Comparison of General Health, Marital Satisfaction, and Happiness Among Women with and Without Recurrent Pregnancy Loss: A Case-Control Study

Abstract

Aims: Recurrent pregnancy loss (RPL) imposes a profound psychological burden. This study aimed to compare general health, marital satisfaction, and subjective happiness between women with RPL and healthy controls, and to elucidate the mediating pathways linking RPL to relational outcomes.

Methods: In this matched case-control study conducted in 2025 in Shushtar, Iran, 210 reproductive-aged women (71 with RPL, 140 healthy controls matched by age, socioeconomic status, and gravidity) were recruited. Participants completed the General Health Questionnaire (GHQ-28), ENRICH Marital Satisfaction Inventory, and Oxford Happiness Questionnaire. Data were analyzed using Mann-Whitney U tests, stepwise multiple regression, and path analysis to evaluate direct and indirect effects.

Findings: Women with RPL exhibited significantly poorer general health (40.89±17.07 vs. 23.41±15.44, $p<0.001$), lower happiness (29.65±19.11 vs. 43.86±16.04, $p<0.001$), and reduced marital satisfaction (123.58±59.91 vs. 163.01±54.56, $p=0.001$) compared to controls. Crucially, path analysis revealed that RPL status did not directly diminish marital satisfaction. Instead, its detrimental effect was fully mediated by compromised general health and reduced happiness (indirect effect $\beta=0.297$, $p<0.001$).

Conclusion: Women with RPL experience poorer general health, lower happiness, and reduced marital satisfaction than healthy controls. Path analysis suggests that RPL may indirectly affect marital satisfaction through compromised health and happiness. These findings support integrating psychosocial care into RPL management. However, longitudinal studies are needed to confirm causal pathways.

Keywords: Recurrent pregnancy loss; Marital satisfaction; Psychological well-being; Happiness; Case-control study; Women's health

Clinical trial number: not applicable

Introduction

Recurrent pregnancy loss (RPL), clinically defined as two or more consecutive pregnancy losses before 20–24 weeks of gestation, affects approximately 1–3% of reproductive-aged women (1, 2). While the biomedical etiologies of RPL are increasingly understood, the psychological and psychosocial sequelae remain underappreciated in routine clinical care. Women experiencing RPL frequently report profound emotional distress, including anxiety, depression and somatic symptoms (3, 4), with pooled evidence indicating that the prevalence of moderate-to-severe depression is nearly four times higher in women with RPL compared to fertile controls (5), and cohort studies reporting that up to 42% of women with recurrent miscarriage experience moderate-to-severe psychological stress, compared to approximately 23% of women without pregnancy loss history (6). Beyond acute psychiatric symptoms, RPL may erode broader, multi-dimensional aspects of well-being, including general health perception, marital satisfaction, and subjective happiness. Grounded in the biopsychosocial model of reproductive distress, these three constructs operate synergistically: somatic and cognitive stress appraisal disrupts general health perception, repeated pregnancy loss strains dyadic coping mechanisms and relational equilibrium, and chronic anticipatory grief progressively depletes positive affect and life satisfaction. Collectively, these domains serve as critical protective factors that influence coping resilience, treatment adherence, and overall quality of life during fertility journeys (3, 7-9). However, existing evidence predominantly focuses on clinical depression or acute grief immediately following pregnancy loss, neglecting the chronic, multidimensional psychological burden that RM imposes on women's daily functioning, relational dynamics, and positive psychological resources.

Prior investigations have predominantly employed cross-sectional designs, convenience samples, or unidimensional psychological scales, which limit causal inference and generalizability (8, 10). Furthermore, most research isolates negative outcomes (e.g., anxiety or depression) without examining how RPL simultaneously impacts general health perceptions, marital harmony, and positive

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psychological constructs such as happiness and life satisfaction (3, 8, 10, 11). Crucially, the vast majority of existing studies lack a rigorously matched healthy control group, making it methodologically difficult to differentiate pregnancy-specific psychological distress from baseline population characteristics or pre-existing vulnerabilities (12). Without comparative data from reproductively healthy women, observed deficits in well-being cannot be confidently attributed to the cumulative trauma of recurrent loss. This absence of controlled comparison obscures whether compromised psychological functioning is a direct consequence of RM or merely reflects broader demographic, socioeconomic, and contextual factors. Consequently, the synergistic impact of repeated pregnancy loss on holistic well-being remains inadequately characterized, leaving a critical gap in understanding how alters both negative and positive dimensions of women's psychological health.

