

Evaluation of Couple's Sexual Function after Childbirth with the Biopsychosocial Model: A Systematic Review of Systematic Reviews and Meta-Analysis

Abstract

Background: After childbirth, sexual dysfunction refers to a chain of psychiatric, physiological, social changes and a couple's experiences. The purpose of our Systematic Review (Syst.Rev.) is to evaluate available high-quality evidence and construct a Bio Psycho Social (BPS) model of couple's sexual function after childbirth. **Materials and Methods:** A systematic search was done with MeSH terms in databases, including PubMed, Web of Science, Scopus, and Science direct. A total number of 9 Syst.Rev. were evaluated from 2009 to 2019 years. The quality of extracted articles was evaluated based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist of contents using two qualified reviewers. Data synthesis was performed using the thematic analysis. **Results:** Biopsychosocial Model of Postpartum Couple's Sexual Function (BMPCSF) is proposed as a developmental process similar to Bronfenbrenner's Bioecological Systems Model. Studies showed a significant relationship among the type of childbirth, trauma of perineum, breastfeeding, mood swings, fears, changes in the self-body image, spousal support, and Postpartum Sexual Dysfunction (PSD). Hence, the evidence about male sexuality in the postpartum period doesn't seem sufficient. **Conclusions:** The information from this study will help health policymakers develop the appropriate guidelines to inform couples and *healthcare* professionals about the BPS changes after childbirth and PSD. Besides, BMPCSF can be used in postpartum sexual counseling to improve sexual health and marital relationships. We propose comprehensive original study on couples' postpartum sexuality, especially men's conduct, emphasizing socio-cultural factors.

Keywords: *Biological factors, parturition, postpartum period, sexual health, socioeconomic factors*

Introduction

Pregnancy and postpartum are important transitional periods in women's lives, posing risks to their sexual health.^[1,2] For example, one or more health problems, fatigue, depression, back pain, hemorrhoids, perineal pain, and sexual problems, were expressed by 94% of the females in the first six months after childbirth.^[1,3,4] Women's sexual problems after the delivery were related to decreased desire, lack of orgasm, vaginal dryness, dyspareunia, sexual dissatisfaction, and decreased frequency of sexual activity.^[5]

Postpartum Sexual Dysfunction (PSD) prevalence is high which affected by biological, psychological, and social factors. Moreover, sexual dysfunction reduces the quality of life and dissatisfaction, which has a negative effect on the physical, psychological, social, and emotional health of women,^[6,7] and ignoring this issue also

leads to a decrease in femininity, decreased self-confidence, and security, and social problems such as various mental and physical illnesses, crime, divorce and drug addiction.^[8]

Considering the importance of the issue and the high prevalence of sexual dysfunction, World Health Organization (WHO) recommends that research should be conducted to identify the causes of sexual dysfunction because lack of awareness about sexual health is the cause of diseases and disorders worldwide.^[9] Studies suggested that postpartum cares are an important opportunity for sexual health counseling.^[10] Therefore, it is important to identify PSD causes and know the direct and indirect effects of these causes on family relationships and couples. As a result, it can be explained by BPS model.^[11-13] Hence, the biopsychosocial model is one of the few

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methods which can explain the association among various factors and components of phenomena or behaviors like couples' sexual function in real life.^[14] A BPS model is based on the belief that the sexual problems among women have several explanatory causes and are multifactorial.^[15,16]

Published studies in medicine, especially health, have dramatically increased in recent decades. Systematic review and meta-analysis have high evidence, as shown by evidence-based pyramid.^[17] Regarding Syst.Rev. studies summarize the results of various studies; they can provide the best evidence to identify PSD causes. As a result, this study aims to examine high-quality Syst.Rev. and meta-analysis about the effect of BPS variables on postpartum women's and men's sexual function.

Materials and Methods

This systematic review was the first part of Ph.D. thesis which was carried out by following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist. Based on eligibility criteria and reviewed articles, factors affecting desire, arousal, orgasm, pain, and sexual satisfaction after childbirth were examined by authors.

We searched PubMed, Web of Science, Scopus, and Science direct databases from 2009 to 2019 to identify relevant articles with MeSH terms (“Sexual Dysfunction” OR “Physiological Sexual Dysfunctions” OR “Sexual Health” OR Orgasms OR “Sexual Behavior” OR libido OR “Sexual Arousal” OR dyspareunia OR “Erectile dysfunction” OR “Premature Ejaculation”). Other different MeSH keywords (Postpartum OR “Cesarean Section” OR “Natural Childbirth” OR “Parturition”) were used to expand the search possibilities. The strategy of search in the databases is described in Appendix A. All studies obtain from search enter to the EndNote X7 for extract duplicates.

We considered different types of sexual dysfunction included: desire, arousal, orgasm, pain, and sexual satisfaction. To assess the factors associated with PSD, the eligible studies should meet following criteria: (i) Syst. Rev. or meta-analysis studies, addressing BPS factors related to sexual function in women or men during the postpartum; (ii) the 2009-2019 publication; (iii) being reported in English or Persian; and (iv) being a complete manuscript (not just an abstract). Irrelevant data from reading titles or abstracts, duplicated, or articles with minimal critical evaluation index were excluded.

