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Original Article

Prevalence of Primary and Secondary Infertility and Associated Factors of Infertility Among Married Women of Hyderabad, Sindh

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ABSTRACT

Background: Infertility is an important reproductive health concern with medical, psychological, and sociocultural consequences, particularly in settings where women are often disproportionately blamed for delayed conception. **Objective:** This study aimed to assess the distribution of primary and secondary infertility and document recorded infertility factors among married infertile women attending selected private fertility and obstetrics/gynecology clinics in Hyderabad, Sindh. **Methods:** A clinic-based descriptive cross-sectional study was conducted over six months among 100 married infertile women. Data were collected using a structured questionnaire designed according to the study objectives. Infertility type was classified as primary or secondary, and recorded infertility factors were categorized as female, male, combined, or unknown. Categorical variables were summarized as frequencies and percentages. **Results:** Primary infertility was recorded in 70 women (70.0%), while secondary infertility was recorded in 30 women (30.0%). Primary infertility was most frequent among women aged 21–25 years (38/70, 54.3%), whereas secondary infertility was most common among women aged 31–35 years (18/30, 60.0%). Infertility duration was most commonly 1–5 years in both primary (38/70, 54.3%) and secondary infertility (18/30, 60.0%). Female-factor infertility was the most frequent category (48.0%), followed by male-factor (28.0%), combined-factor (13.0%), and unknown-factor infertility (11.0%). **Conclusion:** Primary infertility predominated among clinic-attending married infertile women, while secondary infertility was more concentrated in older reproductive-age groups. Although female-factor infertility was the largest single category, non-female-only factors accounted for over half of cases, supporting timely couple-centered infertility evaluation and counseling. **Keywords:** Infertility; Primary Infertility; Secondary Infertility; Female Factor Infertility; Male Factor Infertility; Hyderabad Sindh.

INTRODUCTION

Infertility is a major reproductive health concern affecting couples worldwide and is commonly defined as the inability to achieve pregnancy after at least 12 months of regular unprotected sexual intercourse (1). Fertility represents the biological capacity of a couple to reproduce, whereas infertility reflects a disruption in this capacity due to female-related, male-related, combined, or unexplained factors (2). Clinically, infertility is commonly categorized as primary infertility, in which a couple has never achieved a pregnancy or live birth, and secondary infertility, in which conception has occurred previously but the couple is subsequently unable to conceive again (3). This distinction is important because primary and secondary infertility may differ in age distribution, duration of infertility, underlying causes, treatment-seeking behavior, and social consequences.

Globally, infertility affects a substantial proportion of couples, with estimates commonly ranging from approximately 10% to 15%, although reported rates vary by population, region, definition, and study design (4). The burden is particularly important in low- and middle-income settings, where delayed diagnosis, limited access to fertility services, cultural stigma, and gendered blame may intensify the medical and psychosocial consequences of infertility. In Pakistan, infertility remains an important reproductive health issue, and previous national and regional literature has reported a considerable burden of both primary and secondary infertility among reproductive-age couples (5). However, published estimates differ widely because some studies assess infertility in the general population, whereas others describe only clinic-attending infertile couples. This distinction is essential, as clinic-based studies can identify patterns among patients seeking care but cannot directly estimate population-level prevalence.

The causes of infertility are multifactorial. Female-factor infertility may result from ovulatory dysfunction, polycystic ovarian syndrome, tubal disease, pelvic inflammatory disease, endometriosis, uterine abnormalities, endocrine disorders, age-related decline in ovarian reserve, obesity, thyroid disease, or diabetes (6). Male-factor infertility may arise from abnormal sperm count, motility, morphology, sexual dysfunction, varicocele, infections, endocrine abnormalities, or other reproductive tract disorders (7). In some couples, both partners contribute to infertility, while in others no clear cause is identified despite clinical evaluation, leading to a diagnosis of unexplained infertility (8). Because infertility can involve either partner or both partners, evaluation of the couple as a unit is essential. This is especially important in sociocultural contexts where women are often disproportionately blamed for infertility despite the recognized contribution of male and combined factors.

Beyond its biological causes, infertility has important social, emotional, and marital consequences. Infertile couples may experience psychological distress, anxiety, depression, marital conflict, social isolation, and pressure from family or community members (9). In patriarchal settings, women may experience greater stigma, even when infertility is male-related or unexplained. This makes local evidence important not only for clinical planning but also for correcting misconceptions about infertility and supporting equitable couple-based evaluation and counseling.