Addressing this gap is both clinically and scientifically imperative. To isolate the specific psychological footprint of RPL from baseline population norms, a case-control design with matched healthy controls was explicitly adopted. Establishing quantifiable differences in general health, marital satisfaction, and happiness between women with RPL and healthy counterparts will enable healthcare providers to identify precise psychosocial risk thresholds, prioritize integrated counseling, and develop targeted interventions that extend beyond biomedical management. Elucidating how relational and positive psychological factors are affected by RPL will inform patient-centered care models that recognize emotional and marital well-being as foundational components of reproductive health. Specifically, these findings will support the integration of standardized psychosocial screening protocols into routine RPL clinics, facilitate threshold-based referrals for couples counseling, and guide evidence-based allocation of mental health resources within fertility care pathways.

Therefore, the present case-control study was designed to compare general health, marital satisfaction, and subjective happiness between women with recurrent miscarriage and matched healthy controls, thereby extending the evidence base beyond pathology-oriented outcomes toward a more holistic, patient-centered perspective on reproductive well-being.

Information and Methods

- **Study Design and Setting**

The present study was conducted as a matched case-control study between January 2025 and June 2025 in Shushtar, a city located in Khuzestan Province in southwestern Iran. The study protocol was designed and reported in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines for case-control studies(13).

- **Participants**

The study population comprised all reproductive-aged women residing in Shushtar. Participants were recruited from hospitals, obstetrics and gynecology clinics, and primary healthcare centers affiliated with Shushtar University of Medical Sciences.

- **Case Group:** Women diagnosed with RPL, defined as two or more consecutive pregnancy losses before 20 weeks of gestation, were included in the case group (14).
- **Control Group:** Reproductively healthy women with no history of pregnancy loss, matched to cases, were recruited as the control group.

Inclusion Criteria:

- Reproductive-aged women (15–49 years)
- Permanent residence in Shushtar
- Sufficient proficiency in the Persian language to understand the study procedures and questionnaire items (with verbal assistance provided by trained research assistants for participants with limited literacy or visual difficulties) Willingness to participate and provide written informed consent

Exclusion Criteria:

- History of infertility or use of assisted reproductive technologies (ART)
- Presence of known chromosomal abnormalities in either partner
- History of major psychiatric disorders or current use of psychotropic medications
- History of chronic systemic diseases (e.g., uncontrolled diabetes, hypertension, autoimmune disorders)

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- Recent major life stressors (e.g., bereavement, divorce) within the past six months

- **Sample Size Calculation**

The sample size was calculated using the standard formula for comparing means between two independent groups, based on the findings of a prior study by Hassanpour et al. on sexual intimacy among women with and without recurrent miscarriage (14):

$$n_{ij} = \frac{\left(Z_{1-\alpha/2} + Z_{1-\beta}\right)^2 \left[(s_1^2 + s_2^2)\right]}{(d)^2}$$

Where:

- Z1−α/2Z1−α/2 = 1.96 (for a two-sided significance level of α = 0.05)
- Z1−βZ1−β = 0.84 (for a power of 1 - β = 0.80)
- S1S1 = 6.41 (standard deviation in the case group from the reference study)
- S2S2 = 3.07 (standard deviation in the control group from the reference study)
- dd = 2.5 (the minimum clinically meaningful difference between the two group means)

Based on this formula, the minimum required sample size was estimated at 64 participants per group. Accounting for a potential 10% dropout rate, the adjusted sample size was determined to be 70 participants for the case group. To enhance statistical power and precision of the estimates, a 1:2 case-to-control ratio was adopted, resulting in 140 participants for the control group. The final sample size was 210 participants (71 in the case group and 140 in the control group; the final enrollment slightly exceeded the calculated minimum to ensure adequate power).

- **Sampling Method and Study**

Data collection was conducted over six months, from January 4 to June 26, 2025. Before the main study, a pilot study was performed on a subset of participants (n = 20) to assess the feasibility of the research protocol, evaluate the clarity of the questionnaires, and estimate the average time required for data collection. Based on the pilot findings, minor adjustments were made to the data collection procedure to enhance participant comprehension and minimize response burden.