The title, abstract, and finally full texts of all retrieved records were reviewed and independently indicated by two authors (S.H. and F.R.). When there was disagreement as to whether a study met the eligibility criteria, the article was reviewed by a third author (N.T.) and then selected or rejected by consensus. Then, following variables were extracted from the studies included in Systematic Review (Syst.Rev.). First author's name, year of publication, years

of search, and method of analysis data. The results were classified based on BPS model [Table 1].

The full text of 18 relevant articles was reviewed for the methodological critical evaluation index quality by PRISMA checklist.^[27] PRISMA was used to assess the adherence of review articles to scientific principles, including a checklist of 27 items in seven modules. Each of the items was rated as follows: ‘Yes’ for full compliance, scored of ‘1’; ‘partial’ for partial adaptation, scored ‘0.50’; and ‘No’ for non-compliance, scored ‘zero’; with a maximum total score ‘27’. The review was considered to have major flaws if it received a total score of ≤ 15.0 (high risk of bias), minor flaws if it received a total score of 15.50 to 21.0 (moderate risk of bias), and minimal flaws if it received a total score 21.50 to 27.0 (low risk of bias).^[28] The articles with 15.5 0or higher scores from PRISMA checklist were extracted and used. Article categorization was performed as a flowchart [Figure 1].

Two authors (S.M. and A.K.) independently evaluated the risk of bias in the selected studies using PRISMA checklist; a consensus reviewer (A.Kh.) resolved the observed differences. After reviewing the quality of studies, the available evidence was summarized based on the research question.

At this stage, the effective factors were divided into subgroups of biological, psychological, and social factors [Table 1]. Data synthesis was performed using thematic analysis. Thematic analysis is a method to identify, analyze, and report input patterns. This data set minimizes and describes your data in detail. Beyond this, and interprets different aspects of research topic. Thematic analysis was implemented on qualitative data obtained from articles to sort knowledge based on a topic of main cause. The thematic analysis includes introduction phase, code generation, topic search, review, and description.^[29]

Ethical considerations

The protocol of this study was reviewed and approved by Institutional Review Board of Shahroud University of Medical Sciences on [Ethical code: IR.SHMU.REC.1397.84].

Results

356 articles were retrieved from four databases which PubMed, Web of Science, Scopus, and Science direct search limited to review, Syst.Rev. and meta-analysis studies but we can't apply this restriction for Scopus. As shown in the flowchart 93 duplicates were removed [Figure 1].^[30,31] 235 irrelevant studies were excluded after titles and abstract assessment which met our criteria; finally, the full text of 18 reviews remains for methodologic quality appraisalment which left nine eligible articles. The quality assessment of included studies is detailed in Appendix B. The final studies quality score was 15.5 to 27 based on PRISMA checklist. Narrative reviews and Syst.Rev. with low quality (high risk of bias) (<15.50) excluded.

Table 1: Selected Article characteristics

Authors's name/year	Date of search	Analysis	Eligible articles number	Biological factors	Psychological factors	Social factors	Results
Serati S <i>et al.</i> ^[18] 2010	1960-2010	Syst.Rev.* without any analysis	48 studies	Type of Childbirth Breast-feeding Demographic characteristics (age, parity, body mass index) Urinary symptoms	Body image	Sexual counseling	There was a relationship among breast-feeding, dyspareunia, postpartum pelvic floor dysfunction and delay in resuming sexual intercourse after the childbirth.
Yeniel AO <i>et al.</i> ^[19] 2014	1960-2012	Syst.Rev. without any analysis	20 studies	Type of Childbirth Breastfeeding Age Parity Maternal and fetal health Concomitant urinary tract infections	Sexual inactivity during the first trimester Body image Depression Tiredness Worries about getting pregnant again	Socio-cultural status Increasing responsibilities	There was a relationship among socio-cultural, age, parity, breastfeeding, depression, tiredness, sexual inactivity during the first trimester, body image, worries about getting pregnant again, and concomitant urinary tract infections and postpartum sexual dysfunction.
O'Malley H <i>et al.</i> ^[20] 2015	No time restriction	Syst.Rev. and a principle-based method of concept analysis	91 studies	Type of Childbirth/ Episiotomy/Sutured perineal tears Breastfeeding	Pre-pregnancy sexual problems Body image Fatigue Fear of resuming sexual activity/dyspareunia/ baby's wellbeing Intimate relationship Perception of sexual desire in a partner Emotional and practical support	Adapting to the new role of parent Changing lifestyles Changed roles	Postpartum sexual health was analyzed under the four philosophical principles of epistemological, pragmatic, linguistic and logical.
Andreucci B <i>et al.</i> ^[21] 2015	1995-2015	Syst.Rev. without any analysis	14 studies	Maternal morbidity or maternal near miss (third and/or fourth degree laceration)			There was a relationship among maternal morbidity and dyspareunia and resumed sexual activity later.

Contd...

Table 1: Contd...

