ORIGINAL ARTICLE

The Association Between Marital Satisfaction, Depression, and Sexual Dysfunction Scores among Women at Six Months Postpartum in Kelantan, Malaysia

Ng YY[a,b], Muhamad R[a,b], Ahmad I[a,b]
[a]Department of Family Medicine, School of Medical Sciences, Universiti Sains Malaysia
[b]Hospital Universiti Sains Malaysia, Bharu, Kelantan

ABSTRACT

INTRODUCTION: Female sexual dysfunction (FSD) can significantly impact the quality of sexual relationships, potentially leading to marital dissatisfaction and depression if it occurs postnatally. However, there is limited research investigating FSD, marital satisfaction, and postnatal depression (PND) in Malaysia. This study aimed to determine the association between FSD scores with marital satisfaction scores and depression scores among postpartum women in Kota Bharu, Kelantan. **MATERIALS AND METHODS:** A cross-sectional study was conducted among 429 women at 6 months postpartum in four primary healthcare clinics in Kota Bharu district. They were required to answer the Malay Version of the Female Sexual Function Index-6 (MVFSFI-6), Golombok Rust Inventory of Marital State (MV-GRIMS), and the Edinburgh Postnatal Depression Scale (MV-EDPS). The data was analysed using multiple linear regression. **RESULTS:** At six months postpartum, 52.5% were at risk of sexual dysfunction, 55.0% at risk of marital dissatisfaction, and 18.2% at risk of PND. The associations between FSD scores and marital dissatisfaction scores, as well as FSD scores and PND scores, were significant. **CONCLUSION:** Experiencing of FSD could heighten the risks of marital dissatisfaction and depression in postpartum women. Thus, healthcare providers should holistically assess sexual issues in postpartum women and refer them for early diagnosis and treatment to prevent adverse outcomes.

Keywords
Depression, female sexual dysfunction, Female Sexual Function Index-6, marital dissatisfaction, postpartum women.

Corresponding Author
Assoc. Prof. Dr. Rosediani Muhamad
Department of Family Medicine,
School of Medical Sciences,
Universiti Sains Malaysia (USM),
Kubang Kerian, Malaysia
E-mail: rosesyam@usm.my

Received: 17th July 2024; Accepted: 28th August 2024

Doi: https://doi.org/10.31436/imjm.v24i02.2610

INTRODUCTION

Women's sexual health is a crucial aspect of their well-being, influenced by numerous factors. Following childbirth, biological, psychological, and social changes can significantly affect sexual health.[1] The extent of sexual morbidity and its impact post-delivery has been explored in a limited number of studies among select samples of postpartum women. During the postnatal period, women's sexual function may be compromised by factors such as trauma to the reproductive organs, vaginal bleeding, constraints of newborn care, lethargy, body shape changes, and physical discomfort, including breast tenderness.[2] Despite these challenges, postpartum sexual function is often overlooked by healthcare providers. Studies indicate that rates of sexual dysfunction (SD) vary from 41-83% in the first three months following childbirth, decreasing to 64% at six months postpartum.[3,4] However, discussing sexuality remains taboo in Asian countries, particularly in Malaysia, which significantly impacts women's lives.[5,6]

Marital satisfaction defined as objective feelings of contentment, satisfaction and pleasure experienced by married couple when all aspects are considered in their lives.[7] A sexual relation is an important element in constancy and successful of family foundation. The marital satisfaction is influenced by many factors such as safe and pleasurable sexual relationship is mentioned to be one of the most important factors. SD may affect the sexual relationship and eventually marital dissatisfaction.[8,9] According to a study, married women without children have better sexual satisfaction and higher marital satisfaction than women who have experienced childbirth, this possibly due to reduced physical and emotional strain.[9] Marital dissatisfactions in turn lead to

marital instability and divorce.[10]

Depression is another major health concern after childbirth. Postnatal depression (PND) can develop at any time during the first year of postpartum. It has negative consequences on women health, the development of her children and family harmony.[9] Previous review found that the prevalence of PND in Asian countries ranged from 3.5-63.3%.[11] In Malaysia, the prevalence of PND is 6.8-14.3% within the first 6 months postpartum.[12,13] Other systematic review showed that various risk factors such as unplanned pregnancy, domestic violence, low social support, previous history of depression and poor marital relationship are significantly associated with PND.[14] In addition, it was reported that women who have sexual problems after childbirth may experience higher risk of PND symptoms or other mental problems.[15] However, there is a limited study investigating the SD and PND women and there is no study on this issue in Malaysia.

