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Identifying the factors associated with depressive symptoms among postpartum mothers in Kathmandu, Nepal

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ARTICLE INFO

ABSTRACT

Purpose: This study aimed to identify the factors associated with depressive symptoms among postpartum mothers in Kathmandu, Nepal.
Method: A hospital-based cross-sectional study that included 346 postpartum mothers at 4–14 weeks after delivery was carried out. Validated Nepalese version of Edinburgh Postnatal Depression Scale with cut-off value of ≥ 12 was used to screen depressive symptoms and structured questionnaires were used to identify the associated factors. Possible factors associated with depressive symptoms were identified by logistic regression analysis.
Result: The mean age of the mothers was 22.75 ($SD = 4.51$). The prevalence of depressive symptoms among postpartum mothers was 17.1% (95% $CI = 15.07–19.12$). No significant association existed between postpartum depressive symptoms and socio demographic and economic characteristics. In multivariate analysis, risk factors for postpartum depressive symptoms were identified as follows: women without adequate rest during pregnancy ($aOR = 4.023$, 95% $CI = 1.294–12.501$), abortion history ($aOR = 3.25$, 95% $CI = 1.208–9.065$), poor relationship with husband ($aOR = 1.67$, 95% $CI = 1.073–8.384$), marital dissatisfaction ($aOR = 4.053$, 95% $CI = 2.281–12.819$) and stressful life events ($aOR = 3.89$, 95% $CI = 1.504–9.810$).
Conclusions: This study aids to draw attention on the incorporation of routine screening for basic support and intervention for identified risk factors in postpartum period. Policies can be formulated to encourage postpartum women to obtain adequate rest during pregnancy, support women with poor partner relationship, reduce marital dissatisfaction, help women adjust with stressful life events, and prevent and manage abortion appropriately. These policies may reduce harmful consequences of postpartum depressive symptoms for women, newborn and their family.

1. Introduction

Postpartum depression (PPD), a type of mood disorder, is the most frequently observed morbidity during postpartum period [1]. PPD is the most common childbirth complication [2] which affects 10%–15% of women in high-resource countries [3]. However, the prevalence is also considerably high in developing countries, including India (23%) [4], Pakistan (44%) [5] and Vietnam (33%) [6]. Notably, the prevalence is low in Nepal at 4.9%–19.4% [7–9].

Mostly, the onset of PPD symptoms occurs within six months after delivery [10,11], although they can emerge at any time during the first year of delivery [10]. The PPD symptoms can exert a wide range of effect on the social, physical and mental health conditions of the mother and baby [12]. Addressing PPD symptoms is essential because the feelings associated with PPD symptoms not only affect the health, marriage and families of the mother; they can also be detrimental to the health of the newborn and the entire family [3]. Furthermore, children of depressive mothers exhibit higher cognitive, behavioural and interpersonal problems than those of children of non depressed mothers [13].

PPD symptoms originate not from a single cause, but they likely result from a combination of biochemical, physical and emotional factors. The main biochemical factor causing PPD symptoms is decreased hormonal levels which result in chemical changes in the brain that may trigger mood swings [14]. Several physical and emotional factors are responsible for PPD symptoms; these factors include low socioeconomic status, low education level, extended

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Peer review under responsibility of Chinese Nursing Association.

families [15], young age [15,16], conflict with mother-in-law [16,17], marital dissatisfaction [4,5,17], physical and sexual violence [5,16,18–20], unintended pregnancy, being unmarried, insufficient emotional and practical support [16,21], stressful life events [18,21], artificial feeding, sex of the baby [21] and previous and antenatal depression [17,21,22]. A study conducted in Canada recognised the risk factors for PPD, such as maternal health problems, infant difficulty, lack of money for basic needs, frequent conflicts with network members and poor social support [23]. In nearby countries, such as India and Pakistan, economic deprivation, gender of infant [4], marital dissatisfaction [4,5], previous PPD, joint family structure, domestic violence, low socioeconomic status and being housewives are risk factors for PPD [5]. In Nepal, associated factors for postpartum depressive symptoms are as follows: unsound communication with husband [9], husband's alcoholism, previous depression, smoking and depression during pregnancy [18], polygamy [18,24], food insecurity, caesarean section delivery, perinatal health problems, lack of education of one or both spouses, poor or no antenatal care, not having a son, not staying in parental home during postnatal period and low maternal age [24].

