16-49 were identified and included in the study as study participants. Written and verbal informed consent were obtained from each study participant to be included in the study. The participation was entirely voluntary, and participants could quit at any time without any penalty. All data and identification were kept confidential during the whole study period and thereafter. For publication, all data were anonymized, and no personal identifier was used in this paper. For data collection, the study uses a structured questionnaire on women's age, education, knowledge of CPR, decision-making power of family planing, parity status, and access to family planning services. A multi-stage cluster sampling technique was employed for data collection. In the first stage, the four districts (Sanghar, Dadu, Umerkot, and Ghotki) were selected; in the second stage, union councils were randomly selected from each district. In the third stage, villages were randomly selected from each union council. Lastly, systematic random sampling for households was employed, and one eligible MWRA per household was interviewed. The sample size was calculated through the OpenEpi online tool, assuming a total population of four districts of approximately 1.3 million based on the 2023 Census of Pakistan, an expected CPR of 30%, a 95% confidence level, a 5% margin of error, and a design effect of 1.5 to account for cluster sampling. The estimated size was found to be 1380 for all four districts, which was rounded off to 1400. In total, 1400 MWRAs were identified and interviewed (face-to-face) (Table-1). MWRAs residing in the selected households for at least six months and willing to provide informed consent were eligible to participate in the study. Whereas women who were seriously ill, cognitively unable to respond to the questionnaire, temporarily visiting the household (guest), or unwilling to provide consent were excluded. Ethical approval was obtained before the start of the study from HANDS Welfare Foundation's Ethical Review Committee (HANDS-ERC). The data was collected by CHWs (Marvis) after getting training on the data collection tool. Marvi was able to communicate effectively in the local language (Sindhi) with MWRAs. The data was analyzed using SPSS for statistical analysis.

Table 1: *Distribution of Study Participants*

Type of Sample	Sanghar	Umerkot	Dadu	Ghotki	Total
MWRAs	350	350	350	350	1400
Data collected					**1400**

Results

The study was designed to assess the SRH and FP awareness and uptake situation across four districts, with special focus on rural settings where the overall literacy rate was low. The findings of the current study revealed a detailed understanding of the socio-economic barriers and the current SRH practices among MWRAs and barriers in getting access to FP commodities.

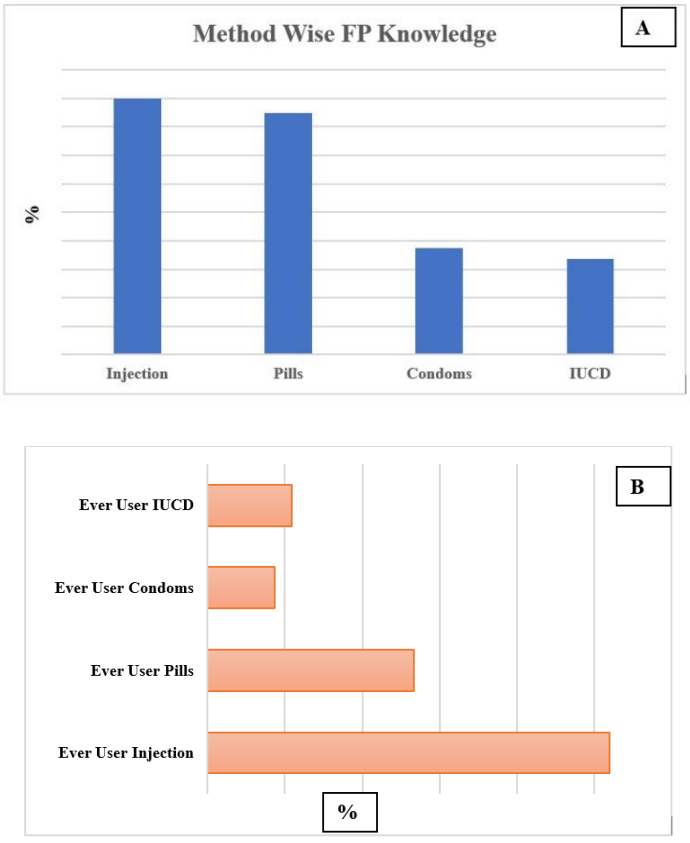

Figure 1: *(A) Level of knowledge among MWRAs (%). (B) Contraceptive use (%) among MWRAs*