Despite the recognized burden of infertility in Pakistan, data from Hyderabad, Sindh remain limited, particularly regarding the distribution of primary and secondary infertility and the recorded clinical categories of infertility among women attending fertility and gynecology services. Existing literature provides broader national and international estimates, but local clinic-based data are needed to understand the pattern of infertility among care-seeking married women in this setting. The present study was therefore designed to assess the distribution of primary and secondary infertility and to document associated infertility factors among married infertile women attending two private fertility and obstetrics/gynecology clinics in Hyderabad, Sindh. The study specifically aimed to answer the following research question: among married infertile women attending selected private clinics in Hyderabad, Sindh, what is the distribution of primary and secondary infertility, and what female, male, combined, or unexplained factors are recorded among these patients

MATERIALS AND METHODS

The study was designed as a clinic-based descriptive cross-sectional study to assess the distribution of primary and secondary infertility and to document recorded infertility factors among married infertile women attending private fertility and obstetrics/gynecology services in Hyderabad, Sindh. The study was conducted at two private clinics in Hyderabad where female gynecologists provided evaluation and management for female infertility and male consultants were available for assessment and treatment of male reproductive and sexual health problems. Data collection was carried out over a six-month period through standard clinic visits.

The study population consisted of married women presenting with infertility at the selected clinics during the data collection period. A total of 100 married infertile female patients were included. Infertility was operationally defined as failure to achieve conception after one year of regular unprotected sexual intercourse. Primary infertility was defined as infertility in a couple who had never conceived or reproduced a child, whereas secondary infertility was defined as inability to conceive again after a previous conception, childbirth, or miscarriage (10). Infertility factors were categorized as female-factor infertility when the identified cause was attributed to the female partner, male-factor infertility when the identified cause was attributed to the male partner, combined-factor infertility when both partners had contributing abnormalities, and unexplained infertility when no clear cause was identified after clinical evaluation.

Participants were selected from eligible married infertile women attending the two clinics during the study period. Before data collection, verbal consent was obtained from the attending gynecologists and from the participating patients. Information was collected using a structured questionnaire designed according to the study objectives. The questionnaire captured infertility type, age category, duration of infertility, and recorded infertility factor. Data were obtained during clinic visits through patient responses and available clinical categorization of infertility factor as recorded during evaluation at the participating centers.

The primary outcome variable was type of infertility, classified as primary or secondary infertility. Additional study variables included age group, duration of infertility, and infertility factor category. Age was grouped into predefined categories, while duration of infertility was categorized according to the number of years for which the participant had experienced inability to conceive. The infertility factor variable was classified into female, male, combined, or unknown factor categories. These variables were analyzed to describe the clinical and demographic profile of infertile women attending the selected clinics.

Data were checked for completeness before analysis. Categorical variables were summarized as frequencies and percentages. The distribution of primary and secondary infertility was calculated among the total sample of infertile women. Age distribution and duration of infertility were summarized separately for women with primary and secondary infertility. Infertility factor categories were summarized for the full sample. Percentages were calculated using the relevant denominator for each analysis, including the full sample for overall infertility factor distribution and the subgroup denominator for age and duration patterns within primary and secondary infertility groups.

To reduce information errors, data were collected through a structured format aligned with the study objectives, and infertility categories were coded consistently before analysis. The study treated the selected clinics as the source population, and findings were interpreted as clinic-based patterns among care-seeking infertile married women rather than population-level infertility prevalence. Verbal informed consent was obtained before participation, and the collected information was used for research purposes.

RESULTS

A total of 100 married infertile women were included in the analysis. Primary infertility was recorded in 70 women, representing 70.0% of the study sample, while secondary infertility was recorded in 30 women, representing 30.0%. The estimated 95% confidence interval was 60.4%–78.1% for primary infertility and 21.9%–39.6% for secondary infertility, indicating that primary infertility was the dominant infertility type among women attending the selected clinics.

Age distribution differed markedly between women with primary and secondary infertility. Among women with primary infertility, the largest age category was 21–25 years, comprising 38 of 70 cases, or 54.3%, followed by 26–30 years with 15 cases, or 21.4%. In contrast, secondary infertility was most

frequent among women aged 31–35 years, comprising 18 of 30 cases, or 60.0%, followed by 26–30 years with 6 cases, or 20.0%. The overall age-group distribution differed significantly between primary and secondary infertility groups ($\chi^2 = 40.44$, df = 5, $p < 0.001$). When age was dichotomized as ≤30 years versus >30 years, women aged >30 years had substantially higher odds of secondary infertility than primary infertility (OR = 16.00, 95% CI: 5.49–46.61, $p < 0.001$).