Case Group Recruitment: A non-probability purposive sampling method was employed. Eligible women were consecutively identified from the obstetrics and gynecology departments of hospitals and specialized private clinics in Shushtar, based on medical records confirming a history of two or more consecutive pregnancy losses.

Control Group Recruitment: To minimize selection bias and ensure comparability between groups, controls were recruited from the same hospitals and clinics where cases were identified, using a systematic random sampling method. Women attending these facilities for routine gynecological check-ups, family planning services, or general health screenings were screened for eligibility. This approach was deliberately chosen to ensure that both cases and controls were drawn from the same underlying source population, thereby reducing the risk of selection bias. For each eligible control, we verified the absence of any history of pregnancy loss through medical record review and personal interview.

This facility-based recruitment strategy, while ensuring comparability of the sampling frame, may introduce some degree of selection bias, as women attending healthcare facilities might differ from the general population in terms of health-seeking behaviors. This limitation is further addressed in the discussion section.

- **Matching Procedure**

To control for potential confounding variables, an individual matching technique with a 1:2 case-to-control ratio was implemented. For each woman in the case group, two control participants were selected and matched based on the following criteria:

- Maternal age (± 2 years)

- Socioeconomic status (assessed using a standardized household economic inventory, classified into low, medium, and high)

- Gravida (number of previous pregnancies, ± 1): This strategy aimed to ensure that the two groups were comparable with respect to key demographic and reproductive factors, thereby minimizing confounding bias and enhancing the internal validity of the study. However, due to the inherent nature of RPL, which is associated with increased gravidity as a consequence of repeated pregnancy

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attempts and losses, complete matching for gravida could not be fully achieved despite our efforts. To address this residual imbalance, all multivariate analyses (stepwise regression and path analysis) were adjusted for reproductive history variables, including gravida, parity,

and number of previous abortions, as covariates. This statistical adjustment allowed us to isolate the independent effect of RPL status on the psychological outcomes of interest while controlling for potential confounding effects of reproductive history.

- **Instruments and Measures**

All participants completed a comprehensive battery of validated self-report questionnaires, along with a demographic and obstetric checklist. The primary outcome measures included:

- **General Health Questionnaire (GHQ-28):** General psychological health was assessed using the 28-item GHQ-28, originally developed by Goldberg and Hillier (1979). This instrument evaluates psychological distress across four subscales (7 items each): somatic symptoms, anxiety/insomnia, social dysfunction, and severe depression. Items are rated on a 4-point Likert scale (0–3), with total scores ranging from 0 to 84. Higher scores indicate poorer general health and greater psychological distress(15). The Persian version has demonstrated excellent internal consistency(Cronbach's α = 0.93) and robust construct validity in Iranian(16).

populations.

- **ENRICH Marital Satisfaction Inventory:** Marital satisfaction was assessed using the 47-item ENRICH (Evaluating & Nurturing Relationship Issues, Communication & Happiness) Marital Inventory, originally developed by Olson et al. (1989). This multidimensional tool evaluates 12 subscales, including marital satisfaction, communication, conflict resolution, financial management, and sexual relationship. Items are rated on a 5-point Likert scale (1 = "strongly agree" to 5 = "strongly disagree"), with specific items reverse-scored to minimize response bias. Total scores range from 47 to 235, where higher scores indicate greater marital satisfaction (17). In the Iranian context, the Persian version of the ENRICH inventory has been extensively validated, demonstrating excellent internal consistency (Cronbach's α > 0.90), strong test-retest reliability, and robust construct and criterion-related validity in Iranian populations (18).
- **Oxford Happiness Questionnaire (OHQ):** a comprehensive 29-item instrument originally developed by Hills and Argyle (2002) to assess multiple dimensions of subjective well-being and positive affect. All 29 items are rated on a 4-point Likert scale ranging from 0 ("never") to 3 ("always"). The total happiness score is calculated by summing the ratings across all items, yielding a possible score range of 0 to 87. Higher total scores indicate greater levels of subjective happiness. The instrument does not include any reverse-scored items. According to the standard scoring guidelines, the total scores are interpreted as follows: Scores below 22 indicate low happiness, Scores from 22 to 44 indicate moderate happiness, Scores from 44 to 68 indicate high happiness Scores from 68 to 87 indicate very high happiness (19). In the Iranian context, Alipour et al. confirmed the instrument's strong internal consistency (Cronbach's α > 0.90) and acceptable construct validity, establishing it as a highly reliable and culturally appropriate tool for assessing subjective happiness in Iranian samples (20).
- **Internal Consistency in the Current Study**