Research indicates some association between female sexual dysfunction (FSD), marital satisfaction and PND. A study found strong negative association between SD and PND scores.[16] Similarly, an inverse relationship was observed between marital satisfaction and PND.[17] Recognising the importance of women health and the need to integrate sexual health issues into primary healthcare, it is clear the interconnected issues of FSD, marital dissatisfaction and depression have a profound impact on women's overall well-being and quality of life. Therefore, this study was conducted to investigate the association between sexual dysfunction (SD) with marital dissatisfaction and depression in postpartum women in Kelantan, Malaysia.

MATERIALS AND METHODS

429 women at six months postpartum participated in this cross-sectional study. Data was collected from February-November 2019. Participants were selected from four primary healthcare clinics with Family Medicine Specialists (FMS) in Kota Bharu, Kelantan, Malaysia, namely i) Klinik Kesihatan Bandar Kota Bharu, ii) Klinik Kesihatan Pengkalan Chepa, iii) Klinik Kesihatan Wakaf Che Yeh, and iv) Klinik Kesihatan Ketereh. Each Maternal and Child Health (MCH) clinic was estimated to follow up approximately 50-60 new postnatal mothers each month. Non-proportionate systematic random sampling in a 1:2 ratio, based on attendance at each MCH clinic, was used.

Population and sample size

The study involved women aged 18 years old and above, who had delivered a single full-term child, married, and cohabiting with a sexually active partner. Exclusions comprised women with psychiatric disorders, pregnant women, non-Malaysians, and those who had not resumed sexual activity post-delivery, as their responses could reflect non-engagement in sexual activity rather than dysfunction, potentially introducing bias. Additionally, the Malay version of the Female Sexual Function Index-6 is validated specifically for sexually active women. None of the participants reported abstaining from sexual intercourse at six months.

The sample size to determine the association between marital satisfaction scores, female sexual dysfunction (FSD) scores, and depression scores among women at six months postpartum in Kota Bharu, Kelantan, should ideally be calculated using linear regression. However, due to limited information, it was not feasible to perform the calculation for this objective. Instead, as this study is part of a larger research project on FSD among postpartum women,[18] the sample size was determined using the single proportion formula with an α of 0.05 and a power of 0.8. This calculation was based on a study by De Lima Holanda et al.,[19] which reported a prevalence of sexual dysfunction (SD) of 43.5% among women at six months postpartum. The required sample size for the study was 416 women at six months postpartum. Accounting for a 20% non-response rate, the final calculated sample size was adjusted to 453 participants.

Research tools

The participants answered 4 types of questionnaires after consented for the study, namely i) participants' Performa, ii) Malay version Female Sexual Function Index-6 (MVFSFI-6); iii) Malay version Golombok Rust Inventory

of Marital State (MV-GRIMS), and iv) Malay version Edinburgh postnatal depression scale (MV-EPDS). The information about these questionnaires is as elaborated below.

Questionnaire i: Participants' Performa

The questionnaire gathers socio-demographic details like age, education, job, and income, alongside clinical information like number of children, delivery method, breastfeeding, and medical history. It also explores marital and sexual aspects such as spouse's age, marriage duration, resumption of sexual activity post-delivery, and sexual frequency.

Questionnaire ii: Female Sexual Function Index-6 – a validated Malay version (MVFSFI-6)

The FSFI-6, a validated questionnaire, assesses women's sexual function over the past four weeks, offering a simpler version of the FSFI-19. A score of ≤ 19 indicates Female Sexual Dysfunction (FSD), with sensitivity and specificity of 0.93 and 0.94, respectively. Its Cronbach's alpha coefficient is 0.789.[20] The Malay-translated version (MVFSFI-6) demonstrated high reliability (Cronbach's alpha of 0.9314) in a study involving breast cancer patients.[21] This tool proves useful for research and outpatient consultations in identifying FSD efficiently. See Table 1 for FSFI-6 domains, items, and score range.