Our study included MWRAs (n = 1400) with a mean age of 29 ± 4.8 years. It was found that HANDS-

CHWs (MARVIs) are the key source of information and promote FP awareness among MWRAs, and also provide facilitation in access to SRH services. The assessment of MWRAs' existing knowledge of FP practices and services revealed that injections (26%) and oral pills (25%) were the two most common methods, and MWRAs have more knowledge about them (Figure 1A). Previous studies conducted in Pakistan reported that male condoms and female sterilization were among the most commonly used methods (Figue1B).[15,16]

Contraceptive Prevalence Rate (CPR)

Evidence-based understanding and situational analysis at the root level are essential to identify gaps and challenges among MWRAs and how they are practicing their SRH. In this study, we evaluated the CPR among MWRAs of four districts. Data analysis revealed a significant difference in contraceptive use in four intervention areas of Sindh.

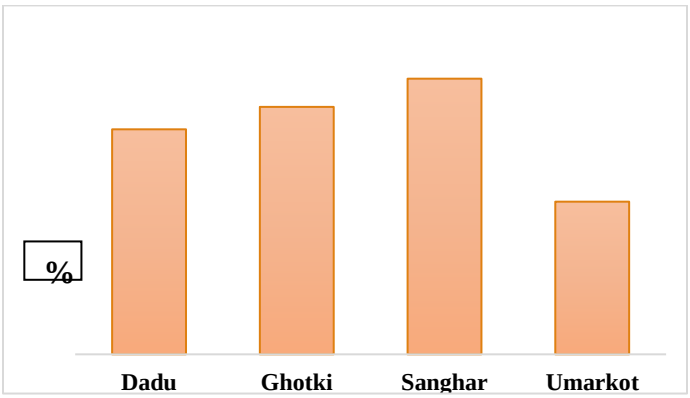

Figure 2: *Level of contraceptive use (%) in four districts of Sindh.*

In 1994, the program of LHWs was introduced in Pakistan, which was further expanded to reach 110 million people approximately. As a result, the LHW program transforms the rural settings by increasing awareness, particularly in Punjab.[17] However, in Sindh, progress was not up to the mark and was low. The challenges were higher due to socio-cultural barriers with significantly low literacy in general. The current analysis showed that the cumulative mCPR across all four districts of rural Sindh was found to be 31.1%, while district-wise analysis showed variation in CPR, with Sanghar reporting the highest mCPR (38.1%), followed by Ghotki (34.2%), Dadu (31.1%), and Umerkot (21.1%) (Figure 2). Moreover, among several mCPRs, the injectable contraceptives and oral pills were the only methods known and used in the current intervention areas. These findings highlight the need to accelerate the targeted community-based strategies to improve awareness and access to other methods of FP services.

Uptake of FP and number of children

It is essential to understand the factors that influence contraceptive use and acceptance in designing an effective intervention, particularly in rural settings of Pakistan, where fertility rates remain high, and literacy rates are low. As summarized in Figure 3, respondents reported that FP use is preferred where the number of children is 5+, whereas FP usage is low where children are 0-2. The research findings indicate that women with 0–2 children exhibited a mCPR of 46.3% in the present study (blue bar), compared to 34% in project monitoring data (red bar) and 17% reported in the Pakistan Demographic and Health Survey (PDHS) 2017–18 (yellow bar). These differences reflect variation across data sources and time periods rather than contradictory estimates within the same dataset.[18] In the same way, for MWRAs with 3-5 children, the percentages of FP usage are found to be low. The comparison shown here revealed the shifts or consistencies in FP uptake over time.[16]