Table 1. Distribution of Primary and Secondary Infertility Among Study Participants

Infertility Type	Frequency (n)	Percentage (%)	95% CI
Primary infertility	70	70.0	60.4–78.1
Secondary infertility	30	30.0	21.9–39.6
Total	100	100.0	—

Table 2. Age Distribution by Type of Infertility

Age Group	Primary Infertility n (%)	Secondary Infertility n (%)	Total n (%)	Statistical Test
16–20 years	3 (4.3)	0 (0.0)	3 (3.0)	$\chi^2 = 40.44$, df = 5, $p < 0.001$
21–25 years	38 (54.3)	0 (0.0)	38 (38.0)	OR = 16.00,
26–30 years	15 (21.4)	6 (20.0)	21 (21.0)	95% CI: 5.49–46.61,
31–35 years	9 (12.9)	18 (60.0)	27 (27.0)	$p < 0.001$
36–40 years	5 (7.1)	4 (13.3)	9 (9.0)	
41–45 years	0 (0.0)	2 (6.7)	2 (2.0)	
Total	70 (100.0)	30 (100.0)	100 (100.0)	
Age >30 years	14 (20.0)	24 (80.0)	38 (38.0)	

The duration of infertility was most commonly 1–5 years in both infertility groups. Among women with primary infertility, 38 of 70 cases, or 54.3%, had infertility for 1–5 years, while 32 cases, or 45.7%, had infertility for 6–10 years. Among women with secondary infertility, 18 of 30 cases, or 60.0%, had infertility for 1–5 years, 10 cases, or 33.3%, had infertility for 6–10 years, and 2 cases, or 6.7%, had infertility for 11–15 years. The overall distribution of infertility duration did not reach conventional statistical significance between primary and secondary infertility groups ($\chi^2 = 5.56$, df = 2, $p = 0.062$). When duration was dichotomized as 1–5 years versus >5 years, the odds of secondary infertility among women with duration >5 years were not significantly different from those with duration 1–5 years (OR = 0.79, 95% CI: 0.33–1.89, $p = 0.664$).

Table 3. Duration of Infertility by Type of Infertility

Duration of Infertility	Primary Infertility n (%)	Secondary Infertility n (%)	Total n (%)	Statistical Test
1–5 years	38 (54.3)	18 (60.0)	56 (56.0)	
6–10 years	32 (45.7)	10 (33.3)	42 (42.0)	
11–15 years	0 (0.0)	2 (6.7)	2 (2.0)	
Total	70 (100.0)	30 (100.0)	100 (100.0)	$\chi^2 = 5.56$, df = 2, $p = 0.062$
Duration >5 years	32 (45.7)	12 (40.0)	44 (44.0)	OR = 0.79, 95% CI: 0.33–1.89, $p = 0.664$

Female-factor infertility was the most frequently recorded infertility factor, affecting 48 of 100 women, or 48.0%, with a 95% confidence interval of 38.5%–57.7%. Male-factor infertility was recorded in 28 cases, or 28.0%, followed by combined-factor infertility in 13 cases, or 13.0%, and unknown-factor infertility in 11 cases, or 11.0%. These findings show that although female-factor infertility represented the largest single category, male and combined factors together accounted for 41.0% of cases, highlighting the importance of couple-based infertility assessment.

Table 4. Distribution of Recorded Infertility Factors

Infertility Factor	Frequency (n)	Percentage (%)	95% CI
Female factor	48	48.0	38.5–57.7
Male factor	28	28.0	20.1–37.5
Combined factor	13	13.0	7.8–21.0
Unknown factor	11	11.0	6.3–18.6
Total	100	100.0	—

Overall, the findings show a clinic-based pattern dominated by primary infertility, particularly among women aged 21–25 years, whereas secondary infertility was concentrated mainly among women aged 31–35 years. The age distribution demonstrated a statistically significant difference between primary

and secondary infertility groups, while infertility duration showed no statistically significant group difference. Female-factor infertility was the most frequent recorded category, but male-factor, combined-factor, and unknown-factor infertility together represented more than half of the non-female-only diagnostic burden.