The internal consistency of the administered questionnaires was evaluated in the current study sample using Cronbach's alpha coefficient. The results demonstrated satisfactory to excellent reliability for all instruments: the GHQ-28 (α = 0.82), the ENRICH Marital Satisfaction Inventory (α = 0.87), and the Oxford Happiness Questionnaire (α = 0.80). These findings confirm that the Persian versions of these instruments possess robust psychometric properties and are highly reliable tools for assessing general psychological health, marital satisfaction, and subjective happiness among Iranian women with and without RPL. All alpha coefficients exceeded the recommended threshold of 0.70, indicating acceptable internal consistency.

- **Data Collection Procedure**

After obtaining ethical approval from the Research Ethics Committee of Dezful University of Medical Sciences (Ethics Code: IR.DUMS.1398.037), data collection commenced. Trained research assistants

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administered the questionnaires in a private setting to ensure confidentiality and minimize response bias. The questionnaire battery required approximately 25 to 35 minutes to complete. For the case group, data collection was conducted after confirming the RPL diagnosis through medical record review.

- **Statistical Analysis**

Data were analyzed using IBM SPSS Statistics for Windows, Version 23.0 (IBM Corp., Armonk, NY, USA), and figures were generated using GraphPad Prism, Version 9.0 (GraphPad Software, San Diego, CA, USA). A two-sided p-value < 0.05 was considered statistically significant.

- Descriptive Statistics: Quantitative variables were expressed as mean ± standard deviation (SD) or median (interquartile range [IQR]) based on the distribution of the data. Categorical variables were presented as frequencies and percentages.
- Assumption Checking: Normality was assessed using the Kolmogorov-Smirnov test to select appropriate parametric or non-parametric tests for group comparisons.
- Bivariate Analyses: Categorical variables were compared using the Chi-square or Fisher's exact test, as appropriate. Quantitative variables were compared using the independent samples t-test (for normally distributed data) or Mann-Whitney U test (for non-normally distributed data), with effect sizes reported as Cohen's d (95% CI). Correlations were examined using Pearson's or Spearman's correlation coefficients based on the normality of the variables.
- Multivariate Analyses: Stepwise multiple regression models were employed to identify the strongest independent predictors of each psychological outcome. To address potential residual confounding resulting from imperfect matching for gravida, all regression models were adjusted for reproductive history variables, including gravida, parity, and number of previous abortions, as covariates. Path analysis was conducted using maximum likelihood estimation with bootstrapping (5,000 resamples) to evaluate direct and indirect effects among the study variables.
- Model Fit Assessment: Goodness of fit for the path model was evaluated using the following indices: χ^2/df, GFI, AGFI, CFI, NFI, TLI, RMSEA, PCLOSE, and RMR. Acceptable model fit was defined as: χ^2/df < 3, GFI/AGFI/CFI/NFI/TLI > 0.90, RMSEA/RMR < 0.08, and PCLOSE> 0.05.

Ethical Considerations

This study was conducted in strict accordance with the Declaration of Helsinki and national biomedical research guidelines (21, 22). Prior to enrollment, participants received a comprehensive verbal and written explanation of the study objectives, procedures, and confidentiality assurances. They were explicitly informed that participation was entirely voluntary, would not affect their ongoing medical care, and that they could withdraw at any time without consequence. All data were anonymized using unique identification codes and stored in password-protected files. Written informed consent was obtained from all participants. For participants with limited literacy or visual difficulties, the consent form and questionnaire items were read aloud by trained research assistants, and consent was documented with a fingerprint or thumbprint in the presence of an impartial witness, in accordance with national ethical guidelines. Furthermore, formal permission for the non-commercial, academic use of all standardized questionnaires was obtained, ensuring compliance with intellectual property and copyright regulations. No financial compensation was provided for participation.

Findings

- **Demographic and Clinical Characteristics**

A total of 210 participants were enrolled in this study, comprising 71 women with a history of RPL(case group) and 140 women without such a history (control group). As detailed in Table 1, the two groups were successfully matched and demonstrated no statistically significant differences regarding maternal age (p = 0.414), paternal age (p = 0.653), maternal occupation (p = 0.120), paternal occupation (p = 0.442), and housing status (p = 0.923).

