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The Impact of Delayed Marriage on Reproductive Health Outcome among Males: A Cross-Sectional Study

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ABSTRACT

Background: Delayed marriage is increasingly common among males in Pakistan, yet its effects on male reproductive health are not well understood. While much research has focused on women, the implications for men particularly regarding fertility, sexual function, and psychological well-being remain underexplored. Objective: This study aimed to evaluate the impact of delayed marriage on reproductive health outcomes among married males in major cities of Pakistan. Methods: A cross-sectional study was conducted in Karachi, Lahore, Islamabad, and Peshawar, enrolling 600 married males aged 30–49 years through stratified random sampling. Participants were grouped by age at marriage: before 30 years and at/after 30 years. Data collection utilized a structured questionnaire, including a fertility checklist, the International Index of Erectile Function (IIEF-5), and the General Health Questionnaire (GHQ-12). Statistical analyses included chi-square, t-tests, and logistic regression. Results: Males married at or after 30 years had significantly higher rates of infertility (21.2% vs 9.1%, $p<0.001$), erectile dysfunction (25.4% vs 11.3%, $p<0.001$), and psychological distress (mean GHQ-12 score 14.6±4.8 vs 11.0±4.1, $p<0.001$) compared to those married before 30. The fertility checklist revealed that delayed marriage was associated with longer time to conception and increased use of fertility treatments. Conclusion: Delayed marriage is linked to adverse reproductive health outcomes among Pakistani males. Comprehensive fertility assessment and early intervention are recommended for men marrying at later ages.

DOI: Availability

INTRODUCTION

BACKGROUND

Marriage is a fundamental institution in South Asian societies, shaping not only family structure but also the physical, psychological, and social well-being of individuals (Jones, 2007). In recent decades, the age at first marriage among males has been rising in Pakistan, particularly in urban centers, due to factors such as educational attainment, economic challenges, shifting social norms, and increased career orientation (Khan et al., 2023; Qureshi et al., 2021). Delayed marriage, commonly defined as marrying at or after the age of 30, has become a notable demographic trend. The implications of delayed marriage for male reproductive health are multifaceted. Research from Pacific Asia and other regions suggests a strong link between delayed marriage and declining fertility rates, with involuntary childlessness becoming more prevalent (Jones, 2007; Karamat, 2016). Advanced paternal age is associated with reduced sperm vitality, increased risk of genetic abnormalities in offspring, and higher rates of infertility (Rehman et al., 2024; Karamat, 2016). Furthermore, delayed marriage can also increase the risk of sexual dysfunction and psychological distress, as men may face heightened social pressures, stigma, and anxiety regarding their marital and reproductive status (Ahmed et al., 2024; Malik et al., 2022).

Despite the recognized importance of male involvement in reproductive health, the participation of men in reproductive health care remains low globally and in Pakistan (Farooq et al., 2024; Ani, 2015). Barriers include ineffective policies, lack of male-friendly services, sociocultural norms, and economic issues (Farooq et al., 2024). The World Health Organization defines reproductive health as a state of complete physical, mental, and social well-being in all matters relating to the reproductive system, not merely the absence of disease or infirmity (WHO, 2022). However, most reproductive health research and services in Pakistan focus on women, with men's needs often overlooked (Farooq et al., 2024).

Infertility, defined as the failure to conceive after 12 months of regular unprotected intercourse, is a significant concern for couples and is closely linked with sexual dysfunction and psychological well-being (Piva et al., 2015). Studies indicate that infertility and its treatment can negatively impact male sexual function, leading to higher rates of erectile dysfunction and reduced satisfaction with sexuality (Piva et al., 2015; Akhtar et al., 2025). These effects are compounded by sociocultural expectations that equate masculinity with fertility and sexual performance (Ahmed et al., 2024).

Given these challenges, there is a pressing need for empirical research on the impact of delayed

marriage on male reproductive health outcomes in Pakistan. This study aims to address this gap by systematically evaluating the relationship between age at marriage and fertility, sexual function, and psychological well-being among married males in four major Pakistani cities.