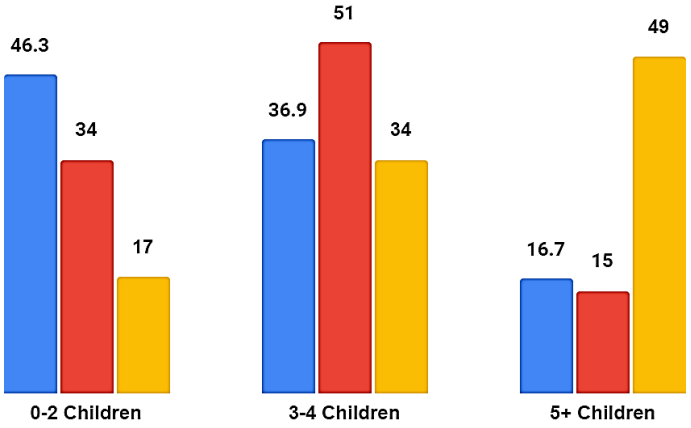

Figure 3: *Trend of contraceptive use (%) with parity*

Data analysis showed that FP utilization is increasing with the number of children in the rural areas of Sindh. MWRAs with a number of children (0-2) reported the lowest mCPR (17%), as compared to MWRAs with children (3–4), which show moderate use (34%), and women with 5 or more children exhibit the highest use (49%) (Figure 3). The observed trend suggests that MWRAs adopt FP services according to family size grows, reflecting their will to limit the family size or create birth space. The current findings showed a similar trend to previous data, that a higher number of children increased the FP uptake in Pakistan. This observation underscores the need to initiate key steps

to promote early adaptation of FP services and their health benefits on maternal and child health.[18]

Access to Contraceptives

Access and affordability to FP commodities are highly important. The study participants (MWRAs) revealed that they depend on Marvi workers/LHVs of their villages as the most accessible source of contraceptive supplies. CHWs also playing important role in making services accessible to MWRAs who may face challenges in mobility, cultural, and socio-economic barriers in visiting formal healthcare facilities. In comparison to this, the use of medical stores, general stores, offices of LHWs, private hospitals/clinics, and government healthcare facilities is found to be lower, which indicates limited engagement with these facilities (Figure 4). The consistent pattern was observed across all study districts of rural Sindh, which highlights the promising role of CHWs in promoting awareness and FP services. That, in turn, improves maternal and child health.[8,19]

Figure 4: *Sources of contraceptive uptake of MWRAs*

The observed lack of access to formal healthcare facilities might be due to distance, cost (affordability), lack of female staff, or perceived poor quality of services. Likewise, dependence on private hospitals for FP supplies is also minimal, which needs to be explored further (Figure 4). The current observations showed that the CHWs are playing an essential role in promoting and providing FP awareness and services in rural areas of Sindh, Pakistan.

Age and Contraceptive uptake

The data analysis showed a direct relationship between the age of the MWRAs and FP Uptake. As the age of the MWRAs is increasing, the uptake of FP is also increasing. Women aged between 30-39 years are found to be higher users of contraceptives, as shown in Figure 5. These findings reflect the stage of family size growth where middle-aged women (30-39 years) often sought to limit the family size. Moreover, the relatively high contraceptive use among MWRAs (25–29 years) suggests the increased awareness and acceptance of FP practices during the early childbearing age.[18]