Although PPD is a major health issue for many women from diverse cultures, this condition often remains undiagnosed [13]. The use of screening scales is an easy, simple and cost-effective way to recognise women who are at risk of depression [25]. The Edinburgh Postnatal Depression Scale (EPDS) is the most widely used screening tool in identifying PPD [26–29], and it has been validated and used in many countries, including Nepal. Hence, in our study, we selected EPDS to screen PPD symptoms [26,28–32].Mothers with increased PPD symptoms are those with score more than the established cut off, i.e. $\geq$12 on EPDS, in our study [32].

Given the implication of postpartum depressive symptoms on the mother and child, knowledge on associated factors is necessary to implement preventive measures and assist health care providers in addressing high-risk groups. Few studies have been conducted to examine PPD symptoms in Nepal, and these studies have been limited to few associated factors. The present study aims to assess the socioeconomic characteristics, as well as family-, violence-, pregnancy- and birth-related factors associated with PPD symptoms among Nepalese women. Adequate rest during pregnancy, intimate partner violence, stressful life events, obstetric complications, history of abortion were additional factors included in this study. Such factors were excluded in previous studies conducted in Nepal.

2. Materials and methods

2.1. Study design

This work is a descriptive cross-sectional study performed in Tribhuvan University Teaching Hospital (TUTH) in Kathmandu, Nepal. The hospital is a tertiary-level referral hospital which covers people of all economic strata throughout the country.

2.2. Sample

The study population included mothers with 4–14 weeks postpartum and who attended an immunisation clinic in TUTH. The onset of PPD symptoms occurs within this period [10,11]. Hence, we selected these women as our study population.

Women whose children died at birth and those suffering from severe medical illness were excluded because physical symptoms, such as insomnia, anorexia, decreased concentration and pain, are similar to PPD symptoms which may create bias in the sample. Women with mental retardation were also excluded because they may interfere with the informed consent and data collection.

The sample size was calculated using the formula $n = z^2 pq/d^2$ for a cross-sectional study, where $Z = 1.96$, $P = 0.08$ (assuming 8% average prevalence of PPD symptoms in Nepal) [7,8], $q = 1-p = 0.92$ and allowable error $(d) = 3\%$ at 5% level of significance. The calculated required sample size was 346, with non-response rate of 10%. The sample was selected by systematic random sampling method. The study population for one-month period was 800 according to the register book maintained in the immunisation clinic. A sampling interval of 2 was calculated by dividing the total study population with the desired sample size, i.e. 346. The first sample was selected by lottery method with simple random sampling. Every second sample was selected from the register book maintained each day in the clinic until the desired sample size was obtained. The mothers waiting for immunisation were also interviewed.

2.3. Data collection

Data were collected by structured face-to-face interview technique with 346 participants from December 2014 to January 2015. The researchers developed the questionnaire for socio-demographic, economic- and family-, pregnancy- and birth-related characteristics. The variables used in socio-demographic conditions were the age of mother, ethnicity, religion, family type, marriage type, education and occupation. The economic status was measured by wealth quintiles; relationship with husband, marital satisfaction, stressful life events in previous year and history of previous depression were the family-related characteristics. The pregnancy- and birth-related characteristics used were adequate rest during pregnancy, number of pregnancies, type of delivery, place of delivery, obstetric complication during pregnancy and delivery and history of abortion.

Similarly, the intimate partner violence was measured by using a shortened and modified version of the Conflict Tactics Scale as used in Nepal Demographic and Health Survey 2011. The answer 'yes' to one or more of the items constitutes the evidence of violence. Seven, two and three items were used to measure physical, sexual and emotional violence, respectively. This approach provides the respondent with multiple opportunities to disclose any experience of violence, but the possibility of underreporting of violence, particularly sexual violence, cannot be entirely ruled out in this study [34]. Privacy and confidentiality were maintained during data collection.

Furthermore, to determine the PPD symptoms, validated Nepali version of EPDS was adopted. The Nepali version of EPDS is acceptable, and it presents good validity with sensitivity of 92, specificity of 95.6, positive predictive value of 77 and negative predictive value of 99.3 [32].The EPDS is a 10-item self-report questionnaire. Questions 1, 2 and 4 were scored as 0, 1, 2 and 3 according to the increasing severity of the symptoms. Questions 3, 5–10 were reverse, scored as 3, 2, 1 and 0. Total score was calculated by adding each score of the 10 items. The score can range from 0 to 30 [33]. The cut-off score of $\geq$12 was obtained to determine the PPD symptoms [32].