OPERATIONAL DEFINITIONS

- **DELAYED MARRIAGE:** Marriage occurring at or after the age of 30 years (Khan et al., 2023).
- **INFERTILITY:** Failure to conceive after 12 months of regular unprotected intercourse (WHO, 2022).
- **FERTILITY CHECKLIST:** A structured set of questions assessing reproductive history, time to conception, semen analysis results, infertility diagnosis, and use of fertility treatments (EAU Guidelines, 2025).
- **ERECTILE DYSFUNCTION:** Difficulty in achieving or maintaining an erection sufficient for satisfactory sexual performance, assessed using the International Index of Erectile Function (IIEF-5) (Rosen et al., 2021).
- **PSYCHOLOGICAL DISTRESS:** A state of emotional suffering characterized by symptoms of depression and anxiety, measured by the General Health Questionnaire (GHQ-12) (Goldberg et al., 2022).
- **SOCIO-DEMOGRAPHIC VARIABLES:** Age, education, occupation, income, and city of residence.

RESEARCH PROBLEM

Despite the rising trend of delayed marriage among Pakistani males, there is limited empirical evidence regarding its impact on reproductive health outcomes—particularly fertility, sexual function, and psychological well-being in the Pakistani context.

OBJECTIVE

To assess the impact of delayed marriage (marriage at or after 30 years) on reproductive health outcomes among males in selected cities of Pakistan.

RESEARCH QUESTION

What is the impact of delayed marriage on fertility, sexual function, and psychological well-being among males in major Pakistani cities?

IMPORTANCE OF THE STUDY

This study provides much-needed evidence for healthcare professionals and policymakers to

address male reproductive health in the context of delayed marriage and to design culturally appropriate interventions.

SCOPE AND LIMITATIONS

SCOPE

- Urban males (Karachi, Lahore, Islamabad, Peshawar)
- Married, aged 30–49
- Focus on fertility, sexual function, psychological health

LIMITATIONS

- Cross-sectional design (cannot establish causality)
- Self-reported data (possible bias)
- Urban-only sample (rural not included)

LITERATURE REVIEW

Research on delayed marriage and male reproductive health is limited but growing. Jones (2007) highlighted that delayed marriage contributes to very low fertility rates in Pacific Asia, with involuntary childlessness and reduced reproductive potential becoming more common. Karamat (2016) and Shirasuna & Iwata (2017) found that advanced paternal age can result in decreased sperm vitality, increased risk of chromosomal abnormalities, and higher rates of autism spectrum disorders in offspring.

Khan et al. (2023) and Qureshi et al. (2021) documented the demographic shift toward later marriage in Pakistan, noting its association with declining fertility and increased use of assisted reproductive technologies. Rehman et al. (2024) confirmed that sperm quality, including count, motility, and morphology, declines with age, leading to higher rates of infertility and need for fertility treatments.

Sexual dysfunction is another significant concern. Akhtar et al. (2025) and Piva et al. (2015) reported that men experiencing infertility or delayed marriage are more likely to suffer from erectile dysfunction, reduced libido, and lower sexual satisfaction. These findings are supported by systematic reviews indicating that infertility negatively affects the sexuality of both partners, but particularly men, who may experience a loss of self-esteem and increased anxiety (Piva et al., 2015).

Psychological well-being is also impacted. Ahmed et al. (2024) and Malik et al. (2022) found that men who marry late or experience infertility report higher levels of psychological distress,

including depression, anxiety, and social isolation. These effects are exacerbated by cultural expectations that tie masculinity to reproductive success (Raza et al., 2023).

Despite the recognized importance of male participation in reproductive health, Farooq et al. (2024) and Ani (2015) noted that men's engagement remains low due to systemic, cultural, and economic barriers. Health systems often lack male-friendly services, and policies tend to focus on women's reproductive health, neglecting men's needs (Farooq et al., 2024).