Author's name/year	Date of search	Analysis	Eligible articles number	Biological factors	Psychological factors	Social factors	Results
Torkzahrani Sh et al. ^[22] 2015	2005-2012		15 studies with a total population of 4109	Mode of delivery/ Perineal trauma/Assisted vaginal delivery Breastfeeding status Maternal age Parity Physical problems Neonate birth weight Contraceptive method Itching after intercourse Vaginal dryness Secretory milk during intercourse	The previous pattern of sexual activity Body image Stress Fatigue Postpartum Depression Fear of first intercourse after childbirth/dyspareunia Marriage duration Dyspareunia at the first intercourse Satisfaction of marriage Experience orgasms during breastfeeding	The sociocultural issues Homeownership Income levels Education status Employment of woman and husband Anal sex Unsuitable performance of health service providers	There was no significant relationship between mode of delivery and PSF** ($p=0.14$). There was significant relationship between lactation and PSF ($p<0.05$). PSF score has decreased by increasing parity. There was no statistically significant difference between maternal age and PSF.
Fan Li et al. ^[23] 2017	Up to 2017	Syst.Rev. and meta-analysis	10 studies with a total population of 2851	Mode of delivery			There was significant relationship among mode of delivery and resumed intercourse at 3 months ($p<0.001$) and at 6 months postpartum ($p<0.56$). There was significant relationship among mode of delivery and sexual pain at 3 and 6 months (OR=0.29, 95% CI 0.24, 0.36, OR=0.73, 95% CI 0.58, 0.93). There was no significant relationship among mode of delivery and sexual satisfaction at the 3 and 6 months postpartum (OR 1.53, 95% CI 0.93-2.49; OR 1.15, 95% CI 0.95-1.39, respectively).
Bucher S et al. ^[24] 2019	2008-2019	Syst.Rev. and meta-synthesis	12 qualitative studies	Breastfeeding			Themes which emerged from the synthesis were Breastfeeding influences one's relationship with her body and identity; When the breasts are perceived as sexual, appearance influences breastfeeding decisions; and people have a concern with embarrassment, discomfort in public, and potential sexual implications of breastfeeding.

Contd...

Table 1: Contd...

Author's name/year	Date of search	Analysis	Eligible articles number	Biological factors	Psychological factors	Social factors	Results
Saei Ghare Naz M <i>et al.</i> [25] 2019	1990-2019	Syst.Rev. and meta-analysis	12 studies with a total population of 3343	Type of delivery Episiotomy Weight at birth Method of contraception Breastfeeding	Maternal fatigue Duration of marriage	Economic status Place of residence	Mean of desire in the vaginal delivery group after sensitivity analysis was 4.24 (3.27-5.22), arousal 3.62 (3.15-4.09), orgasm 4.18 (3.18-4.61), lubrication 4.08 (3.64-4.53), sexual satisfaction 4.53 (3.44-5.26), pain 4.75 (4.29-5.21). Mean of desire in the cesarean Section group after sensitivity analysis was 3.49 (3.27-3.72), arousal 3.65 (3.43-3.87), orgasm 3.79 (3.05-4.53), lubrication 4.32 (4.10-4.54), sexual satisfaction 4.02 (3.73-4.32), pain 4.18 (3.63-4.73). The incidence of perineal pain in the women with an intact perineum was 42% (95% CI 0.56 to 0.75; $P=0\%$), at 2 days postpartum. The incidence of perineal pain in the women with a second-degree tear or episiotomy with all layers of trauma sutured by the continuous technique was 39% (95% CI 0.21 to 0.70; $P=78\%$), at day 2 postpartum. The incidence of perineal pain with an intact perineum was 11% (95% CI 0.09 to 0.13; $P=0\%$), at 4-10 days postpartum. The incidence of perineal pain had reduced to 23% (95% CI 0.14 to 0.38; $P=78\%$), at 4-10 days postpartum.
Manresa M <i>et al.</i> [26] 2019	Up to 2017	Syst.Rev. and meta-analysis	18 studies with a total population of 3133	Vaginal delivery Intact perineum First- or second-degree perineal trauma			

