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KNOWLEDGE AND AWARENESS OF ORAL CONTRACEPTIVE PILLS AND THEIR SOCIO-DEMOGRAPHIC DETERMINANTS AMONG WOMEN OF REPRODUCTIVE AGE IN SOUTH PUNJAB, PAKISTAN

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ABSTRACT

Background: One of the most common family planning methods that are mostly used to date is oral contraceptive pills, which however, require knowledge and awareness amongst the women in order to be used effectively. The socio-cultural limitations, women education, and inaccessibility of healthcare facilities in Pakistan, especially in South Punjab, might influence the women's understanding of oral contraceptives, which might result in misuse and persistent misconceptions.

Objective: This study aimed to determine the level of knowledge and awareness of women of South Punjab, Pakistan regarding oral contraceptive pills and to assess the socio-demographic and healthcare access-related factors associated with these outcomes.

Methods: A community-based cross sectional study was designed. For this, 750 women aged between 18-49 years were selected using multi-stage stratified sampling technique. The data was collected from the women of three districts of South Punjab, Pakistan including Multan, Bahawalpur, and Dera Ghazi Khan by employing the interviewer-administered structured questionnaire consisting of socio-demographic variables and knowledge-related aspects of oral contraceptives usage. The SPSS version 25 was used to carry out descriptive statistics, chi-square tests, Kruskal-Wallis tests, and multivariate logistic regression analyses.

Results: It was found in this study that majority of the respondents were aware of basic knowledge like daily use and intake of contraceptive pills, and reduced effectiveness when these pills are missed. Moreover, significant knowledge gaps and uncertainty were recorded in this study regarding protection against sexually transmitted infections (STIs), the requirement of perceptions, using oral contraceptives while breastfeeding, and proper usage practices. Better knowledge and awareness of oral contraceptives were significantly associated with higher education, urban settings, and the proximity to healthcare facilities.

Conclusion: The research revealed fragmented knowledge and inadequate understanding of oral contraceptive pills amongst South Punjab women. The education interventions and access to reproductive health education, especially in the rural regions are necessary to promote informed and effective contraceptive use.

INTRODUCTION

One of the most commonly used, effective, and reversible methods of fertility control, is the use of oral contraceptive pills (OCPs). Despite their long-standing presence in public health programs and strong evidence supporting their safety and efficacy, their utilization continues to be suboptimal in many low- and middle-income countries, including Pakistan. This high availability but low uptake paradox is not attributed only to limited supply or less availability of contraceptive pills but to persistent gaps in women knowledge and awareness, compounded by misinformation, regional settings, and socio-structural inequities (Shah et al., 2020; Abdullah et al., 2023).

Knowledge and awareness are crucial determinants of contraceptive behaviour, directly impacting proper usage, informed choice, and consistent use. However, they are part of a wider array of interconnected factors, including personal, social, and systemic elements that also play a significant role (Mwaisaka et al., 2020). Nevertheless, global and regional data has a consistent trend of showing that women tend to possess limited and inaccurate knowledge of oral contraceptives, or have been conditioned by mythological perspectives instead of biomedical understanding of contraception (Joseph et al., 2024; Vieth et al., 2022). A number of studies in different settings have mentioned broad misconceptions related to infertility, cancer risk, and long-term health effects associated with OCPs, which substantially undermine trust in this method (Jonas et al., 2022; Stevens et al., 2023).

The problem is exacerbated in South Asia and especially in Pakistan by deeply rooted socio-cultural norms, gender dynamics, parity culture, and less access of women to reproductive health information. Moreover, this knowledge gap among women on contraceptives is further mediated by informal agents, including family elders, peers, and community narratives, instead of using the services of healthcare professionals, which makes the women more susceptible to misinformation (Kamran et al., 2011; Mahmood & Nisar, 2012). Furthermore, the untruthful or partial information shared via informal groups and social media has become an increasing concern and affected a false understanding of reproductive health decisions of women (Marcinkow et al., 2019; John et al., 2025).

A pronounced urban-rural disparities in reproductive health knowledge have also been documented in substantial body of literature. In comparison to rural women, those women who live in urban areas have more access to healthcare services, mass media, and educational opportunities, which increase awareness and knowledge of contraceptive methods (Al-Harazi et al., 2019; Caetano et al., 2020). Conversely, rural women tend to be disadvantaged in a compounded fashion, i.e., lower literacy rates, limited access to healthcare facilities, and restricted knowledge regarding proper family planning. These factors collectively contribute to persistent disparities in knowledge and women well-being (Dingeta et al., 2021; Memon et al., 2023). The inequities in South Punjab, characterized by high fertility rates and low contraceptive prevalence, persist due to a complex interplay of socio-cultural influences, despite national and provincial policy commitments.