This literature underscores the urgent need for comprehensive, male-inclusive reproductive health research and services in Pakistan, particularly as delayed marriage becomes more common.

GAPS IN THE LITERATURE

Recent research has focused primarily on delayed marriage and female reproductive health. There is a paucity of studies examining the impact on males, particularly in South Asia and Pakistan (Khan et al., 2023; Hussain et al., 2022).

THEORETICAL FRAMEWORK

LIFE COURSE THEORY posits that the timing of major life events, such as marriage, can influence long-term health outcomes (Elder et al., 2020).

SOCIAL ROLE THEORY suggests that deviation from traditional marital timing can affect psychological and social well-being (Eagly & Wood, 2021).

CONCEPTUAL FRAMEWORK

Delayed marriage may affect reproductive health through biological aging, increased psychosocial stress, and disruption of traditional roles.

RECENT EVIDENCE

BIOLOGICAL IMPACT: Advanced paternal age is linked to reduced semen quality and increased infertility (Rehman et al., 2024).

SEXUAL DYSFUNCTION: Higher rates of erectile dysfunction are observed in men marrying after 30 (Akhtar et al., 2025).

PSYCHOLOGICAL HEALTH: Delayed marriage correlates with increased anxiety and depression (Ahmed et al., 2024).

PAKISTANI CONTEXT: Urban males are marrying later, with emerging reproductive health concerns (Pakistan Bureau of Statistics, 2024).

METHODOLOGY

STUDY DESIGN AND SETTING

A cross-sectional study was conducted in Karachi, Lahore, Islamabad, and Peshawar.

STUDY POPULATION

Married males aged 30–49 years, residing in the selected cities.

SAMPLING TECHNIQUE

Stratified random sampling ensured equal representation from each city.

SAMPLE SIZE CALCULATION

Sample size was determined using the standard formula for prevalence studies (Naing et al., 2006):

$$n = (Z^2 \times p \times (1-p)) / d^2$$

Where Z = 1.96 (95% confidence), p = 0.15 (estimated infertility prevalence), d = 0.05.

Calculated sample size: 196, increased to 600 to allow for subgroup analysis and non-response.

DATA COLLECTION TOOLS

FERTILITY CHECKLIST

Developed from EAU Guidelines (2025), the checklist included questions on reproductive history, time to conception, semen analysis, infertility diagnosis, fertility treatment, and number of children.

IIEF-5

Assessed erectile function.

GHQ-12

Assessed psychological distress.

PRE-TESTING

Questionnaire was pre-tested on 40 participants (10 per city) for clarity and reliability (Cronbach's alpha >0.8).

DATA COLLECTION

Trained interviewers conducted face-to-face interviews and reviewed medical records (where available) for semen analysis and infertility diagnosis.

VARIABLE TABLE

Variable	Operational Definition	Measurement Tool/Method	Type
Age at Marriage	Age (in years) at first marriage	Self-report	Continuous
Infertility	Failure to conceive after 12 months of regular unprotected intercourse	Fertility checklist, self-report	Binary
Time to Conception	Duration (months/years) from marriage to first conception	Fertility checklist	Continuous
Semen Analysis	Sperm count, motility, morphology (WHO criteria)	Lab report	Continuous
Erectile Dysfunction	Erectile function score (IIEF-5)	IIEF-5	Ordinal
Psychological Distress	Psychological well-being score	GHQ-12	Continuous
Use of Fertility Treatment	Whether fertility treatment was used (yes/no)	Fertility checklist	Binary
Number of Children	Total number of biological children	Fertility checklist	Discrete
Socio-demographics	Age, education, income, city	Self-report	Various

RESULTS

A total of 600 married males participated (mean age: 39.6 ± 5.2 years). Of these, 300 were married before age 30 and 300 at or after 30.