*Syst.Rev: Systematic Review, **PSF: Postpartum Sexual Function

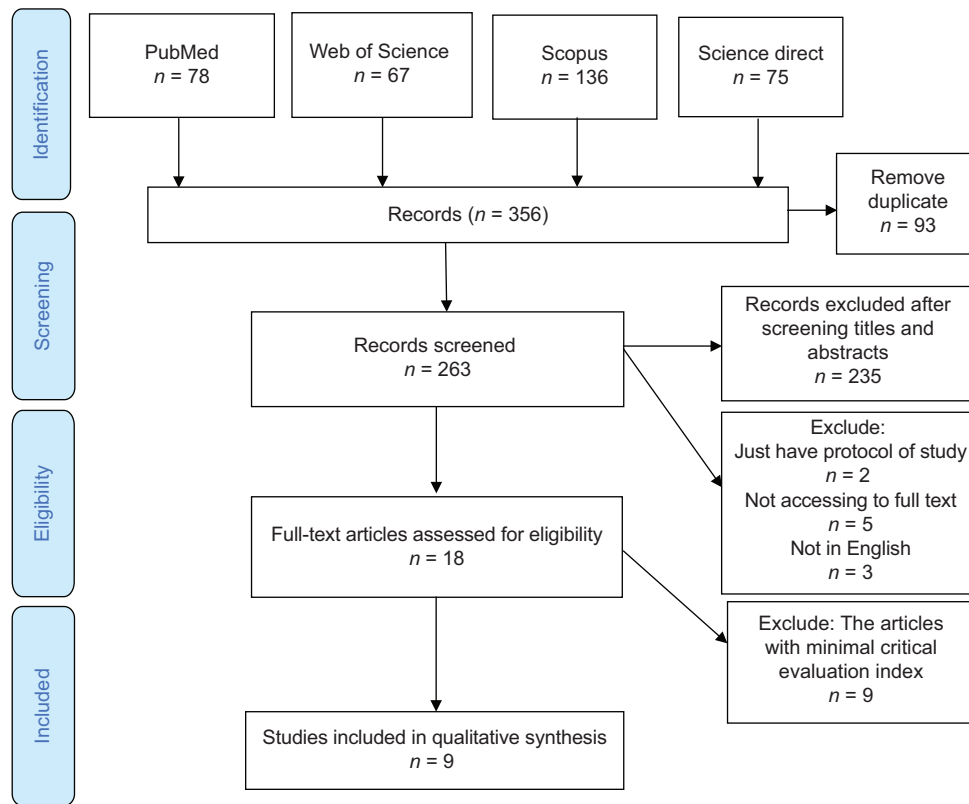


Figure 1: Flowchart of Study Selection

Features of the systematic reviews

Among nine articles from 2010 to 2019 reporting using Syst.Rev. (4 Syst.Rev. only and five of them were meta-synthesis and meta-analysis). 88.88% of studies searched PubMed or Medline databases and almost searched more than one electronic database. The checklists used for the quality assessment in Syst.Rev.s were included in Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) (1 study),^[23] Newcastle–Ottawa (1 study),^[25] the researcher-made checklist (2 studies) and Cochrane Collaboration’s tool and Joanna Briggs Institute Prevalence Critical Appraisal Tool (1 study).^[26]

Selected articles were reviewed; then, the findings were sorted in the groups as follows: mode of delivery/sever morbidity (n = 4 Syst.Rev. and 4 meta-analysis), maternal age and parity (n = 2 Syst.Rev. and 1 meta-analysis), breastfeeding (n = 1 meta-synthesis, 1 meta-analysis and 4 Syst.Rev.), psychological disorders (n = 2), maternal fatigue (n = 5), types of fears (n = 1), body image (n = 4), Sexual education (n = 2), social factors (n = 5), interpersonal relation (n = 2) and men Postpartum Sexual Function (PSF) (n = 3).

Following is an illustration of associated factors with the postpartum couple’s sexual function, as a new concept conceptualized via the BPS Model [Figure 2]. Based on finding, biological factor(s) were assessed in all studies (n = 9), psychological factor(s) by 55.55% (n = 5) of studies, and social factor(s) in 55.55% (n = 5) studies.

Factors related to female postpartum sexual function

Biological factors

1- Type of childbirth/sever morbidity: The meta-analysis of Fan *et al.*^[23] in coordination with other Syst.Rev. indicated that the time required for resuming sexual coitus and dyspareunia in women who had Vaginal Delivery (VD) was higher than Cesarean Section (CS) in 3 and 6 months postpartum.^[18,19] There was no statistically significant sexual satisfaction between the two groups at these two points in time.^[23] Meta-analysis of Manresa *et al.*^[26] demonstrated that at 2 days’ postpartum, the women with perineal trauma or intact perinea after the VD experienced nearly the same incidence of perineal pain. Perineal pain reduced at 4–10 days postpartum whether perineal trauma existed or not. The incidence of perineal pain with highest in women who had an episiotomy. At 12 months, women still experienced dyspareunia for both presence and absence of any perineal trauma. Studies shown delayed resumed sexual activity, lower sexual desire, dyspareunia, sexual unsatisfaction, sexual disorder in VD group because of perineal trauma, perineal tear (grade III or IV), pelvic floor disorder, pudendal nerve dysfunction neuromuscular stretching and ischemic injury similar to neuropathy (prolonged second stage of labor, macrosomia and larger fetal head), stress/urge incontinent and anal incontinence.^[19-21] Moreover, operative vaginal delivery (i.e. vacuum or forceps application) increases

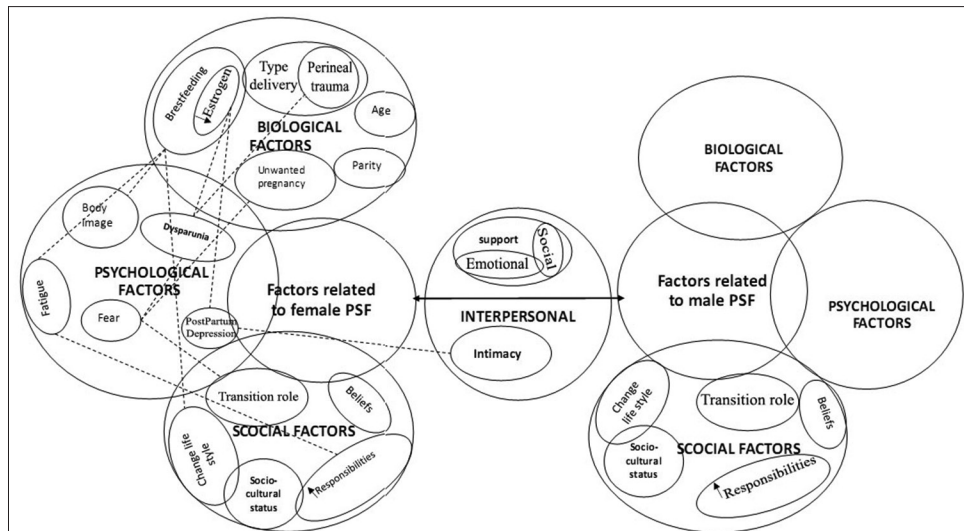


Figure 2: The Biopsychosocial Model of Postpartum Couple's Sexual Function

PSD and decreases the quality of life.^[20] Thus, O'Malley *et al.*^[20] conducted that CS can protect the sexuality in the postpartum period by prevention of pelvic muscle trauma and pudendal nerve injury, but the evidence for the protective effect of CS isn't sufficient and one study didn't show any association between macrosomia and PSF.^[22] Contrary to above mentioned, mean scores of desire, orgasm, and sexual satisfaction were higher in the VD group in Syst.Rev. of Saei Ghare Naz M *et al.*^[25] In Torzkahrani *et al.*^[22] meta-analysis, they didn't find any association between the mode of delivery and PSF.