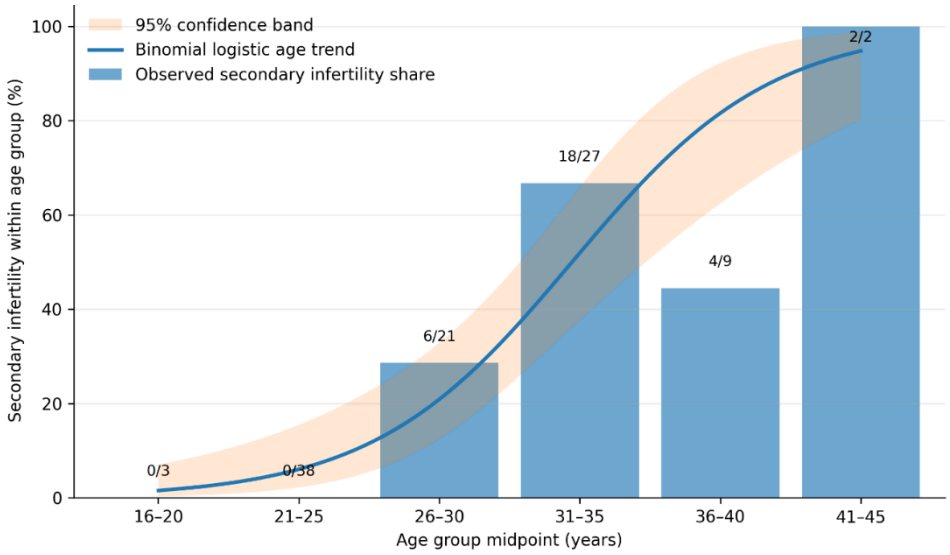

Figure 1. Age-Related Gradient in Secondary Infertility Among Clinic-Attending Infertile Women

Secondary infertility increased sharply across age categories, rising from 0.0% in women aged 16–20 years and 21–25 years to 28.6% in those aged 26–30 years, 66.7% in those aged 31–35 years, 44.4% in those aged 36–40 years, and 100.0% in those aged 41–45 years. The strongest concentration was observed in the 31–35-year group, where 18 of 27 women had secondary infertility, indicating a clear age-related shift from predominantly primary infertility in younger women toward secondary infertility in older reproductive-age women. This pattern supports the clinical relevance of age-stratified infertility assessment among care-seeking married women in Hyderabad, Sindh.

DISCUSSION

The present clinic-based study found that primary infertility was more frequently recorded than secondary infertility among married infertile women attending selected private clinics in Hyderabad, Sindh. Primary infertility accounted for 70.0% of cases, whereas secondary infertility accounted for 30.0%, indicating that most women in this care-seeking sample had not previously achieved childbirth or conception. This pattern is consistent with clinic-based infertility reports in which primary infertility often constitutes the larger proportion of patients presenting for fertility evaluation. The predominance of primary infertility may reflect earlier treatment-seeking among couples who have never conceived, stronger family and social pressure after marriage, and greater concern among younger women and couples when pregnancy does not occur within the expected reproductive period. However, because the study population was drawn from infertile women attending private clinics, these findings represent the distribution of infertility types among care-seeking patients rather than the population prevalence of infertility in Hyderabad.

Age showed a clear difference between primary and secondary infertility patterns. Primary infertility was concentrated among younger women, especially those aged 21–25 years, who represented 54.3% of primary infertility cases. In contrast, secondary infertility was most common among women aged 31–35 years, who represented 60.0% of secondary infertility cases. This age-related shift is biologically and clinically plausible, as increasing female age is associated with reduced ovarian reserve, declining oocyte quality, increased risk of miscarriage, and lower probability of conception (11-13). The observed concentration of secondary infertility in older reproductive-age women may also reflect the cumulative effect of prior pregnancy, postpartum reproductive tract infections, pelvic inflammatory disease, delayed

attempts for subsequent conception, or age-related decline in fecundability. The age gradient therefore highlights the importance of early evaluation, especially for women above 30 years who present with difficulty conceiving after a previous pregnancy.

The duration of infertility was most commonly 1–5 years in both infertility groups, accounting for 54.3% of primary infertility cases and 60.0% of secondary infertility cases. This suggests that many women sought clinical care within the first five years of infertility, although a substantial proportion still experienced infertility for longer than five years. Prolonged infertility may reflect delayed recognition of reproductive problems, financial constraints, sociocultural barriers to couple-based evaluation, limited access to specialized fertility care, or repeated empirical treatment before referral (14,15). From a clinical perspective, duration is important because delayed diagnosis may reduce the effectiveness of treatment, particularly when infertility is related to age-sensitive conditions such as diminished ovarian reserve, endometriosis, tubal damage, or male-factor abnormalities. These findings support the need for timely evaluation of both partners after one year of unsuccessful attempts at conception, and earlier assessment when the woman is older or when known reproductive risk factors are present.

