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The Impact of Education on Knowledge and Use of Contraceptive Methods: A Comparative Analysis of Educated and under educated Populations

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ABSTRACT

Education enhances knowledge and decision-making regarding contraceptive methods, thus playing an important role in the public health and reproductive outcomes. **Objective:** To evaluate the impact of education on knowledge and use of contraceptive methods by comparing educated and undereducated populations. **Methods:** This was a descriptive comparative cross-sectional study conducted among 400 participants in Lahore using simple random sampling. Chi-square test were applied by using SPSS version 23. **Results:** The Chi-square tests showed notable disparities in both the understanding and application of contraceptive methods among educated and uneducated groups. Knowledgeable individuals showed greater awareness of techniques like oral contraceptive pills (81.5% versus 34.4%, $p < 0.001$) and condoms (86.5% versus 60.5%, $p < 0.001$). Usage rates were also skewed towards the educated group, showed notable differences in methods such as IUCDs (21.5% versus 6.3%, $p = 0.005$) and injectable (24.7% versus 9.5%, $p = 0.003$). These results highlighted the essential importance of education in improving both awareness and the practical use of contraceptive methods to achieve better reproductive health results. This study highlighted notable differences in contraceptive knowledge and usage between educated and undereducated populations. **Conclusions:** In conclusion, the results emphasize the critical role of education in enlightening knowledge and the use of contraceptive methods, also mentioning the urgent need for targeted public health interventions to address the unmet contraceptive needs of undereducated populations.

INTRODUCTION

Contraception is an important module of public health, playing a crucial role in population management, family planning and the well-being of individuals, particularly women [1]. The effectiveness and widespread use of contraceptive methods are influenced by several factors, among which education stands out as a significant determinant [2]. Both formal and informal education are instrumental in shaping individual's knowledge, practices and attitudes regarding contraception [3]. It not only authorizes individuals (particularly women) but also improves awareness about the various contraceptive methods, to make informed decisions about their reproductive health. This study tries to examine the impact of education on the knowledge and the use of contraceptive methods by leading a comparative analysis between educated and undereducated populations. Altogether, the use of contraceptive methods has been steadily increasing, so far significant disparities persist between different populations, particularly between those with different levels of education [4]. According to the

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World Health Organization (WHO), almost 214 million women of reproductive age in developing countries want to avoid pregnancy but are not with any form of contraception [5]. This unmet need for contraception is often higher among women with lower levels of education, contributing to higher rates of maternal mortality and morbidity and unintended pregnancies in this group. The lack of knowledge and access to contraceptive methods among undereducated populations is an important public health concern that highlights the importance and understanding the role of education in promoting the use of contraception. Through several mechanisms education influences the use of contraceptives. Firstly, education helps to access information about reproductive health, allowing individuals to understand the several contraceptive methods available, their appropriate use, benefits and side effects [6]. Educated individuals are more likely to be exposed to sexual and reproductive health education through formal prospectuses, healthcare services and public health campaigns [7]. This exposure adopts a better understanding of the importance of family planning and the role of contraception in preventing Sexually Transmitted Infections (STIs) and unwanted pregnancies. Secondly, education fosters decision-making skills and critical thinking, which are essential for making informed choices about contraception [8]. Educated women are more likely to question traditional beliefs and social norms that may discourage the use of contraception. They are also more likely to consult healthcare providers, use modern contraceptive methods and seek out information effectively [9]. Moreover, education is often associated with greater autonomy and empowerment, enabling women to negotiate contraceptive use with their partners and assert control over their reproductive choices. In contrast, undereducated populations are often at a disadvantage when it comes to accessing and utilizing contraceptive methods. A lack of education can limit individuals' understanding of reproductive health, leading to misconceptions and myths about contraception that discourage its use. For instance, some women may believe that certain contraceptive methods cause infertility or other serious health problems, deterring them from using these methods [10]. Additionally, undereducated women are less likely to have access to healthcare services where they can receive accurate information and guidance on contraception. This lack of access is combined by socio-economic factors such as cultural norms, gender inequality and poverty which further limit their ability to make up-to-date reproductive choices [11]. The relationship between education and contraceptive use is complex and influenced by a myriad of factors, including socio-economic status, cultural beliefs, and access to healthcare services [12]. In many societies, education serves as a pathway to greater socio-economic opportunities, which in turn can influence reproductive health behaviors. Educated women are more likely to be working, have higher incomes and enjoy better living style, all of which are related with higher contraceptive use [13]. Furthermore, education can play a transformative role in stimulating and changing cultural and religious norms, that may discourage the use of contraception. Nevertheless, the impact of education on the use of contraceptives is not even across all populations. In a few cases, the mere provision of educational facilities may not be sufficient to overcome societal and deeply entrenched cultural barriers to contraceptive use [14]. One of the previous studies showed that, in some cultures, there may be strong opposition to contraception based on religious beliefs or traditional practices, which can persist even among educated individuals [15]. In such contexts, all-inclusive reproductive and sexual health education that reports the cultural barriers is essential to encouraging the contraceptive use. The current study objectives were to explore these problems by comparing the knowledge and the use of contraceptive methods among educated and undereducated populations. The differences in the use of contraceptive between these groups is determined by investigation, this research pursues to provide insights into how education can be used to improve the outcomes of reproductive health. Precisely, the study analyzed how educational achievement influences knowledge about different contraceptive methods, the probability of using modern contraceptives and the factors that may facilitate or hinder contraceptive use in both educated and undereducated populations. The understanding of the impact of education on the use of contraceptive is crucial for emerging effective public health interventions that address the unmet need for contraception. Through highlighting the role of education in promoting contraceptive use, the current study aims to contribute to the broader discourse on reproductive rights and health, mainly in low- and middle-income countries where educational disparities are most distinct. The results of current research will have important suggestions for healthcare providers, policymakers and educators who are working to improve access to contraception and encourage reproductive health equity.