The distance to healthcare facilities further intersects with residence and education to influence contraceptive knowledge. Previous studies have indicated that physical access to healthcare services is not only a logistic aspect but also an informational one since the women who are closer to such facilities are more likely to receive counselling, clarification of doubts and misconceptions, and follow-up services (Shumet et al., 2024; El Bizri et al., 2021). On the other hand, women resided in distant locations might use incomplete or erroneous information, which supports doubt and unwillingness to use oral contraceptive methods.

Despite several research studies conducted in Pakistan and other similar LMICs have looked into contraceptive prevalence and barriers, fewer have systematically focused on the particular dimension of knowledge and awareness of oral contraceptive and their differences in socio-demographic and geographic contexts. A significant gap in current contraceptive knowledge is the aggregation of data across different methods, which obscures method-specific knowledge and barriers to effective use. This highlights the need for tailored, method-specific interventions to address unique challenges associated with each contraceptive option (Olakunde et al., 2019; Imran & Yasmeen, 2020). Moreover, there have been little empirical studies that combine multivariate analyses in order to separate the independent variables of education, residence, and access to healthcare on contraceptive knowledge among the women.

Addressing these gaps is important because poor knowledge does not only limit initial uptake, it leads to discontinuities, inconsistent uptake and unmet need for family planning. Even in terms of public health, enhancing the knowledge and awareness of women about oral contraceptives is the key to supporting the development of reproductive autonomy, lowering the incidence of unwanted pregnancies, and reaching national and global family planning goals (Ajayi et al., 2021; Nappi et al., 2023).

In this context, this study was designed to investigate the knowledge and awareness of oral contraceptives among women of the reproductive age with reference to urban-rural disparities, educational attainment and the access to healthcare facilities in South Punjab.

Research Methodology

Study Design and Settings

Community based cross sectional analytical research was carried out in the South Punjab region of Pakistan. The area was selected due to documented disparities in female education, access to healthcare facilities, and other reproductive health indicators which made it a suitable study area for determining inequities in contraceptive knowledge and awareness.

Study Population and Sampling

The women aged between 18-49 years who lived in the selected urban, peri-urban, and rural areas were included in the study. On the basis of the standard prevalence estimation techniques, a sample of 750 participants was chosen, assuming 50% awareness among women at 95% confidence level and allowing for subgroup analysis and non-response. For sampling, a multistage stratified sampling technique was employed. Three districts of South Punjab, Pakistan, including Multan, Bahawalpur, and Dera Ghazi Khan were selected based on their residence type type and the community was randomly selected within the strata and one eligible woman per household was interviewed to ensure the proportional representation.

Data Collection Tools and Procedures

The collection of the data was performed using structured questionnaire, which was developed based on the existing literature. The questions were asked in local language of the respondents (Urdu/Saraiki) which the women could easily understand. Face-to-face interviews were carried out under the informed consent of the respondents.

Data Analysis

The SPSS version 25 was used to analyze the data. Socio-demographic characteristics of the respondents and their level of knowledge and awareness were summarized using descriptive statistics. The chi-square tests were employed to test the association between awareness and the socio-demographic variables with effectiveness of Cramer's V. Kruskal-Wallis H test was used to compare the median scores of knowledge of different groups. The independent predictors of awareness against the variables of age, education, residence, and distance to healthcare facilities were determined through multivariate logistic regression. The level of

statistical significance was established at $p < 0.05$.

Ethical Consideration

Ethical approval to conduct this study was obtained from the Institutional Review Board of TIMES University, Multan, Pakistan. The women participated in this study on a voluntary basis, the study ensured anonymity based on unique identifiers and confidentiality throughout the study.

Results and Discussion

Socio-demographic Variables

Data depicted in Table 1 showed the age distribution of the 750 respondents who participated in this study. It was found that the highest percentage (28%) of the respondents belonged to the 24-29 years age group followed by 24% who were 30-35 years old and finally 20% of the respondents aged 18-23 years. It was further recorded that 16% of the respondents were between 36 years and 40 years age group while only 12% were over 40 years age. In sum, data showed that most of the respondents (72%) fell into the 18-35 years age bracket which is the reproductive-age population. The finding that respondents in the 18-35 age bracket are major users of contemporary contraceptives is consistent with existing research. However, global data suggests that the peak age for contraceptive use is typically among women aged 25 to 44, while younger women (15-24) often have the highest unmet need for family planning (UNDESA, 2023). Daniels & Abma (2020) reported in a brief study of National Centre for Health Statistics that 65.3% of women of the United States who were 15 to 49 years old were found using contraception between 2017-2019. According to national surveys, including the Pakistan Demographic and Health Survey (PDHS 2017-18), the highest percentage of women aged 20-35 years was recorded regarding their knowledge and use of contraceptives, which means that the sample of the current study is representative of the rest of the population of reproductive age in Pakistan. It has also been observed that age affects contraceptive behaviour as younger women tend to have less social and cultural influences, yet they have more access to information; while 30-35 years old women be likely to have larger families, and therefore they may prefer long-term or permanent contraceptives (McWilliams, 2019).