The reliability of the instrument calculated by Cronbach's α was 0.742 which is within the acceptable range of reliability [35].

2.4. Ethical consideration

The ethical approval of the study was obtained from the Institutional Review Board of Institute of Medicine in Tribhuvan University. Written approval for the study was obtained from the immunisation clinic and psychiatric department of TUTH. Written informed consent was also obtained from each participant.

2.5. Data analysis

Data were compiled, checked for completeness and entered into EPI-Info version. 3.5.1. The entered data were exported to SPSS version 20.

Descriptive analysis was performed on study variables. Association was identified by logistic regression analysis. The PPD symptom was considered the dependent variable, and the socio-demographic, economic, family and intimate partner violence and pregnancy and birth-related characteristics were considered the independent variables. The odds ratio (OR), P values and 95% confidence interval (CI) were calculated to identify the associations. The variables with $OR > 1$ and P value < 0.05 were the associated risk factors for PPD symptoms.

The significant variables obtained from bivariate analysis were used in multivariate analysis to identify the final associated variables.

3. Result

3.1. Sample characteristics

Table 1 shows the mean age of the mothers, i.e. 22.75 ($SD = 4.51$). Most of the mothers were non-Dalit caste (93%), and majority were Hindus (85%). Approximately 45% of the participants were from nuclear family. All of the participants were married, and arranged marriage was the most common type of marriage (64.5%). Majority of the participants (30.3%) completed secondary education. Additionally, approximately half (49%) of them reported unpaid work.

A total of 87% of the respondents were in good relationship with their husbands during the study period, whereas 11.8%, 2.3% and 6% of the participants experienced physical, sexual and psychological violence, respectively, at least one time in their lives. About 93% of the participants were satisfied with their marriage, 12% of them reported stressful life events in the previous year, and only 1.7% indicated a previous history of depression.

Among pregnancy- and birth-related characteristics, 92.5% of the mothers obtained adequate rest during pregnancy. Approximately 56% of them experienced multiple pregnancies. Normal delivery was the most common type of delivery (67.6%), and 97.4% was institutional. A total of 18% of the mothers experienced obstetric complications during pregnancy or delivery, and only 10% of the respondents presented a history of abortion.

3.2. Prevalence of depression

The prevalence of PPD symptom was 17.1% (95% CI: 15.07–19.12).

3.3. Factors associated with PPD symptoms in bivariate analysis

Table 2 demonstrates no statistically significant association between PPD symptoms and socio-demographic and economic status. Economic status was analysed by the principle component analysis (PCA) method, in which the status was classified into five quintiles, with the first quintile being the poorest and fifth being the richest. The factors used to assess the economic status in PCA were the availability of productive assets (e.g. livestock), non productive assets (e.g. radio, television, mobile and/or landline phone, bicycle, motorcycle, scooter, car, freezer and computer), household amenities (e.g. toilet, electricity, flooring, roof, cooking fuel and light source) and availability of other assets (e.g. number of rooms and land ownership).

Women with poor relationship with their husbands exhibited

Table 1
Sample characteristics.

Variables	Frequency ($n = 346$)	Percentage
Age of Mother		
<20	106	30.6
20–25	180	52.0
26–30	53	15.3
31–35	7	2.1
Ethnicity		
Dalit	23	6.7
Non-Dalit	323	93.3
Religion		
Hindu	294	84.9
Buddhists	25	7.2
Muslim	6	1.7
Christian	21	6.1
Type of Family		
Nuclear	156	45.1
Joint	148	42.8
Extended	42	12.1
Marriage type		
Arranged marriage	223	64.5
Love marriage	123	35.5
Educational status		
Nonformal	18	5.2
Formal	328	94.8
Occupation		
Paid	176	50.9
Unpaid	170	49.1
Wealth Quintile by PCA		
Lowest	69	19.9
Second	69	19.9
Middle	70	20.2
Fourth	69	19.9
Fifth	69	19.9
Relation with Husbands		
Good	300	86.7
Not good	46	13.3
Physical Violence		
No	305	88.2
Yes	41	11.8
Sexual violence		
No	338	97.7
Yes	8	2.3
Psychological Violence		
No	325	93.9
Yes	21	6.1
Marital satisfaction		
No	24	6.9
Yes	322	93.1
Stressful life events in previous year		
No	304	87.9
Yes	42	12.1
History of previous depression		
No	340	98.3
Yes	6	1.7
Adequate rest during pregnancy		
No	26	7.5
Yes	320	92.5
Number of pregnancies		
Primi	153	44.2
Multi	193	55.8
Type of delivery		
Normal	234	67.6
Caesarean section	112	32.4
Place of delivery		
Home	9	2.6
Institution	337	97.4
Obstetric complications during pregnancy and delivery		
No	284	82.1
Yes	62	17.9
History of Abortion		
No	311	89.9
Yes	35	10.1