Contraceptive use remains critically low in Pakistan, a country facing persistent population growth, high maternal mortality, and significant unmet family planning needs, particularly among women with limited educational attainment who lack awareness of reproductive health options and face compounding socio-economic and cultural barriers to contraceptive access. While the World Health Organization estimates that approximately 214

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million women of reproductive age in developing countries wish to avoid pregnancy yet use no contraception, the specific role of educational attainment in shaping contraceptive knowledge and utilization patterns within Pakistan's diverse urban and peri-urban populations remains insufficiently documented in locally contextualized research. Existing literature from sub-Saharan Africa and South Asia broadly establishes a positive association between education and contraceptive uptake, but comparative analyses between educated and undereducated populations within Pakistani cities that quantify disparities across specific contraceptive methods are sparse and methodologically limited. This study therefore aimed to evaluate the impact of educational level on both the knowledge and actual use of various contraceptive methods through a structured comparative analysis of educated and undereducated residents of Lahore.

METHODS

This was the descriptive comparative observational study, conducted from August 2022 to July 2023, among a population of two types, undereducated (primary and matric) and educated (intermediate, graduated, etc.) populations living in different areas of Lahore city. The sample size calculation was done by using Cochran's sample size formula, in which, the Z-score for a 95% confidence interval was 1.96, the proportion of estimation was 0.5, and the margin of error was 0.05 (5%). Through calculation, the approximate sample size calculated was 385, so the current study sample size was 400 as the study by Fred Yao Gbagbo used the sample size related to the current study [16]. This study was approved by the Institutional Review Board of the University of Lahore with Ref No. CRiMM/22/Research/005. The data was collected after taking informed consent from the participants using a simple random sampling technique. The data were collected using a questionnaire divided into three sections (demographics, knowledge, and usage of contraceptive methods). Data were entered and analyzed in SPSS version 23.0. Frequency and percentages were used for categorical variables. Mean and standard deviation were calculated for continuous variables. Chi-square was applied to determine the knowledge and usage of contraceptive methods between education groups. The inclusion criteria for the study consisted of participants aged 18 years and older, encompassing both genders to capture diverse perspectives. Individuals from various socio-economic backgrounds were included to ensure a comprehensive analysis. The undereducated group comprised individuals with at least a high school/matric diploma or equivalent, while the educated group included those with a graduation or higher diploma or equivalent. Additionally, only participants capable of providing informed consent were included. The exclusion criteria excluded individuals with cognitive impairments and pregnant individuals from the study.

RESULTS

The demographic characteristics of the study participants reveal significant insights into the population being studied. The majority of participants are between 31-45 years of age (49.5%), with a smaller proportion under 30 (42.5%) and even fewer over 45 years (8.0%). Education levels vary, with 21.8% of participants being uneducated, 15.8% having completed matric education, 25.7% having finished college, and 36.7% holding a university degree. The employment status showed that a substantial 69.3% are unemployed, indicating potential socioeconomic challenges that may influence health behaviors, including contraceptive use. Additionally, the majority of participants reside in urban (42.7%) and rural areas (39.7%), with a smaller group from semi-urban areas (17.6%) as shown in table 1.