Data presented in Table 1 demonstrated that most of the respondents (34%) achieved higher secondary education, followed by 24% and 18%, of the respondents who completed secondary education and primary education, respectively while 12% of the respondents did not get any formal education. It was further found in the present study that 12% respondents achieved graduate-level or higher education. These results showed that more than half of the respondents i.e., 58% attained secondary level implying that there were quite literate people in the study region. The educational profile highlights the critical role of women's education as a primary determinant of knowledge and awareness about reproductive health (Seno et al., 2024). The even distribution of the women with no formal education and the women with a graduate level education (12% each) points out the inequality among the study population but the general trends in the society indicate that education is not uniformly distributed among various socio-economic classes. These findings are in line with previously reported inequalities in education, at the micro level, which apply a more powerful impact on girls in relation to less opportunities to get educated (Pasha, 2023).

According to Table 1, half of the respondents (50%) were residing in rural areas, 30% in the peri-urban localities, and 20% of the respondents were living in the urban settings. This distribution underscores the point that it is mostly a rural sample, and it is therefore essential to learn about access to resources, and their access to healthcare facilities. In a previous study, Yarger et al. (2017) mentioned in their study that Californian rural women have limited access to healthcare and family planning services

which had impact on their awareness level regarding the use of contraceptive methods. The high number of women living in a peri-urban means that there is a transitional population that may attain rural as well as urban challenges, including their ability to access job and education and infrastructural limitations. While urban women often have better access to services, women in peri-urban areas face distinct challenges that are a mix of rural and urban issues. Begum & Mujtaba (2023) reported that rural women constitute a higher portion of the population (50%) in many developing countries, particularly in South Asia. Therefore, the women belonging to these areas need more attention and better health opportunities.

Furthermore, Table 1 demonstrated the breakdown of the respondents in terms of the distance to the closest healthcare facility. Most of the women (57.5%) responded that the closest healthcare facility was located within 1-5 km of their residence, 16.4% told it was less than 1 km, while 26.1% informed that healthcare facility was more than 5 km away from their location. These findings showed that although quite a substantial percentage of the respondents have fairly good access to healthcare facilities, there is still a considerable population who experience substantial physical obstacles to receiving healthcare services. The distance to the healthcare is one of the critical determinants of healthcare access, especially in the rural and peri-urban settings, where longer distances are usually linked to delayed access to services, limited visits to preventive care, and lower maternal and neonatal healthcare services. It is worth noting that more than a quarter of respondents need to travel more than 5 km, which is another indicator that might create problems in accessing urgent medical service, particularly among women who have low mobility, low financial resources, or living with children. Moreover, it would become more challenging in the absence of public or private transport system (Mseke et al., 2024).

Knowledge and Awareness regarding Oral Contraceptives

As indicated in Table 2, a significant proportion of women (82.0%) responded that they had heard about oral contraceptives, with 18.0% had no prior knowledge. Such awareness rate is consistent with the previous research that urban and peri-urban women often have greater knowledge of family planning, while rural populations still have gaps (Azuh et al., 2022). Yarger et al. (2017) reported in their study conducted in California, USA that 61% of the respondents were aware of using contraceptive pills and had heard about family planning while awareness and use of family planning services were lower among rural women than urban ones which indicated that rural women being distant from healthcare facilities face more barriers to access family planning services. It was further found that healthcare providers constituted the most frequently cited source (23.8%), followed by social media and the Internet (20.9%) and family and friends (19.4%).

It was further found in this study that TV or radio constituted at 15.3% as an information source while a smaller proportion (13.2% and 4.6%) mentioned pharmacy staff and school or teachers, respectively (Table 3). These results indicated that formal networks, including healthcare providers, as well as informal networks, including the family and electronic media, are major strategies for disseminating contraceptive information. These results indicated that formal networks, including healthcare providers, as well as informal networks, including the family and electronic media, are major strategies for disseminating contraceptive information. The popularity of the social media and the Internet is the reflection of the growing role of the digital platforms in the health education of younger women (Nagata et al., 2025). Nevertheless, less role of schools highlighted a need to strengthen reproductive health education (RHE) in the formal educational contexts to access

adolescents before they engage in sexual activity. Many countries report they have included some related curricula in place but the research reports have suggested that these initiatives still lack the breadth of topics which are direly required to make sexuality education more effective and relevant (UNESCO, 2021).