However, significant differences were observed in educational attainment and reproductive history. Both maternal (p = 0.001) and paternal (p = 0.002) educational levels were significantly lower in the case group. Regarding the detailed distribution of obstetric history, significant disparities were observed across gravidity, parity, and abortion history. The distribution of gravidity differed significantly between the two groups ($\chi2$ = 138.00, p < 0.001). Notably, none of the women in the RPL group had experienced only one or two pregnancies; the majority had higher gravidity, with the highest proportions observed in those with 4 (19.7%), 6 (16.9%), and 8 (19.7%) pregnancies. In contrast, the control group was

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predominantly distributed across lower gravidity numbers, with 21.4% having one pregnancy and 21.4% having four.

Similarly, parity distribution showed a significant difference ($\chi2 = 10.82$, $p = 0.001$). In the case group, the most common parity was two deliveries (35.2%), followed by one (21.1%) and three (16.9%), while over a quarter (26.8%) were nulliparous. Conversely, the control group exhibited a broader distribution, including women with four (11.4%) and five (2.1%) deliveries, which were completely absent in the case group.

The most striking difference was found in the history of previous abortions ($\chi2 = 361.93$, $p < 0.001$). By definition, no woman in the case group had zero or one previous abortion; their history ranged from two to six abortions, with the highest frequencies observed for four (23.9%) and six (23.9%) previous abortions. In the control group, the vast majority had either zero (40.7%) or one (38.6%) previous abortion, with very few experiencing two (15.0%) or more. Due to the non-normal distribution of quantitative variables, the Mann-Whitney *U* test was utilized, while Chi-square or Fisher's exact tests were applied for categorical variables, as appropriate.

- **Comparison of Psychological Variables**

The Mann-Whitney *U* test revealed significant differences between the case and control groups across all assessed psychological variables (Table 2). Women in the case group demonstrated significantly poorer general health (higher GHQ scores: 40.89 ± 17.07 vs. 23.41 ± 15.44, $p < 0.001$, Cohen's $d = 1.09$), lower levels of happiness (29.65 ± 19.11 vs. 43.86 ± 16.04, $p < 0.001$, $d = -0.83$), and reduced marital satisfaction (123.58 ± 59.91 vs. 163.01 ± 54.56, $p = 0.001$, $d = -0.70$) compared to the healthy control group.

- **Correlation Analysis**

Spearman's rank correlation analysis indicated significant interrelationships among the study variables in both groups (Table 3).

- In the case group, the strongest correlation was observed between happiness and general health ($r = -0.513$, $p < 0.001$), indicating that higher happiness is associated with better general health (lower GHQ scores). Additionally, happiness showed a positive correlation with marital satisfaction ($r = 0.462$, $p < 0.001$), while marital satisfaction was negatively correlated with general health ($r = -0.232$, $p = 0.042$).
- In the control group, the strongest correlation was between marital satisfaction and general health ($r = -0.573$, $p < 0.001$), suggesting that better mental health is closely linked to higher marital satisfaction in healthy individuals. Happiness also correlated positively with marital satisfaction ($r = 0.243$, $p = 0.004$) and negatively with general health ($r = -0.272$, $p = 0.001$).

- **Stepwise Multiple Regression Analysis**

Stepwise regression models were employed to identify the strongest predictors of the psychological outcomes (Table 4):

1. Predicting General Health (GHQ): Four variables entered the model: Marital Satisfaction (ENRICH), Group status, Happiness, and Education. The final model explained 42.3% of the variance in general health ($R^2 = 0.423$, $p < 0.001$), with Marital Satisfaction and Group status contributing the largest increments in R^2.
2. Predicting Happiness: Four variables entered the model: Marital Satisfaction, General Health, Husband's age, and Group status. This model accounted for 34.1% of the variance in happiness ($R^2 = 0.341$, $p < 0.001$), with Marital Satisfaction and General Health being the most substantial predictors.
3. Predicting Marital Satisfaction (ENRICH): Only two variables entered the model: General Health and Happiness. This model explained 36.4% of the variance ($R^2 = 0.364$, $p < 0.001$). Notably, Group status did not enter this model, suggesting that the relationship between having a history of RPL and marital satisfaction is fully mediated by general health and happiness.