2- Age and parity: It is reported that older age^[19] and multiparity^[22] are associated to postpartum dissatisfaction and the lower score of sexual function, but other studies haven't found any relation.^[18,22]

3- Breastfeeding: Breastfeeding, due to low levels of estrogen, progesterone, and androgen, high level of prolactin and oxytocin which may cause reduction of lubrication, reduced blood vessel congestion, vaginal dryness, atrophy of the vaginal epithelium, also, increased nipple sensitivity and leaking milk, can decrease the sexual desire, increase dyspareunia and sexual dissatisfaction.^[18-20] Estrogen is an important hormone that affects women's sexual desire through various and complex mechanisms. Estrogens have extensive activities in the brain via the synthesis and transport of monoamines (dopamine, noradrenaline, serotonin), cholinergic, and Gamma-Aminobutyric Acid (GABA) neurotransmitters, along with complex actions on neuropeptide systems, such as melanocortins, opioids, and oxytocin. Increased estrogen function increases the vaginal blood flow by the release of vasodilators such as nitric oxide in endothelial cells, which causes the blood vessels to dilate.^[32,33] Results from the meta-synthesis of Bucher *et al.*^[24] revealed that breastfeeding influences one's body image and identity; the breasts are perceived as sexual, appearance influences breastfeeding

decisions (particularly fear of sagging), and potential sexual implications of breastfeeding.

Psychological factors

1- Postpartum Depression (PPD): Psychological changes after childbirth and PPD may play an important role in the PSD and decreased sexual satisfaction.^[19,24] PPD prevalence is 19.20%, and multifactorial conditions can affect it.^[15,34] Hormonal conditions can cause mood changes, and many have hypothesized the role of sex hormones in PPD because of the temporary communication between the fundamental and rapid changes in the hormone concentrations which occur during childbirth and the onset of depressive symptoms. In the forebrain, hippocampus, and cerebral cortex, estradiol, and progesterone increases Brain-Derived Neurotrophic Factor (BDNF) levels which decreases in depression and increases with antidepressants. Furthermore, estradiol increases the activity of the Cyclic AMP Responsive Element Binding protein (CREB), etc., in the brain of mice like antidepressant medications. The association of gonadal steroids with more emotional regulation has been suggested with modulatory effects on stress and Hypothalamus-Pituitary-Adrenal (HPA) axis, neuroplasticity, immune activation, etc., all processes which play a role as depressive disorders.^[35,36]

2- Fatigue: The fatigue which arises from caring infant, establishing a milk supply, and lack of sleep was documented as impacting resumed intercourse, desire, and intimate relationship, especially in breastfeeding women.^[20,22,24]

3- Fear: The experience of fear about the transition of roles, lack of security, awakening the newborn or not hearing him/her, dyspareunia, and resuming intercourse were documented as impacting on PSF, desire, orgasm, and the intimate relationship. Worries about unintended pregnancies are also reported as independent risk factors for PSD.^[19] Women may have resumed sexual activity and

ovulation six weeks after delivery, thus putting them at risk for another pregnancy.^[37]

4- Self-body image: Negative self-body image after childbirth, which is associated with weight gain, breast changes, abdominal striae, varicose veins, and lack of sleep and low grace, can impact PSF, desire, and the intimate relationship.^[19,20,22] Hence, in Serati *et al.*^[18] study, despite Body Mass Index (BMI) in puerperium comparable with the pre-pregnancy period, worsening body image can cause PSD.

5- Others: The previous pattern of sexual activity continues in most women after the childbirth. The history of painful intercourse and dyspareunia before childbirth was associated with a delay in initiating intercourse, increased dyspareunia, decreased desire, and sexual dissatisfaction in puerperium.^[22,23] Marriage duration, sexual inactivity during the first trimester of pregnancy, time of first intercourse, and frequency of sexual coitus per week after childbirth may influence PSF.^[19,22,25]

Social factors

The transition of roles and adapting to parenthood, increasing responsibilities (requiring more time, more energy, and less sleep), changed lifestyle, socio-cultural status, and ethnic beliefs about sexuality and intercourse were documented as impacting the couple's PSF.^[19,20,23] However, economic status can affect the women's sexual desire.^[25] There were no significant associations among religion, the employment of couple, and type of homeownership with PSF and satisfaction.^[21]

Interpersonal relation

Female's sexual desire after childbirth was most strongly related to how close or intimate, they felt towards their partner and their perception of their partner's level of sexual desire. The amount of support, especially emotional and practical, and talking about fear and stress can play a role in sexual health and increase desire.^[20]

Factors related to men postpartum sexual function

Social factors

As regards the sexual partner plays an important role in the couple's sexual function and satisfaction, it is reported that the challenges of fatherhood and being adapt to changing roles, increase responsibilities, and socio-cultural status can affect men's PSF and satisfaction.^[19,20,23] There was no significant association between the type of delivery and the male partner's PSD.^[19]