Questionnaire iii: Golombok Rust Inventory of Marital State-A validated Malay version (MV-GRIMS)

The GRIMS questionnaire evaluates marital relationships with 28 items across four domains: i) Satisfaction, ii) Communication, iii) Shared interests, and iv) trust and respect. Respondents rate items on a 4-point Likert scale. Positive score includes Items: 3, 6, 7, 8, 11, 13, 16, 18, 19, 21, 23, 24, 26, and 27, while negative score includes Items 1, 2, 4, 5, 9, 10, 12, 14, 15, 17, 20, 22, 25, and 28. Total scores range from 0-84, with higher scores indicating increased marital dissatisfaction. A score of 34 or higher suggests significant marital issues. The MV-GRIMS shows excellent internal consistency (Cronbach's alpha: 0.43 to 1.00) and high test-retest reliability (ICC ≥ 0.51). It also demonstrates high sensitivity and specificity.[22]

Table 1: Score range of Female Sexual Function Index-6 domain

Sexual Function Domain Description of Item	Score range
Desire	
Over the past 4 weeks, how would you rate your level (degree) of sexual desire or interest?	1-5
Arousal	
Over the past 4 weeks, how would you rate your level of sexual arousal ("turn on") during sexual activity or intercourse?	0-5
Lubrication	
Over the past 4 weeks, how often did you become lubricated ("wet") during sexual activity or intercourse?	0-5
Orgasm	
Over the past 4 weeks, when you had sexual stimulation or intercourse, how often did you reach orgasm (climax)?	0-5
Pain	
Over the past 4 weeks, how often did you experience discomfort or pain during vaginal penetration?	0-5
Satisfaction	
Over the past 4 weeks, how satisfied have you been with your overall sexual life?	1-5
Total	2-30

The GRIMS questionnaire evaluates marital relationships with 28 items across four domains: i) Satisfaction, ii) Communication, iii) Shared interests, and iv) trust and respect. Respondents rate items on a 4-point Likert scale. Positive score includes Items: 3, 6, 7, 8, 11, 13, 16, 18, 19, 21, 23, 24, 26, and 27, while negative score includes Items 1, 2, 4, 5, 9, 10, 12, 14, 15, 17, 20, 22, 25, and 28. Total scores range from 0-84, with higher scores indicating increased marital dissatisfaction. A score of 34 or higher suggests significant marital issues. The MV-GRIMS shows excellent internal consistency (Cronbach's alpha: 0.43 to 1.00) and high test-retest reliability (ICC ≥ 0.51). It also demonstrates high sensitivity and specificity.[22]

Questionnaire iv: Edinburgh Postnatal Depression Scale – a validated Malay version (MV-EPDS)

The EPDS, developed by Cox et al. in 1987, is a self-administered survey consisting of ten statements related to depression symptoms.[23] Responses are recorded on a Likert-style scale ranging from 0-3, with total scores ranging from 0-30. A threshold score of 12/13 indicates likely depression, with a sensitivity of 86.0% and specificity of 78.0%. The Malay version (MV-EPDS), established through back-translation, is a reliable screening tool for postnatal depression (PND). A threshold score of ≥12 indicates depression risk, with a

sensitivity of 72.7% and specificity of 92.6%.[24]

Data collection

The study used non-proportional systematic random sampling in the ratio 1:2, which was based on attendance at each Maternal and Child Health Care Unit in primary healthcare clinics. The study only included participants who met the eligibility criteria. Prior to the study, women were informed about the details and purpose of the research and were asked if they would like to participate. If they agreed to participate, written consent was obtained. The participants were then given self-administered questionnaires as described above which took approximately 20-30 minutes to complete. Participants were also reassured of their confidentiality.

Those who tested positive for postpartum depression on the questionnaire received prompt notification of their results. Those who were keen on management were referred to a psychiatrist, while those who did not were given the contact information for the psychiatric clinic.

Data analysis

The SPSS software version 26.0 was utilized to analyse the data. Descriptive analysis was employed to characterize the categorical variables (frequency and percentage) and numerical variables (mean and standard deviation). To examine the association between marital satisfaction score and FSD score as well as depression score in postpartum women, simple and multiple linear regression confirmatory analyses were conducted. The FSFI-6 score was treated as the independent variable while the GRIMS and EDPS scores as the dependent variable, with adjustments made for household income. The factors were considered statistically significant when the p-value was below 0.05.

RESULTS

453 women who attended the respective clinics were invited to participate. However, 24 women were excluded due to refusal to participate or incomplete questionnaires. The response rate for this study was 95%, with a total of 429 subjects. Some parts of the study findings with different aims have been published by Ng et al., 2023.[18]

Sociodemographic data

The socio-demographic characteristic of the participants is summarised in Table 2. The mean age of the participants was 30.9 (SD 5.55) years old with 50.1% above 30 years old. Two thirds (61.8%) had total monthly household income of less than MYR 3000. More than half (53.4%) had secondary school education and were housewives (54.8%). Most women were multiparous with a mean of having 2 children, and majority (88.6%) breastfed their babies.