Female-factor infertility was the most frequently recorded category, accounting for 48.0% of all cases. This finding aligns with the known contribution of ovulatory disorders, polycystic ovarian syndrome, tubal pathology, pelvic inflammatory disease, endometriosis, uterine abnormalities, endocrine disorders, obesity, thyroid disease, diabetes, and age-related reproductive decline to female infertility (16,17). Nevertheless, the finding should not be interpreted as evidence that infertility is primarily a female responsibility. Male-factor infertility accounted for 28.0% of cases, while combined-factor infertility accounted for 13.0%; together, male and combined factors were recorded in 41.0% of the study sample. This is clinically important because infertility evaluation that focuses only on women risks delayed diagnosis, unnecessary investigations, inappropriate treatment, and reinforcement of gender-based blame. Couple-based assessment remains essential because male-factor infertility is common, often treatable, and may coexist with female-factor causes.

The presence of unknown-factor infertility in 11.0% of cases further emphasizes the complexity of infertility diagnosis. Unexplained infertility may occur even after standard clinical evaluation when ovulation, semen parameters, tubal patency, and uterine factors appear normal. In such cases, subtle abnormalities in gamete quality, fertilization, embryo development, endometrial receptivity, tubal function, or immunological and molecular mechanisms may remain undetected by routine assessment (18). This category is particularly challenging for couples because the absence of a clear diagnosis can increase psychological distress and uncertainty about treatment options. Clinically, unexplained infertility requires careful counseling, individualized management, and consideration of the woman's age, duration of infertility, prior reproductive history, and available treatment resources.

The findings also have sociocultural relevance. In many South Asian settings, infertility is often socially attributed to women, even when male-factor, combined-factor, or unexplained infertility is present. The current findings challenge that assumption by showing that non-female-only categories made up a substantial proportion of cases. This has implications for reproductive counseling, public health education, and clinical practice. Fertility services should encourage evaluation of both partners from the beginning of care, normalize semen analysis as an essential component of infertility workup, and reduce stigma toward women who are often blamed before a complete couple-based assessment is performed (19). Addressing infertility as a shared reproductive health condition may improve diagnosis, treatment adherence, emotional support, and marital communication.

The study's strengths include its focus on a locally relevant reproductive health issue and its reporting of primary infertility, secondary infertility, age distribution, duration of infertility, and infertility factor categories among clinic-attending infertile women in Hyderabad, Sindh. These descriptive data provide useful insight into the profile of patients seeking infertility care in selected private clinical settings. However, several limitations should be considered when interpreting the findings. The sample size was

modest, and participants were recruited from two private clinics, which may not represent women attending public hospitals, rural facilities, or those who do not seek infertility care. The clinic-based design does not allow estimation of infertility prevalence in the general married female population. In addition, the analysis was primarily descriptive, and the available aggregated data limit adjustment for potential confounders such as socioeconomic status, duration of marriage, body mass index, menstrual history, prior pelvic infection, obstetric history, contraceptive history, and detailed male partner parameters.

Despite these limitations, the study adds meaningful local evidence by showing that primary infertility was the predominant presentation among infertile women attending the selected clinics, while secondary infertility was more concentrated in older age groups. The distribution of infertility factors also reinforces the importance of moving beyond a woman-centered blame model toward comprehensive couple-based diagnosis. Future research in this setting would benefit from larger multicenter designs, inclusion of both public and private facilities, standardized diagnostic criteria, and analytical approaches that examine predictors of primary and secondary infertility separately (20). Incorporating male partner evaluation, clinical records, laboratory findings, ultrasound results, and reproductive history would provide a more complete understanding of infertility patterns and guide targeted interventions for couples in Hyderabad and similar settings.

CONCLUSION

In this clinic-based study of married infertile women attending selected private fertility and obstetrics/gynecology clinics in Hyderabad, Sindh, primary infertility was the predominant presentation, accounting for 70.0% of cases, while secondary infertility accounted for 30.0%. Primary infertility was most frequent among women aged 21–25 years, whereas secondary infertility was concentrated mainly among women aged 31–35 years, indicating a clinically relevant age-related shift in infertility pattern. Most women in both groups had experienced infertility for 1–5 years, reflecting substantial care-seeking during the early years of reproductive difficulty. Female-factor infertility was the most commonly recorded category at 48.0%; however, male-factor, combined-factor, and unknown-factor infertility together accounted for 52.0% of cases, emphasizing that infertility cannot be attributed to women alone. These findings support the need for timely, couple-centered infertility assessment, early diagnostic evaluation, and culturally sensitive counseling to reduce gender-based blame and improve reproductive care for infertile couples in this setting.

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