- **Path Analysis**

Path analysis was conducted to evaluate the direct and indirect effects of the variables (Tables 5 and 6; Figure 1). The model demonstrated that Group status had a significant direct negative effect on General Health ($\beta = -0.460$, $p < 0.001$), confirming that the control group exhibited better health outcomes. Group status also had a direct positive effect on Happiness ($\beta = 0.201$, $p = 0.003$) and a positive indirect effect mediated through General Health ($\beta = 0.166$), yielding a total effect of $\beta = 0.366$.

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Crucially, regarding Marital Satisfaction, the direct path from Group status was non-significant and subsequently removed from the final model, indicating full mediation. However, Group status exerted a strong, significant positive *indirect* effect on Marital Satisfaction mediated through General Health and Happiness (β = 0.297). This implies that a history of RPL does not directly diminish marital satisfaction; rather, it exerts its detrimental effect indirectly by compromising mental health and reducing happiness. In the final model, General Health emerged as the strongest predictor of Marital Satisfaction (β = -0.415, p < 0.001), followed by Happiness (β = 0.288, p < 0.001). The model successfully explained 36.4% of the variance in Marital Satisfaction, 23.6% in Happiness, and 21.2% in General Health.

The goodness-of-fit indices for the final path model indicated an excellent fit to the data (Table 7): $\chi 2/df$ = 0.146, GFI = 0.990, AGFI = 0.979, CFI = 0.990, NFI = 0.989, TLI = 0.926, RMSEA = 0.011 (PCLOSE = 0.768), and RMR = 0.062.

Discussion

The primary objective of this matched case-control study was to compare general psychological health, subjective happiness, and marital satisfaction between women with recurrent pregnancy loss (RPL) and healthy controls, and to elucidate the mediating pathways linking RPL to relational outcomes. The key findings revealed that women with a history of RPL experienced significantly poorer general health, lower levels of happiness, and reduced marital satisfaction compared to their healthy counterparts. Crucially, path analysis demonstrated that RPL status did not exert a direct detrimental effect on marital satisfaction; rather, this relationship was fully mediated by compromised general psychological health and diminished subjective happiness.

The observation that women with RPL exhibit significantly poorer general health and lower happiness is concordant with a growing body of international literature. The most recent comprehensive reviews and the ESHRE guidelines emphasize that the psychological burden of RPL extends far beyond acute grief, often manifesting as chronic anxiety, depressive symptoms, and a profound disruption of daily functioning (1, 12). While many prior studies have predominantly focused on the *presence* of psychopathology (e.g., depression or PTSD)(5, 6), our findings align with emerging positive psychology perspectives, highlighting that RPL actively depletes *positive affect* and subjective well-being. Studies focusing on the Iranian context, such as the investigation by Tavoli et al. (7) and Azin et al. (11), have similarly documented a high prevalence of multidimensional psychological morbidity and diminished quality of life among women with RPL. The current findings reinforce this biopsychosocial perspective, suggesting that RPL acts as a chronic, cumulative stressor that systematically erodes an individual's psychological resources and capacity for happiness over time.

Regarding marital dynamics, the present study found that women with RPL reported significantly lower marital satisfaction. This finding is consistent with prior research indicating that RPL acts as a profound shared stressor that can strain dyadic coping mechanisms and relational equilibrium (10, 23). In the local context, studies by Hasanpour et al. have demonstrated that the psychological fallout of RPL significantly impairs sexual function and marital intimacy, further corroborating the widespread relational impact of recurrent loss (14). However, the most novel contribution of this study lies in the elucidation of the *mechanism* underlying this relational strain. While some earlier literature might implicitly suggest that the trauma of pregnancy loss directly damages the marital bond (e.g., through divergent grieving styles or mutual blame), our path analysis refines this understanding by demonstrating full mediation. Specifically, the statistical association between RPL status and marital dissatisfaction was entirely attenuated when general health and happiness were accounted for. This suggests that the loss itself does not directly erode marital harmony; rather, it is the secondary consequence of the woman's depleted mental health and reduced capacity for positive affect that impairs her emotional availability and dyadic functioning. This interpretation is strongly supported by recent dyadic research, such as the study by Kuhlmann et al.(4), which demonstrated that a woman's posttraumatic distress positively correlates with her partner's stress, indicating that unaddressed individual psychological deterioration permeates the couple's system, thereby compromising overall marital equilibrium. Consequently, this aligns with the biopsychosocial model of reproductive distress, which posits that individual psychological well-being serves as a foundational prerequisite for resilient relational dynamics (24). It is worth noting a fascinating divergence in the correlational patterns between the two groups. In the control group, the