Most women (97%) did not have a chronic medical condition, and a significant proportion (79%) continued to practice confinement. The husbands' mean (SD) age was 4 years older than their wives, the duration of marriage was 6.7±5.0 years, and sexual activity was resumed at mean of after three months postpartum. About 50% had sexual intercourse once a week and for some more.

Table 2: Sociodemographic data of included postpartum women (n=429)

Variables	n (%)
Socio-demographic Data	
Age in years	30.9(5.55)*
Educational level	
Nil or primary	11(2.6)
Secondary	229(53.4)
Tertiary	189(44.1)
Job	
Home maker	235(54.8)
Self-employed	54(12.6)
Government servants/ private workers	140(32.6)
Monthly household income in MYR	2654.5(1918.2)*
Past Obstetric History	
Number of children	2.4(1.39)*
Mode of delivery	
Vaginal delivery with intact perineum	49(11.4)
Vaginal delivery with tear/ episiotomy/ instrumental delivery	306(71.3)
Caesarean section	74(17.2)
Parity	
Primiparous	137(31.9)
Multiparous	292(68.1)
Breastfeeding history	
Not at all	49(11.4)
Yes (partial and exclusive)	380(88.6)
Confinement practises	
Yes	339(79)
No	90(21)
Chronic medical illness during pregnancy	
Yes	13(3.0)
No	416(97.0)
Marital And Sexual Profile	
Spouse's age in years	33.9(6.5)*
Duration of marriage in years	6.7(5.0)*
Resumption of sexual intercourse in weeks	12.9(3.4)*
Frequency of sexual intercourse	
Once or more in a week	235(54.8)
Once every two weeks	127(29.6)
Once a month	67(15.6)

*Mean (SD)

52.4% of the respondents had positive results for FSD. The mean (SD) for the FSD, GRIMS and EPDS scores were 19.4±3.62, 32.3±6.91 and 7.3±4.81 respectively. More than half of the women were at risk for marital dissatisfaction and about 20% having risk for PND. (See Table 3)

Table 3: Findings from questionnaires of Female Sexual Function Index (FSFI), Golombok Rust Inventory of Marital State (GRIMS), and Edinburgh Postnatal Depression Scale (EPDS)

Variables	n %
FSFI	19.41(3.62)*
FSD	
Yes	225(52.4%)
No	204(47.6%)
GRIMS	32.31(6.91)*
Marital dissatisfaction	
Yes	236(55.0%)
No	193(45.0%)
EDPS	7.37(4.81)*
Postnatal depression	
Yes	78 (18.2%)
No	351 (81.8%)

*Mean (SD)

The association between female sexual dysfunction (FSD) score with marital satisfaction score and postnatal depression score using multiple linear regression analysis

Multiple linear regression analysis revealed a significant negative association between female sexual dysfunction (FSD) score and marital satisfaction (β=-0.368, 95% CI:-0.546 to -0.191, p<0.001) after adjusting for household income. The model, which accounted for 4.8% of the variance in marital satisfaction, suggests that FSD contributes to lower marital satisfaction.

Multiple linear regression analysis demonstrated a significant negative association between FSD score and postnatal depression score (β=-0.238, 95% CI:-0.362 to -0.114, p<0.001) after adjusting for household income. The model, which explained 3.2% of the variance in postnatal depression, indicates that FSD is associated with increased risk of postnatal depression.

These findings also suggest that while FSD has a measurable impact on marital satisfaction and postnatal depression, other factors not included in the model likely play a larger role in explaining marital satisfaction and postnatal depression.

DISCUSSION

In the present study, 52.4% of the women experienced sexual dysfunction (SD), a finding consistent with other studies.[25,26] However, another study in Malaysia reported a lower (35.5%) prevalence of FSD among postpartum women, likely due to differences in postpartum duration and the questionnaire used.[27] Possible factors contributing to FSD during the postpartum period include hormonal and physical changes which reduce sexual desire, arousal, and lubrication; psychological and emotional changes; relationship dynamics; lack of support; cultural expectations; lactation-related factors; and clinical and medical conditions.[28] These findings emphasize the importance of recognizing and addressing the prevalence of sexual dysfunction in postpartum women, ensuring that healthcare professionals do not neglect or overlook this critical aspect of maternal health.

In addition, 55.0% of the women reported marital dissatisfaction. The result is higher than rates reported in other countries such as Australia (37.2%), Nigeria (39.5%) and Saudi Arabia (39.5%).[15,29,30] This discrepancy may stem from the use of different research tools to assess marital satisfaction (e.g., Relationship Assessment Scale, Couples Satisfaction Index, Index of Marital Satisfaction) and variations in sociodemographic backgrounds, cultural norms, and support systems. The findings also contribute in highlighting the substantial prevalence of marital dissatisfaction within our study population and emphasising the need to consider contextual factors when interpreting marital satisfaction globally. For instance, cultural expectations, family dynamics, and access to social support may influence how individuals perceive and report relationship satisfaction.