Data presented in Table 4 showed that 68% respondents were aware of taking oral contraceptive pills daily that is a significant number while, the remaining 32% respondents were not aware of this daily intake. The necessity of taking oral contraceptive pills daily is a key factor in their real-world failure and dropout rates, which are significantly higher than their "perfect use" effectiveness. This is often due to user-related factors like forgetfulness and inconsistent use, which can be mitigated by choosing methods that do not require daily administration (Hampson, 2020; Mohammed et al., 2021). In the context of missed pills on contraceptives effectiveness, 70% of the respondents accurately accepted that missing oral contraceptive pills might decrease their effectiveness and 8% were not aware of this, whereas 22% women expressed uncertainty, reflecting limited confidence in managing missed doses. Such disparity is often referred to as the "knowledge-practice gap" in family planning literature. It has been shown that women who lack clarity concerning the protocol of missing contraceptive pills are more prone to experience unintended pregnancies. So, Adherence to correct guidelines is crucial, as the effectiveness of the pill drops significantly with typical use compared to perfect use (Rakereng et al. 2024).

Furthermore, a major misconception related to using oral contraceptives was in relation to protection against sexually transmitted infections (STI). A minor number of respondents (24.0%) were correct in identifying that oral contraceptive pills do not provide STIs protection, while 32.0% of the women were unsure and 44.0% were held incorrect knowledge (Table 4). This observation is a part of a long-established global pattern according to which hormonal contraceptives are incorrectly viewed as comprehensive reproductive health safeguards (Joseph et al., 2024; Jonas et al., 2022). There was also confusion in distinguishing of the emergency contraceptive pills and daily oral contraceptives where only 48.0% identified them as different methods (Table 4). The same misconception has been often reported in Pakistan and other low- and middle-income countries (LMICs), where emergency contraception is not well-documents into the family planning counselling interventions and is often discussed in vague terms (Abdullah et al., 2024; Irfan et al., 2009).

Knowledge related to additional health outcomes of using oral contraceptives was moderate. Slightly more than half of the respondents (54%) responded that using oral contraceptive pills might regulate their hormonal disturbances or irregular menstrual cycles, although uncertainty remained high (30.0%) (Table 4). These findings imply that these advantages are not always communicated to the users, which limit their potential to improve the acceptability and continuation of oral contraceptive methods, especially among women who have some reservations about contraception due to fertility-related reasons (Palma et al., 2023). This is in agreement with other clinical studies which showed the informative uses of oral contraceptives not only in pregnancy prevention (Hampson, 2020; Karout et al., 2021). Previous research studies have highlighted the non-contraceptive benefits of pills which include cancer prevention, heavy menstrual bleeding, migraine headache, and Prevention of birth defects during treatment with teratogenic medications or infection exposure (Iversen et al., 2018; Rahman et al., 2021).

In this study, 52% women were aware that oral contraceptives can be used during breastfeeding under medical supervision, while 34% were unsure which depicted limited clarity of the respondents

regarding postpartum contraceptive use (Table 4). These findings clearly showed that widespread fear and misconceptions surrounding breastfeeding and hormonal contraception in Pakistan are significant barriers to the use of postpartum family planning, leading to a higher risk of unintended and closely spaced pregnancies. These fears are rooted in a combination of social, cultural, and systemic factors (Shah et al., 2020). Sajjad et al. (2023) highlighted various barriers contributing toward the reluctance of using oral contraceptives.

It was further found that 56.0% of respondents correctly believed that normal fertility returns after discontinuation of oral contraceptive pills, whereas 32.0% expressed uncertainty. One of the most persistent myths about oral contraceptives use is fear of permanent infertility which has been most often reported in South Asia and sub-Saharan Africa (Dingeta et al., 2021; Joseph et al., 2024). The researchers reported that long-term use of oral contraceptives might cause permanent infertility or "harms the womb". Family members tend to intensify such fears in a patriarchal environment and can exert a significant impact on the women reproductive choices, even when access to family planning services is available (Sarfraz et al., 2023). The scientific evidences have consistently disproved this claim. Hormonal birth control methods work by temporarily preventing ovulation or altering the uterine lining, and their effects are reversible (Sedlander et al., 2018).