Table 2
Association between socio-demographic and family- and intimate partner violence-related characteristics with postpartum depressive symptoms.

Variables	Depression Number (%)		OR	95% CI	P
	Yes	No			
Caste/Ethnicity					
Dalit	6 (10.2)	17 (5.9)	1.798	0.677—4.772	0.239
Non-Dalit	53 (89.8)	270 (94.1)	1		
Religion					
Hindu	53 (89.8)	241 (84.0)	1		
Non-Hindu	6 (10.2)	46 (16.0)	1.686	0.685—4.152	0.256
Type of marriage					
Love	40 (67.8)	183 (63.8)	1.196	0.659—2.173	0.556
Arrange	19 (32.2)	104 (36.2)	1		
Education					
Non formal	5 (8.5)	13 (4.5)	1.952	0.221—2.958	0.221
Formal	54 (91.5)	274 (95.5)	1		
Occupation					
Unpaid work	30 (50.8)	140 (48.8)	1.086	0.620—1.902	0.772
Paid work	29 (49.2)	147 (51.2)	1		
Wealth category					
Lower	30 (50.8)	143 (49.8)	1.042	0.595—1.824	0.886
Upper	29 (49.2)	144 (50.2)	1		
Relationship with husband					
Good	32 (54.2)	268 (93.4)	1		
Poor	27 (45.8)	19 (6.6)	2.084	1.542—3.168	0.001*
Physical violence					
No	36 (61)	269 (93.7)	1		
Yes	23 (39)	18 (6.3)	3.624	2.852—6.213	0.001*
Psychological Violence					
No	43 (72.9)	282 (98.3)	1		
Yes	16 (27.1)	5 (1.7)	2.837	1.017—4.137	0.001*
Sexual Violence					
No	53 (89.8)	285 (99.3)	1		
Yes	6 (10.2)	2 (0.7)	1.833	1.212—3.615	0.001*
Marital Satisfaction					
No	16 (27.1)	8 (7.8)	12.977	5.237—32.155	0.001*
Yes	43 (72.9)	279 (92.2)	1		
Stressful life events in previous year					
No	45 (76.3)	259 (90.2)	1		
Yes	14 (23.7)	28 (9.8)	2.470	1.170—5.711	0.004*
History of previous depression					
No	53 (89.8)	287 (100)	1		
Yes	6 (10.2)	0 (0)	2.035	1.357—4.012	0.999

Note: OR: Odds ratio, *CI*: Confidence interval, Significance: *P* < 0.05, 1 = Reference category, * = Significant.

two times higher chance to develop PPD symptoms (*OR* = 2.084, 95% *CI* = 1.542—3.168) than that of women with good relationship with their husbands. Similarly, increased risk was observed in women experiencing physical (*OR* = 3.624, 95% *CI* = 2.852—6.213), psychological (*OR* = 2.837, 95% *CI* = 1.017—4.137) and sexual violence (*OR* = 1.833, 95% *CI* = 1.212—3.615) among intimate partner violence-related characteristics. Women who were dissatisfied with their marriage were 12 times more likely to develop depressive symptoms than those of women who were satisfied with their marriage (*OR* = 12.977, 95% *CI* = 5.237—32.155). In addition, women who experienced stressful life events in previous year (*OR* = 2.470, 95% *CI* = 1.170—5.711) were two times more likely to develop PPD symptoms than those who experienced none. No significant association was observed among women with previous history of depression (*OR* = 2.035, 95% *CI* = 1.357—4.012).