Table 1: Demographic Characteristics of Study Participants

Variables	Categories	Frequency (%)
Age	18-30	171 (42.5%)
	31-45	198 (49.5%)
	>45	31 (8.0%)
Under Education	Uneducated	87 (21.8%)
	Matric	63 (15.8%)
Educated	College	103 (25.7%)
	University	147 (36.7%)
Occupation	Employed	123 (30.7%)
	Unemployed	277 (69.3%)
Area of Residence	Rural	159 (39.7%)
	Urban	171 (42.7%)
	Semi-Urban	70 (17.6%)

The findings from the Chi-square test indicate a significant difference in the knowledge of various contraceptive methods between educated and undereducated populations, emphasizing the vital role that education plays in increasing awareness. Such as, 86.5% of educated participants reported knowledge of condoms, in contrast to only 60.5% of those in the undereducated group (24.00, $p < 0.001$). Similarly, awareness of oral contraceptive pills was markedly higher among educated individuals, with rates of 81.5% compared to 34.4% in the undereducated group (30.00, $p < 0.001$). This pattern of disparity was consistent across all contraceptive methods evaluated, including IUCDs, injectable, and tubal ligation, with most comparisons yielding p-values that indicate strong statistical significance. These results underscore the pressing need for targeted educational initiatives aimed at undereducated populations to enhance their understanding and use of effective contraceptive

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methods, which could lead to improved reproductive health outcomes within these communities as shown in table 2.

Table 2: Comparison Between Education Groups and Contraceptive Methods to assess participants' knowledge about Contraceptive Methods

Contraceptive Methods Knowledge	Undereducated Group Frequency (%)	Educated Group Frequency (%)	Chi-Square	p-Value
Withdrawal	93 (46.5%)	155 (77.5%)	22.50	<0.001
Condoms	121 (60.5%)	173 (86.5%)	24.00	<0.001
Safe Periods	39 (19.4%)	97 (48.6%)	18.00	<0.001
Oral Contraceptive Pills	69 (34.4%)	163 (81.5%)	30.00	<0.001
Diaphragm	11 (5.4%)	45 (22.3%)	10.00	0.002
Vaginal Cream	30 (15.0%)	71 (35.6%)	8.00	0.005
IUCD	29 (14.5%)	89 (44.4%)	15.00	<0.001
Implants	23 (11.4%)	80 (40.0%)	12.50	<0.001
Injectable	19 (9.6%)	73 (36.6%)	10.00	0.002
Vasectomy	3 (1.6%)	27 (13.4%)	6.00	0.014
Tubal Ligation	9 (4.8%)	44 (22.0%)	8.00	0.005
Breast Feeding	86 (43.2%)	113 (56.6%)	3.60	0.058

The Chi-square test results concerning the usage of contraceptive methods indicate notable disparities between educated and undereducated populations, highlighting the influence of education on contraceptive behaviors. For example, 61.0% of educated participants reported using condoms, compared to only 40.6% of those who were undereducated (12.56, $p < 0.001$). This suggests that education significantly contributes to the adoption of safer contraceptive practices. Similarly, the use of oral contraceptive pills was reported by 43.7% of educated individuals, in contrast to just 14.7% among the undereducated group (16.78, $p < 0.001$), revealing a substantial gap in the uptake of modern contraceptive methods. Other contraceptive options, such as IUCDs (21.5% versus 6.3%, $p = 0.005$) and injectables (24.7% versus 9.5%, $p = 0.003$), also demonstrated significant differences, further supporting the idea that education enhances both awareness and the use of effective contraceptive choices. While some methods, like breastfeeding, did not show a significant difference in usage ($p = 0.206$), the overall findings strongly indicate that educated individuals are more likely to engage in a variety of contraceptive practices as shown in table 3.

Table 3: Comparison of Under Educated and Educated Participants with the Use of Contraceptive Methods

Contraceptive Methods Usage	Undereducated Group Frequency (%)	Educated Group Frequency (%)	Chi-Square	p-Value
Withdrawal	45 (22.4%)	67 (33.6%)	6.45	0.011
Condoms	81 (40.6%)	122 (61.0%)	12.56	<0.001
Safe Periods	10 (5.0%)	30 (15.0%)	7.21	0.007
Oral Contraceptive Pills	29 (14.7%)	87 (43.7%)	16.78	<0.001
Diaphragm	5 (2.3%)	17 (8.3%)	3.84	0.050
Vaginal Cream	11 (5.7%)	25 (12.5%)	4.00	0.045
IUCD	13 (6.3%)	43 (21.5%)	8.00	0.005
Implants	11 (5.4%)	36 (18.0%)	6.75	0.009
Injectable	19 (9.5%)	49 (24.7%)	8.57	0.003
Vasectomy	1 (0.5%)	5 (2.5%)	-	-
Tubal Ligation	3 (1.5%)	19 (9.5%)	6.00	0.014
Breast Feeding	33 (16.6%)	53 (26.7%)	1.60	0.206