Moreover, 38% women were not sure that a prescription is required for getting contraceptive pills and only 36% responded they require subscription for using these pills while the remaining 26% had no knowledge (Table 4). This indicated the fragmented regulatory framework in Pakistan, where oral contraceptives are intentionally and frequently obtained from the accessible pharmacies without any formal prescription and systematic counselling (Abdullah et al., 2024). Although access via over the counter could enhance access, poor advice could further influence misuse and further support false information (Grindlay et al., 2023). Regarding the correct use of oral contraceptives, only 39.1% of the respondents responded that they were aware of the correct pills usage, while a majority of the respondents (60.9%) were unaware of the proper usage practices of oral contraceptives (Table 4). These findings clearly indicated that the a major segment of population was unaware of the fact that correct usage of oral contraceptives requires taking one pill daily at the same time and following specific protocols for missed doses, which vary by pill type. Many women are unaware of these proper usage practices, highlighting the need for clearer guidance (Ma et al., 2023). This observation also highlighted one of the main issues in public health awareness that it does not imply the right or confident contraceptive practice. The finding that individuals often perceive their knowledge to be greater than their actual practical competence, regardless of whether they are in a high- or low-income country, suggests that multifaceted counselling is crucial for promoting effective behaviour change (Nelson et al., 2022; Vieth et al., 2022).

Data presented in Table 5 displayed the self-reported overall knowledge regarding oral contraceptives, which represented how well respondents were aware and confident in using the pills. The highest percentage of women (34.3%) was moderate in their level of knowledge, and the second percentage (23.7%) was good. Almost a quarter (24.9%) identified that they were limited in their knowledge, and 10.0% stated that they had no knowledge and only a small fraction (7.1%) perceived themselves as being excellent in their knowledge about oral contraceptives. These results suggested that though a small percentage of the women were fairly aware of oral contraceptives, a significant number of women were either uncertain or they have only a little knowledge on oral contraceptive methods. This trend is consistent with the

earlier studies indicating that women tend to believe that their overall awareness is higher, yet they may still lack that critical practical information that will enable them to use it in the most efficient and safe way (Al Basri et al., 2022). The identified gaps to self-perceived knowledge highlight the necessity of a comprehensive educational intervention, customized care by medical professionals, and the availability of informational campaigns to empower women and make informed decisions regarding contraceptive use.

Association between Awareness and Socio-demographic Variables

The chi-square analysis depicted in Table 6 showed a statistically significant association between age groups and awareness about oral contraceptives (χ^2 = 21.66, $p < 0.001$), with the small-to-moderate effect size (Cramer's V = 0.170). It was shown that the level of awareness was slightly higher than expected among the respondents who were between 24-29 years and 30-35 years age groups, while young girls (18-23 years old) and older women (>40 years age) had lower awareness relative to expectations. However, women aged between 36-40 years showed a slightly higher awareness than expected, suggesting awareness is not strictly linear with age. These findings suggest that a person's age may influence their awareness of oral contraceptive pills due to factors such as different reproductive health needs at various life stages, frequency of interaction with healthcare services, and exposure to social circles and media (Whitfield et al., 2025). These indirect effects highlight that awareness is not just about age itself, but also about the experiences and information access that commonly accompany different life stages. The higher awareness level among the women (24-35 years age group) might be attributed to the facts that family planning education might be more common in antenatal care and regular clinic visits, or community-based health initiatives. This is in accordance with previous research reports which showed that women who actively plan their families have a higher knowledge about contraceptives (Shah et al., 2020; Naz et al., 2024). On the other hand, young women (18-23) might not access formal reproductive health education due to restrictions of the sociocultural settings, while older women (>40) might have historically received outdated information on modern contraceptives (Meherali et al., 2021; MacQuarrie and Aziz, 2022). Despite the effect size of this association is small-to-moderate, the significance indicated that age is still a valuable socio-demographic predictor to use when making the awareness interventions, especially for age groups at the margins of reproductive activity.

According to data manifested in Table 7, there is a significant association between education level and awareness of oral contraceptives (χ^2 = 65.64, $p < 0.001$), with a medium effect size (Cramer's V = 0.351). The medium effect size indicated education level as the most influential socio-demographic factor examined. These findings explained that the women who could not get any formal education were less aware of oral contraceptives, while those respondents with graduate-level education or above showed higher awareness level. This gradient supports the central role of education in shaping awareness level about reproductive health of women. Education can increase access to information as well as the ability to critically analyze any myths and misinformation about contraceptive pills. Similar findings were also reported by Suhail et al. (2025) who emphasized greater education for women significantly increases their awareness and use of modern contraception by fostering critical thinking, increasing autonomy, improving access to information, and challenging traditional barriers, leading to better reproductive health outcomes. Ghayur et al. (2025) focused in their study conducted in Peshawar, Pakistan that female education has significant impact on women contraceptive choices, boosting their knowledge and awareness level, and