Discussion

To the best of our knowledge, the current study is the first biopsychosocial Syst.Rev. of Syst.Rev. on associated factors with the postpartum couple's sexual function that presents a unique model. BMPCSF was prepared as a potential assessment and educational tool for the perinatal counselor to assess and educate the different impacting factors on the postpartum women's sexual function in their clients who want to have a better sexual function after childbirth. However, it

is important to recognize; these factors are descriptive and do not entirely represent the factors that might influence postpartum couple's sexual function. This article indicates different environmental layers of various variables related to postpartum couple's sexual function. Women's PSF is affected by complex multilevel factors, and each of three components (biological, psychological, and social factors) is influenced by one another [Figure 2]. The effects of biopsychosocial factors on PSF and as well as on each other with dotted lines are shown in the model. Biological factors such as lactation directly affect women's PSF and indirectly cause dyspareunia and PPD by lowering estrogen levels. Furthermore, PPD directly affects women's PSF and PPD indirectly affects intimacy with their partner. Breastfeeding is associated with changes in body image, directly affecting women's PSF. Moreover, breastfeeding is associated with the changes in women's lifestyles and maternal fatigue due to insomnia and increased maternal responsibilities, which also directly affect women's PSF. Another biological factor is the mode of childbirth, especially traumatic delivery which causes dyspareunia. Dyspareunia directly affects women's PSF. Psychological factors such as fear of dyspareunia, fear of transition role, and fear of unwanted pregnancy directly affect women's sexual performance [Figure 2].

Hence, the evidence about male sexuality in the postpartum period doesn't seem sufficient. This proposed model indicates a lack of information about men and the need for further investigation in this area. As we know, one of the benefits of Syst.Rev. studies are finding the gap of knowledge about assessing subjects which are well shown in the model by empty circles of biological and psychological factors affecting male sexual function in the postpartum period [Figure 2].

The most common biological causes were the type of childbirth. Several studies examined the effect of the type of childbirth on PSF and satisfaction. The studies showed conflicting results about the association between the mode of delivery with PSF and satisfaction, but most studies conducted that sexual satisfaction in elective CS and VD with intact perineum was higher than urgency CS, VD with episiotomy or grade III and IV, and operative vaginal delivery. Thus, instrument-free birth, intact perineum, and avoidance of episiotomy are the best ways to prevent the PSD. Moreover, performing pelvic floor muscle exercises during pregnancy and postpartum period can minimize perineal trauma.^[18,38] In general, sexuality in VD and CS are similar to pre-pregnancy in 12 months of postpartum and appeared to have minimal effect on the long-term sexual function.

Another biological factor was breastfeeding. Breastfeeding and low estrogen levels may cause delayed initiation of intercourse, lessen desire, decreased arousal, and painful sexual intercourse that persist up to 6 to 8 months after childbirth.^[39] The recommendation of using water-soluble lubricant during intercourse may decrease vaginal dryness due to hypoestrogenism.^[24,38]

Most studies showed the relationship among PSD and psychological changes included PPD, feeling of attractiveness, various types of fear (transition of the roles, lack of security, awakening the newborn or not hearing him/her, dyspareunia, unintended pregnancies) in puerperium and spousal support (emotional and financial). Recent guidance from the “Faculty of Sexual and Reproductive Healthcare” (FSRH) states that health care providers should ensure that all post-pregnancy women have access to a full range of effective contraceptive methods and are able to provide these immediately after delivery.^[37,40,41]

Some studies indicated the effectiveness of socio-cultural factors and changed lifestyle on couple’s PSF.^[19] One of the gaps in the studies was examining the effect of cultural factors such as race, ethnicity, and religion on sexual function after childbirth.^[25]

Sexual education/counseling is mentioned in some studies as influencing factor on PSF, and it can prevent PSD.^[18,22] Sexual education for the couples may increase sexual health that can show an important role of the healthcare system, midwife, and obstetrician in deprecating and break for embarrassment and taboo of sexual function. Sexual education or counseling can help people acquire information, attitude, and skills on sexual issues. This will enable couples to satisfy mutual needs and balance social behavior and family life and improve PSF and sexual satisfaction.^[42-44] According to the survey, 9 articles were about postpartum sexual activity and related factors. Some of them talked about the causes of men’s PSD, but they weren’t comprehensive. Women-related articles focused more on two effective variables, such as type of Childbirth and breastfeeding. Four meta-analysis were done to assess the effect of mode of delivery on PSF.^[23,25,26] One of these meta-analysis was assessed three dimensions of PSF includes resumed intercourse, dyspareunia, and sexual satisfaction, not all outcome measures (desire/arousal, orgasm, sexual sensation and ...).^[23] Another one just surveys the sexual pain and dyspareunia in VD with intact perineum, first or second-degree perineal trauma and didn’t consider CS group to compare childbirth mode effect on PSF. This meta-analysis reported very high heterogeneity of some results (I^2 statistic >75%) and very wide Confidence Interval (CI).^[26] The overall bias of three meta-analysis articles chosen, including only the primiparous Chinese and Iranian women; thus, they were generalizable just to these groups because of the effect of religious, cultural, and additional attitudes factors on sexual function and satisfaction.^[22,23,25] Other studies couldn’t analyze the result because of heterogenic methods of original studies, such as study design, evaluation of exposure or outcome, validated questionnaires, sampling time, and so on.^[18,19,21]

Although most studies showed a significant relationship among BPS factors with PSF, the probability of publishing studies with positive results is higher, and publication bias is a limitation of the study. Besides, most studies announced

there aren’t prepared a questionnaire for sexual function in the postpartum period, and there may be misclassification bias based on a self-created questionnaire. One of the eligibility criteria of this study was being reported in English or Persian which limited the assessed articles.