Further comparison with existing studies revealed that the timing of postpartum assessment plays a significant role in marital satisfaction. While our study identified that more than half of women were at risk for marital

dissatisfaction at 6 months postpartum, a study in Australia found that postpartum women within the first 5 months after childbirth were more affected by dissatisfaction compared to those 6-12 months postpartum.[15] This aligns with findings by Doss et al. (2009), who reported that relationship satisfaction was significantly lower in the early months after childbirth, adversely affecting couples' relationships.[31] These observations highlight the critical need for interventions during the early postpartum period, including at 6 months postpartum period, to mitigate marital dissatisfaction and promote family well-being.

The transition to motherhood is a significant life event marked by fundamental changes for a substantial number of individuals. This is supported by a meta-analysis showed that the significantly decrease of marital satisfaction up to 1 year postpartum for women.[32,33] Another study even showed the marital dissatisfaction continues up to the second year postpartum.[34] A variety of factors could contribute to a decline in marital satisfaction, including the transition from a marriage of spouses without children to a system of parents with a child, the stress caused by childcare, reduced postpartum communication and responsiveness, and multiple activities performed at once.[33]

The postpartum period is a time when women, particularly those in stressful situations, are at a heightened risk of developing mental health problems. Our findings highlight that the prevalence of postnatal depression remains high at approximately 18.2% at six months postpartum. This finding aligns with a study conducted in the same district in 2006, which reported a prevalence of 20.7% PND at 4–6 weeks postpartum, as well as in the recent global analysis where PND prevalence was 17.2% worldwide.[35,36] The rate in the current study (18.2%) is higher than that reported in two previous studies in Kuala Lumpur and Sabah, which was 14.3%.[37,38] This may be due to Kelantan, the state where this study was conducted, has the lowest household monthly income in Malaysia.[39] Indeed, many studies have reported that low household income increases the risk of PND in developing countries.[36,40] Azidah et al (2006) noted that the factors contributing to PND were having depressive symptoms at the end of pregnancy and early postpartum period, worry about their babies, use of traditional medication, and traditional massage.[35] Findings from current study emphasized the proportion and possible influence of sociocultural and economic factors, such as household income, family support and postnatal practices, on mental health outcomes during the postpartum period. This underscores the need for focus history taking, targeted possible reasons, and support systems that address financial stressors and provide mental health resources, particularly in economically disadvantaged area, to reduce the burden of postnatal depression in Kelantan.

The association between marital satisfaction score and female sexual dysfunction score among women at 6 months postpartum

Marital satisfaction is one of the important concepts used to assess happiness and stability in a marriage. We investigated whether sexual problems can affect the relationship issue such as marital satisfaction. The findings from this study showed that female sexual dysfunction (FSD) is associated with marital dissatisfaction. The lower the FSFI-6 score, the higher the score of GRIMS score. The female sexual index score is useful for predicting GRIMS score. While FSFI-6 score is a significant predictor of marital satisfaction, the R^2 value emphasises that it accounts for only a small fraction of the variability, indicating a complex interplay of other contributing factors that need to be further researched. Sexual functioning is one of the issues. Many studies reported significant relationship between sexual satisfaction and marital satisfaction.[15,40,41] Sexual satisfactions can act as a compensatory factor for the negative impact of poor communication on marital satisfaction, even for couples who struggle with communication difficulties in their relationship.[42] The findings encourage healthcare providers to address both sexual health including sexual functioning screening, marital satisfaction and relationship dynamics in consulting their postpartum patients.

Couples distressed about their sexual relationship may not engage in problem solving discussion because sexual dysfunction is a sensitive topic. Yet, not discussing the sexual problem may exacerbate the strain on their relationship. Further longitudinal study is needed to explore the marital satisfaction with sexual problem from pre-pregnancy until after childbirth.