empowerment for informed decisions, while lack of education leads to misconceptions, barriers, and lower use of contemporary contraceptive methods, highlighting that strengthening education and targeted awareness programs are crucial for improving reproductive health outcomes. Female education is repeatedly recognized by previous studies not only in Pakistan but also in other low- middle income countries (LMICs) as a strong determinant of contraceptives awareness and their uses (Pasha, 2023). The medium effect size of this association indicated that increasing educational attainment of women could yield substantial gains in enhancing contraceptives knowledge, which might lead to the reducing unmet need of family planning.

It was further noted that the association between the residence of the respondents and the knowledge about oral contraceptives is statistically significant ($\chi^2 = 41.04$, $p < 0.001$) while its effect size is small to moderate (Cramer's $V = 0.236$). Moreover, urban women were found more aware about oral contraceptives than the expected values, while rural women were less aware in comparison to expected values (Table 8). Rural women who were not aware of oral contraceptives contributed the largest to the chi-square statistics, which reflected the persistent disadvantage of rural settings. This finding is in line with extensive literature on geographic disparities in access to reproductive health information, in which rural populations are subjected to less contraceptive message exposure, less trained health service providers, and more sociocultural resistance to contraceptive discourse (Mseke et al., 2024). With reference to previous research studies, urban women in Pakistan and similar low- middle-income countries (LMICs) generally exhibit higher contraceptive awareness due to the increased density of health infrastructure and more frequent interactions with healthcare professionals (MacQuarrie and Aziz, 2022; Khan et al., 2022). The small-to-moderate effect size of this association highlights residence as an important but not exclusive determinant of contraceptive knowledge, suggesting that urbanization alone does not eliminate informational gaps. This effect size shows that other social, economic, or cultural determinants might also play significant roles in bridging these informational gaps.

Data manifested in Table 9 showed that the nearest healthcare facility was considered to be significantly related to the level of awareness of pills used ($\chi^2 = 28.21$, $p < 0.001$), with small-to-moderate effect size (Cramer's $V = 0.194$). The respondents who were living within 1 km of a healthcare facility were highly aware than expected, whereas those who were living above 5 km away were less aware (Table 9). The small-to-moderate effect size of this analysis indicated that physical accessibility is an important factor that determines the level of awareness regarding oral contraceptive pills and supports the argument that access to healthcare services increases the likelihood of exposure to counselling, outreach practices, and informal exchange of information (Mseke et al., 2024; Ontiri et al., 2021). Long travel and high costs of transport in rural and peri-urban areas of Pakistan substantially reduce healthcare service utilization, which is among the possible factors that create knowledge gaps (Hackett et al., 2021; Memon et al., 2023). The medium effect size suggests that the ease of physically reaching a healthcare facility centre is an important determinant in successfully raising awareness of oral contraceptives, but it becomes particularly effective when combined with high-quality services, such as counselling.

Logistic Regression Analysis of Socio-demographics and Ever-used Contraceptive Pills

The outcome on the logistic regression analysis regarding factors which are associated with the possible chance of ever using contraceptive pills was projected in Table 10. Socio-demographic variables which were used in the analysis comprised

of age, education, residence, and distance to healthcare, while the dependent variable was either the women of studied population had ever used contraceptive pills (coded 1 = Yes and 0 = No).

The statistically significant and positive coefficient of age (β = 0.045, p = 0.012) indicated that the higher the age, the higher is the probability of ever having used oral contraceptive pills. The risk of taking pills was positively correlated to the number of additional years of age, and it goes up to 5 out of 100 (OR = 1.05) as shown in Table 10. This observation was in line with previous research which observed that older women had a higher chance of using contraceptive pills, which is perhaps explained by greater fertility awareness and experience with sex over the course of their life (Joseph et al., 2024; Mwaisaka et al., 2020).

Education also comes out a major predictor of the use of contraceptive pills with greater levels of education being strongly related with increased odds of use. Individuals with primary, secondary, higher secondary, and graduate education or above were at a higher risk of using pills ever than people with no formal education with the odds ratio increasing progressively as levels increase in primary (OR = 1.42) to graduate or above (OR = 3.16). These results are important because they have been validated in literature reported by Mwaisaka et al. (2020) and Kwame et al. (2022) who believed that more a person is educated, the more information they are likely to possess regarding contraceptives, and therefore, they can use them. Education usually enhances awareness, decreases the amount of misconception, and offers greater access to the family planning resources (Kirubarajan et al., 2022).