Conclusion

To conclude, the postpartum couple’s sexual function is affected by complex reciprocal interaction in the multilevel biopsychosocial factors. Identifying and considering these factors can help couples expand their awareness of risk factors that interrupted their sexual function after childbirth. By identifying these factors, health policymakers and researchers can develop appropriate guidelines for health providers about the BPS changes of couples after childbirth, the effects of these changes on their PSF, and coping skills to improve sexual health. Therefore, by BMPCSF, therapists can better identify the factors affecting postpartum couple’s sexual function and then, provide the appropriate counseling for couples in prenatal and postpartum counseling. Regarding the influence of BPS factors on women’s sexuality and lack of sufficient attention to the sexual health of men after childbirth, we suggested to conduct a comprehensive original study on couples’ postpartum sexuality, especially men, emphasizing socio-cultural factors.

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Conflicts of interest

Nothing to declare.

References

1. Mortazavi F, Mousavi SA, Chaman R, Khosravi A. Maternal quality of life during the transition to motherhood. *Iran Red Crescent Med J* 2014;16:e8443.
2. Razavinia F, Tehranian N, Tatari FT, Bidhendi Yarandi R, Ramezani Tehrani F. The postpartum marital satisfaction, maternal serum concentration of orexin-A and mode of delivery. *J Sex Marital Ther* 2019;45:488-96.
3. Moghimi Hanjani S, Mehdizadeh Tourzani Z. Comparison of sexual function after childbirth in primiparous women experiencing vaginal delivery and caesarian section in Karaj city. *Quarterly Horizon Med Sci*2013;18:224-31.
4. Dabiri F, Yabandeh AP, Shahi A, Kamjoo A, Teshnizi SH. The effect of mode of delivery on postpartum sexual functioning in primiparous women. *Oman Med J* 2014;29:276-9.
5. Khajehei M, Doherty M, Tilley PJ, Sauer K. Prevalence and risk factors of sexual dysfunction in postpartum Australian women. *J Sex Med* 2015;12:1415-26.
6. Anzaku A, Mikah S. Postpartum resumption of sexual activity, sexual morbidity and use of modern contraceptives among Nigerian women in Jos. *Ann Med Health Sci Res* 2014;4:206-10.