RESULTS BY AGE GROUP (BEFORE 30 VS. AT/AFTER 30 YEARS)

Age at Marriage	Infertility (%)	Erectile Dysfunction (%)	GHQ-12 Score	Use of Fertility Treatment	Time to Conception
Before 30 years	9.1	11.3	11.0 ± 4.1	Lower	Shorter
At/After 30	21.2	25.4	14.6 ±	Higher	Longer

years	4.8

FERTILITY CHECKLIST FINDINGS

Men married at or after 30 years had higher rates of infertility diagnosis (21.2% vs 9.1%), longer time to conception (mean: 16.4 months vs 9.7 months), greater use of fertility treatments (14.8% vs 6.3%), and lower mean sperm counts and motility (where laboratory data were available).

SEXUAL AND PSYCHOLOGICAL HEALTH

Delayed marriage was associated with increased prevalence of erectile dysfunction (25.4% vs 11.3%) and higher psychological distress scores (GHQ-12 mean: 14.6 ± 4.8 vs 11.0 ± 4.1).

MULTIVARIATE ANALYSIS

Delayed marriage remained a significant predictor of infertility (OR=2.3), erectile dysfunction (OR=2.1), and psychological distress (β=2.7) after adjusting for confounders.

DISCUSSION

The results of this study provide robust evidence that delayed marriage is associated with a spectrum of adverse reproductive health outcomes among Pakistani males. The use of a comprehensive fertility checklist, aligned with international best practices, enabled a nuanced evaluation of both clinical and lifestyle factors influencing male fertility. The data demonstrated that men who married at or after 30 years were significantly more likely to experience infertility, as confirmed by both self-report and laboratory semen analysis. This is consistent with the global literature, which documents age-related declines in sperm quality and increased difficulty achieving conception as paternal age advances (Rehman et al., 2024; Karamat, 2016).

Moreover, the results revealed that delayed marriage is linked to a higher prevalence of erectile dysfunction and greater psychological distress. These findings likely reflect the combined effects of biological aging, increased psychosocial stress, and the unique cultural pressures faced by men who delay marriage in Pakistani society (Ahmed et al., 2024; Malik et al., 2022). The psychological impact is particularly important, as chronic stress and anxiety can further impair reproductive function, compounding the risk of infertility and sexual dysfunction. The study also found that men who married later were more likely to seek fertility treatments, suggesting both increased need and greater health-seeking behavior in this group.

The integration of the fertility checklist was instrumental in capturing the multifactorial nature of male reproductive health. By systematically assessing medical history, lifestyle, semen analysis, and treatment history, the checklist ensured a holistic approach to identifying at-risk

individuals. This comprehensive assessment model can inform both clinical practice and future research, emphasizing the need for early intervention and targeted counseling for men considering delayed marriage.

The study's strengths include its multi-city design, robust sample size, and use of validated assessment tools. However, limitations such as the cross-sectional design, reliance on self-reported data, and exclusion of rural populations should be acknowledged. Future studies should employ longitudinal designs and include rural settings to enhance generalizability and explore causal relationships.

Main Finding	Implication
Delayed marriage linked to higher infertility	Need for early fertility assessment
Increased erectile dysfunction among late marriages	Require sexual health education
Higher psychological distress with delayed marriage	Psychosocial support necessary
Greater use of fertility treatments in late marriages	Health service planning implications

CONCLUSION

In summary, delayed marriage among Pakistani males is significantly associated with increased infertility, greater use of fertility treatments, higher rates of erectile dysfunction, and elevated psychological distress. The application of a structured fertility checklist provided a thorough and reliable means of assessing these outcomes and highlighted the importance of comprehensive reproductive health evaluation in this population. Given the rising trend of delayed marriage in Pakistan, it is imperative that public health initiatives incorporate routine fertility assessment, early counseling, and psychosocial support for men at risk. Continued research is needed to further elucidate the long-term consequences of delayed marriage on male reproductive health and to develop culturally sensitive interventions.

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