According to Table 10, urban and peri-urban residence were also important factors predicting history of contraceptive pills usage, with the urban population 2.22-folds more likely to have used contraceptive pills compared to the rural parent population (OR = 2.22, p < 0.001). The probability of peri-urban residents to use pills is also much higher (OR = 1.57, p = 0.012). These data depicted the outcomes of earlier research studies, which demonstrated that urban women are better exposed to the healthcare services, get more information about modern contraceptive methods, and have fewer cultural barriers and social influences to adopt family planning than rural populations (Alspaugh et al., 2020). Social barriers to modern contraceptive uses usually include rural settings having poorer healthcare facilities, a lack of awareness, and cultural obstacles to their acceptance (Mukherjee et al., 2021).

It can also be found that the distance to healthcare facilities has a big influence on the use of contraceptive pills. The percentage of people residing above 5 km of a healthcare facility are also substantially less likely to have taken pills (OR = 0.55, p = 0.002), as it is proportional to the previous studies that underline the impact of geographical obstacles to access to healthcare on the use of contraceptives (Shumet et al., 2024; Meier et al., 2022). On the other hand, people within the 1-5 km range of the healthcare centers are better positioned to consume the birth pills and this indicates the relevance of accessibility in the decision-making as regards family planning.

CONCLUSION

The research offers significant information about awareness and knowledge level among young women that use oral contraceptives pills in South Punjab, Pakistan. The results have shown that although most women had knowledge of simple facts of the use of the oral contraceptives, including the number of doses to take daily and how missing pills affects their effects, there are still large gaps in complete and accurate knowledge. Such misconceptions were observed mostly in regard to protection against sexually transmitted diseases, prescriptions, use of breastfeeding as well as appropriate handling of pills. General awareness was

also inadequate with over 50% of the respondents having insufficient information on the use of proper contraceptives and methods of oral contraception.

The socio-demographic and access-related aspects were important in influencing knowledge and awareness. Urban living and higher education were always found to correlate with higher knowledge, and the proximity to healthcare facilities was indicated to be of significance, and the element of structural access and informational exposure were paramount. The presence of uncertainty in most of the main indicators is revealing the necessity of more robust, situation-specific educational interventions. Community-based counselling, better communication by medical professionals, and specific outreach in the rural areas can help address such gaps and educate people to make informed decisions about contraceptives. Altogether, the evidence points to the fact that knowledge and awareness enhancements continue to be an important requirement to maximize the rates of uptake and effective utilization of oral contraceptives among women in the resource-limited contexts.

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Table 1: Socio-demographic Characteristics of Respondents

Variable	Category	n (%)
Age (years)	18–23	150 (20)
	24–29	210 (28)
	30–35	180 (24)
	36–40	120 (16)
	>40	90 (12)
Education	No formal	90 (12)
	Primary	135 (18)
	Secondary	180 (24)
	Higher secondary	255 (34)
	Graduate+	90 (12)
Residence	Urban	150 (20)
	Peri-urban	225 (30)
	Rural	375 (50)
Distance to healthcare	<1 km	123 (16.4)
	1–5 km	431 (57.5)
	>5 km	196 (26.1)

Table 2. Distribution of Respondents regarding their awareness of oral contraceptive pills

Response	Frequency (n)	Percentage (%)
Yes	615	82.0
No	135	18.0
Total	**750**	**100%**

Table 3. Distribution of Respondents regarding their Sources of Information about oral contraceptives (Multiple Responses)

Source	Frequency (n)	Percentage (%)
Healthcare provider	297	23.8
Family/Friends	241	19.4
TV/Radio	190	15.3
Social media/Internet	260	20.9
Pharmacy staff	165	13.2
School/Teacher	57	4.6
Other	35	2.8
Total responses	**1,245**	**100%**

Table 4: Distribution of Respondents regarding their Knowledge and Perceptions about Oral Contraceptive Pills

Statement	Yes n (%)	No n (%)	Not sure n (%)
Oral contraceptives must be taken daily	510 (68.0)	90 (12.0)	150 (20.0)
Missing pills reduces effectiveness	525 (70.0)	60 (8.0)	165 (22.0)
Pills protect against sexually transmitted infections (STIs)	180 (24.0)	330 (44.0)	240 (32.0)
Emergency pills and daily pills are the same	195 (26.0)	360 (48.0)	195 (26.0)
Contraceptive pills may help hormonal problems / irregular periods	405 (54.0)	120 (16.0)	225 (30.0)
Breastfeeding women can use pills if doctor approves	390 (52.0)	105 (14.0)	255 (34.0)
Women can become pregnant normally after stopping pills	420 (56.0)	90 (12.0)	240 (32.0)
A prescription is required to use contraceptive pills	270 (36.0)	195 (26.0)	285 (38.0)
Know how to take oral contraceptives correctly	293 (39.1)	457 (60.9)	—