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strongest correlation was observed between marital satisfaction and general health, whereas in the RPL group, the strongest link was between happiness and general health. This divergence can be interpreted through the lens of the stress-buffering hypothesis. In the absence of reproductive trauma, marital harmony naturally serves as a primary driver of a woman's perceived health. Conversely, in the context of RPL, the trauma disrupts this baseline relational equilibrium. Therefore, the preservation of personal happiness and positive affect becomes the critical, independent psychological buffer protecting general health from severe deterioration. This highlights a shift in protective factors: for women with RPL, fostering individual resilience and subjective happiness may be a more immediate prerequisite for health than relying solely on relational harmony, which may itself be strained by the shared grief.

Despite these robust findings, the results must be interpreted within the context of the study's limitations. The cross-sectional design precludes definitive causal inferences; while path analysis suggests directional relationships, longitudinal studies are required to track the temporal evolution of these psychological and relational dynamics following successive losses. Additionally, the reliance on self-reported measures introduces the potential for recall and social desirability biases. Furthermore, the inclusion of only female participants means that the dyadic perspective of the male partners was not captured, which is a notable gap given the shared nature of RPL. Future research should employ longitudinal, dyadic designs to further unpack how couples mutually navigate the psychological aftermath of RPL and to validate the mediating pathways identified in this study.

Clinical Implications

The finding that RPL's detrimental impact on marital satisfaction is *fully mediated* by compromised general health and diminished happiness offers a paradigm shift in patient care. It indicates that marital strain is a secondary ripple effect of unaddressed psychological distress, not a direct consequence of the loss itself. Therefore, routine RPL management must evolve beyond a strictly biomedical focus. Clinics should integrate standardized psychosocial screening (e.g., GHQ-28) into care pathways. Interventions must prioritize restoring the woman's mental well-being and fostering positive affect, supported by dyadic, couple-centered counseling. Treating psychological and relational dimensions as foundational components of reproductive health allows clinicians to holistically support women and their families through their reproductive journey.

Strengths and Limitations

This study has several notable strengths. First, the rigorous matched case-control design with a 1:2 ratio effectively minimized confounding from key demographic factors. Second, the facility-based recruitment of both cases and controls from the same hospitals and clinics ensured comparability of the sampling frame and reduced selection bias. Third, the application of advanced path analysis allowed us to elucidate complex mediating mechanisms beyond simple correlational analyses. Fourth, the confirmed internal consistency of all instruments (Cronbach's $\alpha > 0.80$) reinforced the reliability of our findings.

Despite these strengths, several limitations warrant consideration. First, the cross-sectional design precludes definitive causal inferences; longitudinal studies are required to confirm the directional relationships suggested by path analysis. Second, reliance on self-reported questionnaires introduces potential recall and social desirability biases. Third, facility-based recruitment may limit generalizability to women who do not regularly attend healthcare facilities. Fourth, despite efforts to match for gravida, the inherent association between RPL and higher gravidity prevented perfect matching; although we adjusted for reproductive history variables in multivariate analyses, residual confounding may persist. Fifth, the exclusion of male partners limits the dyadic perspective on RPL's impact. Finally, the specific cultural context of Shushtar, Iran, and unmeasured variables such as coping styles and social support networks may affect generalizability.

Conclusion

This study demonstrates that women with RPL experience significantly poorer general health, lower happiness, and reduced marital satisfaction compared to healthy controls. Path analysis suggests that RPL may indirectly affect marital satisfaction through its negative impact on general health and happiness, rather than through a direct pathway. These findings underscore the need for integrated psychosocial care in RPL management, with interventions targeting mental health resilience and positive affect. However, the cross-sectional design limits causal inferences; longitudinal and dyadic studies are needed to confirm these mediating pathways and evaluate the effectiveness of targeted interventions. A

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holistic, patient-centered approach addressing both biomedical and psychological dimensions appears essential for optimizing well-being in women and couples affected by RPL.

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