7. Banaei M, Tork Zahrani S, Pormehr-Yabandeh A, Ozgoli G, Azad M. Investigating the impact of counseling based on PLISSIT model on sexual intimacy and satisfaction of breastfeeding women. *IJPRAS* 2016;5:489-99.
8. McCool-Myers M, Theurich M, Zuelke A, Knuettel H, Apfelbacher C. Predictors of female sexual dysfunction: A systematic review and qualitative analysis through gender inequality paradigms. *BMC Womens Health* 2018;18:108.
9. Kaviani M, Rahnnavard T, Azima S, Emamghoreishi M, Asadi N, Sayadi M. The effect of education on sexual health of women with hypoactive sexual desire disorder: A randomized controlled trial. *Int J Community Based Nurs Midwifery* 2014;2:94-102.
10. Zamani M, Roudsari RL, Moradi M, Esmaily H. The effect of sexual health counseling on women's sexual satisfaction in postpartum period: A randomized clinical trial. *Int J Reprod Biomed* 2019;17:41-50.
11. Malary M, Khani S, Pourasghar M, Moosazadeh M, Hamzehgardeshi Z. Biopsychosocial determinants of hypoactive sexual desire in women: A narrative review. *Mater Sociomed* 2015;27:383-9.
12. Hosseini Tabaghdehi M, Keramat A, Khosravi A. Prevalence of female sexual dysfunction in Iran: A meta-analysis study. *Int J Health Stud* 2017;2. doi: <http://dx.doi.org/10.22100/ijhs.v2i4.158>.
13. Ghiasi A, Keramat A. Prevalence of sexual dysfunction among reproductive-age women in Iran: A systematic review and meta-analysis. *J Midwifery Reprod Health* 2018;6:1390-8.
14. Haseli A, Shariati M, Nazari AM, Keramat A, Emamian MH. Infidelity and its associated factors: A systematic review. *J Sex Med* 2019;16:1155-69.
15. Labbok MH. Postpartum sexuality and the lactational amenorrhea method for contraception. *Clin Obstet Gynecol* 2015;58:915-27.
16. Mohsenzadeh-Ledari F, Keramat A, Khosravi A. Sexual dysfunctions and some related factors in northeast part of Iran. *J Health Stud* 2019;5:1-4.
17. Tawfik GM, Dila KA, Mohamed MY, Tam DN, Kien ND, Ahmed AM, *et al.* A step by step guide for conducting a systematic review and meta-analysis with simulation data. *Trop Med Health* 2019;47:46.
18. Serati M, Salvatore S, Siesto G, Cattoni E, Zanirato M, Khullar V, *et al.* Female sexual function during pregnancy and after childbirth. *J Sex Med* 2010;7:2782-90.
19. Yenieli A, Petri E. Pregnancy, childbirth, and sexual function: Perceptions and facts. *Int Urogynecol J* 2014;25:5-14.
20. O'Malley D, Higgins A, Smith V. Postpartum sexual health: A principle-based concept analysis. *J Adv Nurs* 2015;71:2247-57.
21. Andreucci CB, Bussadori JC, Pacagnella RC, Chou D, Filippi V, Say L, *et al.* Sexual life and dysfunction after maternal morbidity: A systematic review. *BMC Pregnancy Childbirth* 2015;15:307.
22. Torkzaharani S, Banaei M, Ozgoli G, Azad M, Emamhadi M. Postpartum sexual function; conflict in marriage stability: A systematic review. *Int J Med Toxicol Forensic Med* 2016;6:88-98.
23. Fan D, Li S, Wang W, Tian G, Liu L, Wu S, *et al.* Sexual dysfunction and mode of delivery in Chinese primiparous women: A systematic review and meta-analysis. *BMC Pregnancy Childbirth* 2017;17:408.
24. Bucher MK, Spatz DL. Ten-year systematic review of sexuality and breastfeeding in medicine, psychology, and gender studies. *Nurs Womens Health* 2019;23:494-507.
25. Saei Ghare Naz M, Banaei M, Ghasemi V, Rashidi-Fakari F, Khiabani A, Abed M, *et al.* Postpartum female sexual dysfunction and related factors in Iranian women: A systematic review and meta-analysis. *J Isfahan Med School* 2019;37:1149-61.
26. Manresa M, Pereda A, Bataller E, Terre-Rull C, Ismail KM, Webb SS. Incidence of perineal pain and dyspareunia following spontaneous vaginal birth: A systematic review and meta-analysis. *Int Urogynecol J* 2019;30:853-68.
27. Moher D, Liberati A, Tetzlaff J, Altman DG. Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *PLoS Med* 2009;6:e1000097.
28. Li J-I, Ge L, Ma J-c, Zeng Q-I, Yao L, An N, *et al.* Quality of reporting of systematic reviews published in "evidence-based" Chinese journals. *Syst Rev* 2014;3:58.
29. Salleh I, Ali NS, Yusof KM, Jamaluddin H. Analysing qualitative data systematically using thematic analysis for deodoriser troubleshooting in palm oil refining. *Chem Eng Trans* 2017;56:1315-20.
30. Akbarin MM, Shirdel A, Bari A, Mohaddes ST, Rafatpanah H, Karimani EG, *et al.* Evaluation of the role of TAX, HBZ, and HTLV-1 proviral load on the survival of ATLL patients. *Blood Res* 2017;52:106-11.
31. Torshizi R, Karimani EG, Etminani K, Akbarin MM, Jamialahmadi K, Shirdel A, *et al.* Altered expression of cell cycle regulators in adult T-cell leukemia/lymphoma patients. *Rep Biochem Mol Biol* 2017;6:88-94.
32. Bitzer J, Giraldi A, Pfaus J. Sexual desire and hypoactive sexual desire disorder in women. Introduction and overview. Standard operating procedure (SOP Part 1). *J Sex Med* 2013;10:36-49.
33. Del Rio JP, Alliende MI, Molina N, Serrano FG, Molina S, Vigil P. Steroid Hormones and Their Action in Women's Brains: The Importance of Hormonal Balance. *Front. Public Health* 2018;6:141.
34. Pahlavan F, Kazemnejad A, Razavinia F, Daryasari SR, Tahrani N. Biological reflect of Adiponectin hormone in postpartum marital satisfaction and depression scores. *BMC Pregnancy Childbirth* 2020;20:1-6.
35. McBride HL, Olson S, Kwee J, Klein C, Smith K. Women's postpartum sexual health program: A collaborative and integrated approach to restoring sexual health in the postpartum period. *J Sex Marital Ther* 2017;43:147-58.
36. Schiller CE, Meltzer-Brody S, Rubinow DR. The role of reproductive hormones in postpartum depression. *CNS Spect* 2015;20:48-59.
37. Gallimore A, Craig A, Cameron S, Milne D, Lakha F. Developing the role of midwives as 'contraceptive champions' to support early access to effective postnatal contraception for women. *BMJ Sex Reprod Health* 2019;45:309-12.
38. Drozdowskyj ES, Castro EG, López ET, Taland IB, Actis CC. Factors influencing couples' sexuality in the puerperium: A systematic review. *Sex Med Rev* 2020;8:38-47.
39. O'Malley D, Smith V. Altered sexual health after childbirth: Part 1. *Pract Midwife* 2013;16:30-2.
40. Heller R, Cameron S, Briggs R, Forson N, Glasier A. Postpartum contraception: A missed opportunity to prevent unintended pregnancy and short inter-pregnancy intervals. *J Fam Plann Reprod Health Care* 2016;42:93-8.
41. Thwaites A, Logan L, Nardone A, Mann S. Immediate postnatal contraception: What women know and think. *BMJ Sex Reprod Health* 2019;45:111-7.
42. Keramat A, Vakilian K, Mousavi S. Barriers to youths' use of reproductive health services in Iran. *Life Sci J* 2013;10:943-9.
43. Marvi N, Golmakani N, Miri HH, Esmaily H. The effect of sexual education based on sexual health model on the sexual function of women with infertility. *Iran J Nurs Midwifery Res* 2019;24:444-50.
44. Shariati M, Babazadeh R, Mousavi SA, Najmabadi KM. Iranian adolescent girls' barriers in accessing sexual and reproductive health information and services: A qualitative study. *J Fam Plann Reprod Health Care* 2014;40:270-5.