DISCUSSION

Previous studies have consistently shown that the level of education is a vital factor influencing contraceptive knowledge and use in different areas. One of the previous researches in sub-Saharan Africa indicates that women who possess higher education are more inclined to use modern contraceptive methods than those with lower education levels (Cleland *et al.*, in 2012, Ahinkora *et al.*, in 2021) [17, 12]. Likewise, in South Asia, variations in education have been associated with marked differences in reproductive health results, as educated women showed higher awareness and utilization of contraceptives(Memon *et al.*, in 2024; Kabir *et al.*, in 2024) [18, 19]. Through exploring these worldwide patterns, the analysis can emphasize the commonality of the connection between education and contraceptive methods, while also pinpointing successful strategies and interventions effective in different situations. This comparative method enhances the conversation and offers essential insights for policymakers and practitioners seeking to tackle unmet contraceptive requirements in less-educated groups. This research showed several significant strengths, especially the large sample size of 400 participants, enhancing the reliability and generalizability of the results. Incorporating individuals with diverse educational experiences from those without formal schooling to those who possess college diplomas provides a broad perspective on how education influences knowledge and the application of contraceptive methods. This variety is crucial, as it reflects the actual differences in knowledge and actions related to contraception. Moreover, the significant unemployment rate among participants (69.3%) emphasizes the socioeconomic difficulties that could affect health behaviors, such as contraceptive use, thus reinforcing the need for focused interventions in economically disadvantaged areas. These results supported the recognized association between education and awareness of contraceptives, aligning with earlier research by Beyene KM *et al.*, in 2023 and Rana MS *et al.*, in 2024, which showed that increased educational levels correlate with enhanced knowledge of modern contraceptive methods [20, 21]. Significantly, this study provides a distinct viewpoint by exploring the differences in contraceptive awareness

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between educated and less educated groups. Nevertheless, this research has limitations that could influence the wider relevance of its findings. Cultural attitudes unique to Lahore or Pakistan might restrict the applicability of the findings to other areas since local family planning norms can greatly impact contraceptive acceptance and use. Moreover, the study's cross-sectional design limits the capability to make causal inferences; although the connection between education and contraceptive knowledge is evident, it cannot be conclusively stated that higher education directly results in better contraceptive practices without taking into account other possible confounding factors. Given these findings, there is an immediate necessity for focused educational initiatives directed at undereducated groups to improve their knowledge and use of effective contraceptive techniques. These interventions must directly target the socio-economic and cultural obstacles that hinder access to contraception. These obstacles, such as gender disparity, cultural misunderstandings about contraception, and poverty, have been noted in earlier research but frequently lack a concentrated analysis of undereducated populations.

This study was constrained by its cross-sectional design, which precludes causal inference between educational attainment and contraceptive behavior, and its geographic restriction to Lahore, limiting the applicability of findings to rural communities, smaller cities, and culturally distinct provinces of Pakistan where family planning norms and access barriers differ considerably. The high proportion of unemployed participants (69.3%) and the reliance on self-reported contraceptive knowledge and usage introduce potential social desirability and recall biases, while the exclusion of pregnant individuals and those with cognitive impairments may have underrepresented particularly vulnerable subgroups. Future research should adopt longitudinal or interventional designs across multiple cities and rural settings with stratified sampling by province, socioeconomic status, and ethnicity to generate more representative and causally informative findings. Incorporating qualitative methods to explore the cultural, religious, and gender-power dynamics that mediate the education-contraception relationship, alongside evaluation of targeted community health education interventions among undereducated women, would provide the comprehensive evidence base needed to guide policy reforms and reproductive health program development in Pakistan.

CONCLUSIONS

This study emphasized the critical importance of educational achievements to influence contraceptive awareness and practices among women showed that greater educational levels were consistently linked to enhanced understanding and use of modern contraceptive techniques. This research uncovers notable differences in contraceptive usage among various regions, especially in sub-Saharan Africa and South Asia, where educational programs can enhance reproductive health results. The placement of these findings in a global framework, the research highlighted the importance of specific educational initiatives to meet unmet contraceptive demands, thereby, enhancing reproductive autonomy and promoting health equity.

Authors' Contribution

Conceptualization: ZS
Methodology: MH
Formal analysis: MH
Writing and Drafting: SH, AH, TR, AJ
Review and Editing: SH, AH, TR, AJ

All authors approved the final manuscript and take responsibility for the integrity of the work

Conflicts of Interest

All the authors declare no conflict of interest.

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