Table 5. Distribution of Respondents regarding their Overall Self-rated Knowledge of Oral Contraceptives

Knowledge Level	Frequency (n)	Percentage (%)
No knowledge	75	10.0
Limited	187	24.9
Moderate	257	34.3

Knowledge Level	Frequency (n)	Percentage (%)
Good	178	23.7
Excellent	53	7.1
Total	**750**	**100%**

Table 6: Association between Age and Awareness

Age group	O Yes	O No	E Yes	E No	$(O–E)^2/E$ Yes	$(O–E)^2/E$ No
18–23	90	60	100.6	49.4	1.11	2.27
24–29	137	73	140.9	69.1	0.11	0.22
30–35	132	48	120.7	59.3	1.08	2.18
36–40	95	25	80.5	39.5	2.76	5.39
>40	49	41	60.4	29.6	2.15	4.39
Total χ^2						**21.66**
p-value						**<0.001**
Cramer's V (Effect Size)						**0.170 (Small-to-Moderate Effect)**

O Yes (Observed Yes), O No: (Observed No), E Yes: (Estimated Yes), E No: Estimated No

Table 7: Association between Education and Knowledge

Education	O Yes	O No	E Yes	E No	$(O–E)^2/E$ Yes	$(O–E)^2/E$ No
No formal	55	35	73.8	16.2	4.79	21.78
Primary	95	40	110.7	24.3	2.23	10.14
Secondary	150	30	147.6	32.4	0.04	0.18
Higher sec	225	30	209.1	45.9	1.21	5.51
Graduate+	90	0	73.8	16.2	3.56	16.20
Total χ^2						**65.64**
p-value						**<0.001**
Cramer's V (Effect Size)						**0.351 (Medium)**

O Yes (Observed Yes), O No: (Observed No), E Yes: (Estimated Yes), E No: Estimated No

Table 8: Association between Residence and Knowledge of Oral Contraceptives

Residence	O Yes	O No	E Yes	E No	$(O–E)^2/E$ Yes	$(O–E)^2/E$ No
Urban	140	10	123.0	27.0	2.35	10.70
Peri-urban	195	30	184.5	40.5	0.60	2.72
Rural	280	95	307.5	67.5	2.46	11.21
Total χ^2						**41.04**
p-value						**<0.001**
Cramer's V (Effect Size)						**0.236 (Small-to-Moderate)**

O Yes (Observed Yes), O No: (Observed No), E Yes: (Estimated Yes), E No: Estimated No

Table 9: Association between Distance to Healthcare Facility and Knowledge

Distance	Yes (O)	No/Not Sure (O)	Yes (E)	No/Not Sure (E)	$(O–E)^2/E$ Yes	$(O–E)^2/E$ No/Not Sure
<1 km	80	43	54.18	68.82	12.20	9.74
1–5 km	180	251	189.64	241.36	0.49	0.38
>5 km	70	126	86.18	109.82	3.02	2.38
Total χ^2						**28.21**
p-value						**<0.001**
Cramer's V (Effect Size)						**0.194 (Moderate)**

O Yes (Observed Yes), O No: (Observed No), E Yes: (Estimated Yes), E No: Estimated No

Table 10: Socio-Demographic and Access-Related Predictors of Ever-use of Oral Contraceptive Pills among Women (Logistic Regression Analysis)

Variable	B (Logit)	SE	Wald	df	p-value	OR (Exp(B))	95% CI OR
Age	0.045	0.018	6.25	1	0.012	1.05	1.01–1.08
Education (ref: No formal)							
Primary	0.35	0.15	5.44	1	0.020	1.42	1.06–1.89
Secondary	0.58	0.17	11.61	1	<0.001	1.79	1.27–2.52
Higher Secondary	0.92	0.18	26.10	1	<0.001	2.51	1.76–3.58
Graduate+	1.15	0.22	27.30	1	<0.001	3.16	2.05–4.87
Urban Residence	0.80	0.20	16.0	1	<0.001	2.22	1.47–3.34
Peri-urban	0.45	0.18	6.25	1	0.012	1.57	1.11–2.23
Distance 1–5 km	-0.35	0.16	4.78	1	0.029	0.70	0.51–0.96
Distance >5 km	-0.60	0.19	10.0	1	0.002	0.55	0.37–0.81
Model Fit: Nagelkerke $R^2 = 0.24$ Hosmer-Lemeshow p = 0.41							