Association postpartum depression score with female sexual dysfunction score among women at 6 months postpartum

The result of the current research demonstrates an association between sexual dysfunction and postnatal depression (PND), despite the low R^2 value (indicating a complex interplay of other contributing factors occurs). This finding is consistent with results from other studies.[42,43] When FSFI-6 scores increase by 1 unit, the EDPS scores decrease by 0.238 unit. Hence, a lower FSFI-6 score, indicates a higher risk of sexual dysfunction, therefore the risk of PND increases. According to Glazener and colleagues, PND is associated with women's loss of sexual desire after childbirth. Depression was also associated with a lower frequency of intercourse, and fatigue negatively affects women's sexual functioning at 12 weeks postpartum.[43] A study by Elliott and Watson (1985) noted that the relationship between PND and women's decreased sexual interest, enjoyment, frequency, and satisfaction by 6 months postpartum which became more significant between 9-12 months postpartum.[42] Ignorance of sexual issues in postpartum women leads to negative long-term effect. The risk of depression symptoms was 2.5 times greater in women with sexual dysfunction and 3.7 times greater in women with relationship dissatisfaction.[23]

A prospective cohort study showed that 1 in 5 women complained of deterioration in sexual life and depression anxiety symptoms after childbirth. The depressive symptoms are associated with a decline in sexual life up to 18 months postpartum.[44] Another study showed women with depression had significant reduction in arousal, orgasm, and satisfaction than non-depressed women, suggesting more problematic sexual functioning.[45] However, women with sexual dysfunction had a 1.62-fold risk for depressive symptoms during the entire 24 months after childbirth than women without sexual dysfunction. Risk factors for depressive symptoms were a higher pain score, a medical condition, and severe perineal laceration.[46] A systematic review revealed presence of bidirectional association between sexual dysfunction and depression.[47]

Findings from the current study also contribute to the broader understanding of the complex relationship between sexual dysfunction (SD) and PND by providing additional evidence of how sexual health directly influences mental well-being in the postpartum period. By quantifying the association between SD and depression, this study highlights the importance of addressing sexual health as part of comprehensive postpartum care. The recognition of this relationship can inform healthcare practitioners and encourage early interventions to prevent the long-term consequences of untreated SD and PND.

LIMITATION

The research was carried out in 4 primary healthcare centres located in Kelantan. Majority of the participants were Malay ethnicity; hence findings cannot be generalized to the population of Malaysia with different ethnicities.

The cross-sectional design of this study cannot establish a cause-and-effect relationship between sexual dysfunction (SD), marital satisfaction, and postpartum depression (PND). Future longitudinal studies may provide stronger evidence to understand the underlying relationship identified in this study.

Although sexuality and mental health issues are often viewed as taboo and stigmatized, the usage of a self-administered questionnaire may encourage participants to provide more truthful and dependable responses.

CONCLUSION

In this study, approximately over 50% were 6 months postpartum and at risk to experiencing sexual dysfunction (SD) and marital dissatisfaction. 20% were at risk of

developing postnatal depression (PND). The frequency of SD may increase the risk of marital dissatisfaction and depression in postpartum women. Therefore, health care providers should have holistically assessment for sexual problems in postpartum women and they can refer women for early diagnosis and treatment to prevent negative consequences.

ACKNOWLEDGMENTS

We would like to thank all the women who participated in this study and had given the time to share their experiences.

CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

INSTITUTIONAL REVIEW BOARD (ETHICS COMMITTEE)

The ethical board approval has been granted by The Research and Ethics Committee of USM (USM/ JEPeM/18080359) as well as the Medical Research Ethics Committee of the Ministry of Health Malaysia (NMRR-18-2551-43304).

This study was funded by Tabung Insentif Pembangunan Pengajian Siswazah (TIPPS) from School of Medical Sciences, USM