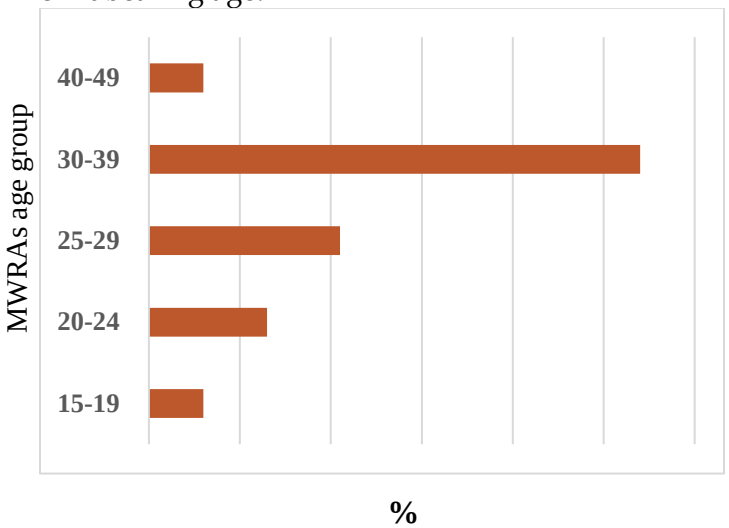

Figure 5: *The contraceptive use (%) by age groups of MWRAs*

The contraceptive use is found to be markedly lower among younger women (aged 15–19 and 20–24 years). The evidence-based reasons behind this should be explored further. We believe that the lower uptake may be attributed to socio-cultural norms, higher expectations for early fertility, restricted decision-making power, and less exposure to FP counseling. MWRAs (aged 40–49 years) exhibited decreased contraceptive use that might reflect diminished biological age of fertility. As a whole, the age-based distribution (age = 16-24) showcased the targeted population to be addressed, particularly to avoid unwanted pregnancies and to enhance birth space.

Satisfaction level of MWRAs

Findings showed that MWRAs were largely satisfied with the contraceptive methods they were using, suggesting good usability and acceptance. In Sanghar, MWRAs reported the challenges that may require enhanced follow-up and counseling services. MWRAs showed considerable trust in the Marvi workers and the services they provided, reflecting confidence in their guidance and reinforcing the importance of community-based providers in improving family planning uptake. The LHW Program is the world's largest program, launched in Pakistan in 1994 to provide knowledge of primary health care.

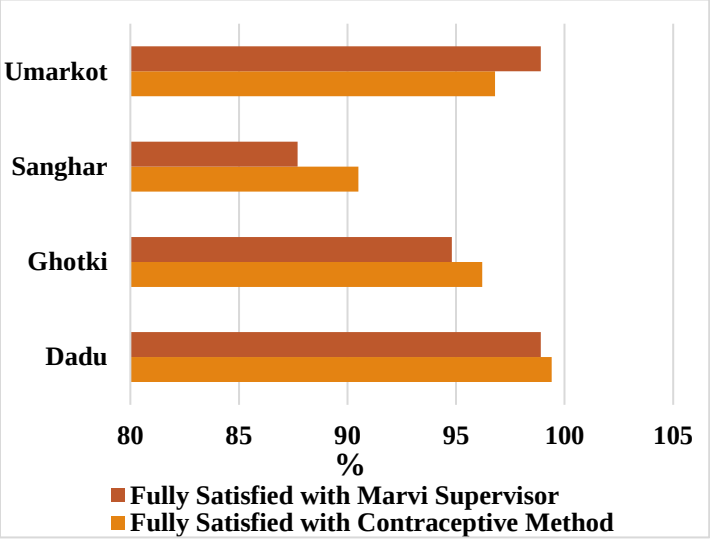

Figure 6: *Trend of the level of satisfaction of MWRAs with Marvis and contraceptive methods (%).*

This program exhibited a profound effect on Pakistan's progress in achieving the best health care and the health- and poverty-related developmental goals.[20] In the present study of family planning and use of contraceptives, LHW named "Marvi" (a strong character of Sindh folktale) workers played a remarkable role in spreading awareness and counselling of using modern contraceptives at every door of the selected communities. Currently, 1400 MWRAs were interviewed individually with a detailed questionaire about age, parity, decision power in family planning, income, education, number of pregnancies and live children, their opinion about support from Marvi workers in awareness about the use of contraceptives and supply. Therefore, the research findings highlight a successful community-led Marvi model that has enhanced access to family planning services, improved reproductive health outcomes, and contributed to broader social well-being.

Statistical Analysis

The chi-square test showed significant differences in CPR across the four districts ($\chi^2 = 32.47$, $p < 0.001$), with Sanghar having the highest CPR at 65.3% and Umerkot the lowest at 45.5%. Access to Marvi workers was strongly and significantly associated with contraceptive use ($\chi^2 = 112.34$, $p < 0.001$), with women having access nearly twice as likely to use contraception (63.9%) compared to those without access (31.8%). Similarly, women's education showed a significant association ($\chi^2 = 84.56$, $p < 0.001$), with educated women achieving an 82.8% CPR compared to 51.1% among women with no formal education. Lastly, all four districts showed statistically signifycant improvements ($p < 0.001$), with Sanghar increasing by 27.2 % ($\chi^2 = 52.14$), Ghotki by 25.7 points ($\chi^2 = 47.89$), Dadu by 23.7 points ($\chi^2 = 41.23$), and Umerkot by 24.4 points ($\chi^2 = 46.78$), confirming the effectiveness of the Marvi workers interventions in all study areas.