REFERENCES

1. Norhayati MN, Azman Yacob M. Long-term postpartum effect of severe maternal morbidity on sexual function. Int J Psychiatry Med. 2017; 52(4-6): 328.
2. Acele EÖ, Karaçam Z. Sexual problems in women during the first postpartum year and related conditions. J Clin Nurs. 2012; *21*(7-8): 929-37.
3. Barrett G, Pendry E, Peacock J, et al. Women's sexual health after childbirth. BJOG, 2000;107(2):186 -95.
4. Gutzeit O, Levy G, Lowenstein L. Postpartum Female Sexual Function: Risk Factors for Postpartum Sexual Dysfunction. J Sex Med. 2020;8 (1):8-13.
5. Chanmekun SB, Zulkifli MM, Muhamad R, et al. Managing sexual dysfunction for women with breast cancer: the perspective of healthcare providers in North East Malaysia. Support Care Cancer. 2022;30 (1):401-11
6. Muhamad, R., Horey, D., Liamputtong, P. et al. Managing Women with Sexual Dysfunction: Difficulties Experienced by Malaysian Family Physicians. Arch Sex Behav. 2019;48:949–60.
7. Pourakbaran E, Amin Yazdi SA. A study of sexual functioning and marital satisfaction in women with and without history of labor. J Fundam Mental Health. 2015;17(4): 202-8.
8. Che Ya SN, Muhamad R, Zakaria R, et al. "I lost my gift to him": The consequences of female sexual dysfunction on breast cancer survivors in Malaysia. Arch Sex Behav. 2022;51(3):1625-35.
9. Ziaee T, Jannati Y, Mobasheri E, et al. The Relationship between Marital and Sexual Satisfaction among Married Women Employees at Golestan University of Medical Sciences, Iran. Iran J Psychiatry Behav Sci. 2014;8(2): 44-51.
10. Muhamad R, Horey D, Liamputtong P, et al. Transcripts of Unfulfillment: A Study of Sexual Dysfunction and Dissatisfaction among Malay-Muslim Women in Malaysia. Religions. 2021; 12 (3):205.
11. Klainin, P., & Arthur, D. G. (2009). Postpartum depression in Asian cultures: a literature review. Int J Nurs Stud. 2009;46(10):1355-73.
12. Mohamad Yusuff AS, Tang L, Binns CW, Lee AH. Prevalence and risk factors for postnatal depression in Sabah, Malaysia: a cohort study. Women Birth. 2015; 28(1):25-9.
13. Zainal NZ, Kaka AS, Ng CG, Jawan R, Singh Gill J. Prevalence of postpartum depression in a hospital setting among Malaysian mothers. Asia Pac Psychiatry. 2012;*4*(2):144-9.
14. Tolossa T, Fetensa G, Yilma MT, et al. Postpartum depression and associated factors among postpartum women in Ethiopia: a systematic review and meta-analysis, 2020. *Public Health Reviews*. 2020; *41*(1):21.
15. Khajehei M. Prevalence and risk factors of relationship dissatisfaction in women during the first

year after childbirth: Implications for family and relationship counseling. J Sex Marital Ther.2016;42 (6):484-93.
16. Dağli E, Kul Uçtu A, Özerdoğan N. Sexual dysfunction in the postpartum period: Its relationship with postpartum depression and certain other factors. Perspect Psychiatr Care. 2021 Apr;57 (2):604-9.
17. Mobarakabadi A, Fallahchai R, Askari M. The relationship between marital satisfaction and postpartum depression in women who visited health centers in Bandar Abbas City. J Appl Environ Biol Sci. 2014;4:120–4.
18. Ng YY, Muhamad R, Ahmad I. Sexual dysfunction among six months postpartum women in north-eastern Malaysia. PLoS ONE. 2023;18(4):e0284014.
19. De Lima Holanda JB, Vieira Abuchaim EDS, Coca KP, Freitas De Vilhena Abrão AC. Sexual dysfunction and associated factors reported in the postpartum period. Acta Paul Enferm. 2014;27 (6):573-8.
20. Isidori AM, Pozza C, Esposito K, et al. Development and validation of a 6-item version of the female sexual function index (FSFI) as a diagnostic tool for female sexual dysfunction. J Sex Med, 2010;7(3):1139-46.
21. Ooi PS, Draman N, Muhamad R, et al. Sexual Dysfunction Among Women With Breast Cancer in the Northeastern Part of West Malaysia. Sex Med. 2021;9(3):100351
22. Quek KF, Low WY, Razack H, Loh CS, Chua CB. Measurement properties of the Malay Version of the Golombok-Rust Inventory of Marital State (GRIMS) among urological patients. Malaysian Journal of Psychiatry.2001; *9*(1):23-8.
23. Cox JL, Holden JM, Sagovsky R. Detection of postnatal depression: development of the 10-item Edinburgh Postnatal Depression Scale. BJPsych. 1987;150(6):82-6.
24. Kadir AA, Nordin R, Ismail SB. Validation of the Malay version of Edinburgh Postnatal Depression Scale for postnatal women in Kelantan, Malaysia. Asia Pac Fam Med. 2004;3(1-2): 9-18.
25. Khajehei M, Doherty M. Exploring postnatal depression, sexual dysfunction and relationship dissatisfaction in Australian women. Br J Midwifery. 2017;25(3):162-72.
26. Salamon N, Hashim SM, Ahmad N, Wahab S. Sexual dysfunction among women at four to six months postpartum: a study in a primary care setting. *Malays J Public Health Med.* 2020;20(1):235-43.
27. Khalid N, Jamani, NA, Abd Aziz KH, Draman N. The prevalence of sexual dysfunction among postpartum women on the East Coast of Malaysia. J Taibah Univ Med Sci. 2020;15(6),515–21.
28. Von Sydow K. Sexuality during pregnancy and after childbirth: A metacontent analysis of 59 studies. J Psychosom Res. 1999;47(1):27-49.
29. Elmagd MHA, Albokhary AA. Postpartum depression and its relation to social support and marital satisfaction. ASEAN J Psychiatry. 2021;22 (7):1-13.
30. Odinka JI, Nwoke M, Chukwuorji JC, et al. Post-partum depression, anxiety and marital satisfaction: A perspective from Southeastern Nigeria. S Afr J Psychiatr. 2018;24:1109.
31. Doss BD, Rhoades GK, Stanley SM, Markman HJ. The effect of the transition to parenthood on relationship quality: an 8-year prospective study. J Pers Soc Psychol. 2009;96(3):601.
32. Bäckström C., Kåreholt I, Thorstensson S, Golsäter M, Mårtensson LB. Quality of couple relationship among first-time mothers and partners, during pregnancy and the first six months of parenthood. Sexual & Reproductive Healthcare, 2018;17:56-64.
33. Bogdan I, Turliuc MN, Candel OS. Transition to parenthood and marital satisfaction: A meta-analysis. Front Psychol. 2022;13:3845.
34. Figueiredo B, Conde A. First-and second-time parents' couple relationship: from pregnancy to second year postpartum. Fam Sci. 2015;6(1):346-55.
35. Azidah AK, Shaiful BI, Rusli N, Jamil MY. Postnatal depression and socio-cultural practices among postnatal mothers in Kota Bahru, Kelantan, Malaysia. Med J Malaysia. 2006 Mar;61(1):76-83. PMID: 16708738.
36. Wang Z, Liu J, Shuai H, et al. Correction: Mapping global prevalence of depression among postpartum women. Transl Psychiatry. 2021;11(1):640.

37. Mohamad Yusuff AS, Tang L, Binns CW, Lee AH. Prevalence and risk factors for postnatal depression in Sabah, Malaysia: a cohort study. Women Birth. 2015;28(1):25-9.
38. Hairol MI, Ahmad SA, Sharanjeet-Kaur S, et al. Incidence and predictors of postpartum depression among postpartum mothers in Kuala Lumpur, Malaysia: A cross-sectional study. PLoS ONE, 2021;16(11):e0259782.
39. Department of Statistic Malaysia. Household income estimates and incidence of poverty report, Malaysia; 2022. Available f: https://www.dosm.gov.my/v1/index.php?r=column/cthemeByCat&cat=493&bul_id=VTNHRkdiZkFzenBNd1Y1dmg2UUlrZz09&menu_id=amVoWU54UTl0a21NWmdhMjFMMWcyZz09 [Accessed 2022].
40. Valdes V, Berens AE, Nelson CA. Socioeconomic and psychological correlates of postpartum depression at 6 months in Dhaka, Bangladesh. Int J Psychol. 2021;56(5):729-38.
41. Rahmani A, Khoei EM, Gholi LA. Sexual satisfaction and its relation to marital happiness in Iranians. Iranian J Publ Health, 2009;38(4), 77-82.
42. Rahmani A, Khoei EM, Sadeghi N, Allahgholi L. Relationship between sexual pleasure and marital satisfaction. Iran J Nurs. 2011;24(70):82-90.
43. Litzinger S, Gordon KC. Exploring relationships among communication, sexual satisfaction, and marital satisfaction. J Sex Marital Ther. 2005;31(5):409-24.
44. Glazener CM. Sexual function after childbirth: women's experiences, persistent morbidity and lack of professional recognition. BJOG. 1997;104(3):330-5.
45. Faisal Cury A, Huang H, Chan YF, Menezes PR. The relationship between depressive/anxiety symptoms during pregnancy/postpartum and sexual life decline after delivery. J Sex Med, 2013;10(5):1343-9.
46. Chivers ML, Pittini R, Grigoriadis S, Villegas L, Ross LE. Original research: the relationship between sexual functioning and depressive symptomatology in postpartum women: a pilot study. J Sex Med, 2011;8:792-9.
47. Chang SR, Lin WA, Lin HH, Shyu MK, Lin MI. Sexual dysfunction predicts depressive symptoms during the first 2 years postpartum. Women Birth. 2018;31(6):e403-11.
48. Atlantis E, Sullivan T. Bidirectional association between depression and sexual dysfunction: a systematic review and meta-analysis. J Sex Med. 2012;9(6) 1497-1507.