Discussion

The study provides a comprehensive situational analysis of SRH awareness and mCPR uptake among MWRAs in four districts of Sindh, Pakistan, particularly in rural settings. Previous studies have indicated that adults in Pakistan have limited access to SRH awareness and services, including contraceptive availability and reproductive rights. These gaps contribute to adverse outcomes such as unintended pregnancies, early childbearing, short birth intervals, pregnancy-related complications, and increased maternal and neonatal morbidity and mortality.[21] Moreover, SRH issues are affected by political, social, and economic conditions at the community, regional, national, and international levels. Addressing these concerns requires a combination of services, education, counseling, and evidence-based interventions. [22] It was observed that variation in contraceptive prevalence among four districts indicates the differences in awareness, cultural norms, and the program's outreach. Results indicate that the Marvi workers in low-resource areas of rural Sindh emerge as the primary and most trusted source of SRH and FP information and services. Additionally, parity status and age of MWRAs were found to be the key determinants of FP adaptation. MWRAs with large family size are more likely to adopt FP services, indicating the will to limit the family size or birth space. This trend was found to be missing in early age and with a small family size, highlighting delayed contraceptive uptake. This pattern suggests gaps in early-stage reproductive health counseling and limited engagement of newly married or younger couples in FP decision-making. It also underscores the need to address sociocultural barriers and misconceptions that may hinder early adoption of contraception. Therefore, implementing targeted interventions that promote early adaptation of FP services, expand FP choices, and spread awareness to improve reproductive health outcomes in low-resource settings of rural Sindh is substantial.

The study includes a community-based cross-sectional design and robust multi-stage cluster sampling, which ensured representative data from rural Sindh. However, Certain limitations should be highlighted. The study used self-reported data collected by Marvi workers, who also provide services, which may have introduced recall and social biases. Additionally, the current study included only women of reproductive age without collecting the perspective of male partners, which needs to be explored further to understand the challenges and gaps. The current study was conducted in four rural districts of Sindh, Pakistan, which could not be generalized to other populations. Additionally, the current research study failed to collect the perspectives of MWRAs' mothers-in-law, who also influence SRH and practices.

Conclusion:

This study showed that SRH awareness and contraceptive uptake in rural areas of four districts (Dadu, Sanghar, Umerkot, and Ghotki) of Sindh, Pakistan is promoted by Marvi workers. Results showed that CPR across all four districts is found to be 31%. The FP services uptake is found to be lower in younger MWRAs (aged < 30years). Additionally, contraceptive use is getting higher with a greater number of children (> 5). The differences in CPR among the four districts showed that the differences in social and information barriers exist. Therefore, sustained efforts are essential to strengthen and support Marvi workers (CHWs) to enhance aware-ness and improve access to contraceptive services. Additionally, the provision of age-specific reproductive health education is critical to improving reproductive health outcomes in rural settings.

Ethical Permission: The Ethical Review Committee of HANDS Welfare Foundation (HANDS-ERC) approved this study vide Ref No. HANDS/ERC/02/8-2024.

Conflict of Interest / Disclosure: Nil.

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Authors' contribution:

MAR: Conception & design, analysis & interpretation, drafting and reviewing the manuscript, final approval of the version to be published

QS: Conception & design, drafting of article, critical intellectual revision of the work

NB: Acquisition of data, conception & design, drafting of article

ZS: reviewing the manuscript critically for important intellectual content

SP: Analysis & interpretation, critical intellectual revision of the work, drafting of manuscript, final approval of the version to be published

PM: Analysis and interpretation of data, critical revision of the manuscript for intellectual content

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