Table 3 displays the association between the pregnancy- and birth-related characteristics with PPD symptoms. The women without adequate rest during pregnancy were 10 times more likely to develop PPD symptoms than those women with adequate rest (*OR* = 10.307, 95% *CI* = 4.393—24.185). Similarly, women with multiple pregnancies showed four times higher risk to develop depressive symptoms than those of women with single pregnancy (*OR* = 4.904, 95% *CI* = 2.731—9.652). Women with history of abortion (*OR* = 1.901, 95% *CI* = 1.071—3.594) were two times more likely to develop depressive symptoms than those of women without

such history.

This finding revealed no statistically significant association between PPD symptoms and the type of delivery (*OR* = 1.351, 95% *CI* = 0.724—2.521), place of delivery (*OR* = 1.404, 95% *CI* = 0.284—6.931) and obstetric complication during pregnancy and delivery (*OR* = 0.826, 95% *CI* = 0.409—1.670).

3.4. Factors associated with PPD symptoms in multivariate analysis

The significant variables obtained from bivariate analysis were used in multivariate analysis to identify the final variables associated with PPD symptoms.

Table 4 shows that women with no adequate rest during pregnancy were four times more at risk to develop PPD symptoms than those with adequate rest during pregnancy (adjusted *OR* (*aOR*) = 4.023, 95% *CI* = 1.294—12.501). Similarly, women with history of abortion were three times more likely to develop PPD symptoms (*aOR* = 3.25, 95% *CI* = 1.208—9.065) than those without such history. The risk to develop PPD symptoms was increased by four times in women with marital dissatisfaction compared with those without marital satisfaction (*aOR* = 4.053, 95% *CI* = 2.281—12.819). In addition, women with stressful life events in previous year (*aOR* = 3.89, 95% *CI* = 1.504—9.810) and with poor relationship with husband (*aOR* = 1.67, 95% *CI* = 1.073—8.384) were more likely to develop PPD symptoms by four times and two times,

Table 3
Association between pregnancy- and birth-related characteristics with PPD symptoms.

Variables	Depression Number (%)		OR	95% CI	P
	Yes	No			
Adequate rest during pregnancy and delivery					
No	16 (27.1)	10 (3.5)	10.307	4.393—24.185	0.001*
Yes	43 (72.9)	277 (96.5)	1		
No. of pregnancies					
Primi	18 (30.5)	135 (47.0)	1		
Multi	41 (69.5)	152 (53.0)	4.904	2.731—9.652	0.022*
Type of delivery					
Vaginal	43 (72.9)	191 (66.6)	1		
C.S	16 (27.1)	96 (33.4)	1.351	0.724—2.521	0.345
Place of delivery					
Home	2 (3.4)	7 (2.4)	1		
Institutional	57 (96.6)	280 (97.6)	1.404	0.284—6.931	0.677
Obstetric complications during pregnancy and delivery					
No	47 (79.7)	237 (82.6)	1		
Yes	12 (20.3)	50 (17.4)	0.826	0.409—1.670	0.595
History of abortion					
No	43 (72.9)	268 (93.4)	1		
Yes	16 (27.1)	19 (6.6)	1.901	1.071—3.594	0.001*

Note: OR: Odds ratio, *CI*: Confidence Interval, Significance: $P < 0.05$, 1 = Reference category, * = Significant.

Table 4
Adjusted relationship of significant characteristics in bivariate analysis with PPD symptoms.

Variables	Unadjusted OR (95% CI)	P	aOR (95% CI)	P
No adequate rest during pregnancy	10.307 (4.393—24.185)	0.001	4.023 (1.294—12.501)	0.016*
Abortion history	1.901 (1.071—3.594)	0.001	3.250 (1.208—9.065)	0.042*
Poor relationship with husband	2.084 (1.542—3.168)	0.001	1.670 (1.073—8.384)	0.001*
Physical violence	3.624 (2.852—6.213)	0.001	0.840 (0.673—3.342)	0.104
Psychological violence	2.837 (1.017—4.137)	0.001	1.149 (0.467—1.411)	0.121
Sexual violence	1.833 (1.212—3.615)	0.001	0.251 (0.172—1.632)	0.279
Marital dissatisfaction	12.977 (5.237—32.155)	0.001	4.053(2.281—12.819)	0.017*
Stressful life events	2.470 (1.170—5.711)	0.004	3.890 (1.504—9.810)	0.046*
Number of pregnancies	4.904 (2.731—9.652)	0.022	0.254 (0.139—2.919)	0.388

Note: OR: Odds ratio. CI: Confidence interval, * = Significant.

respectively, than those of women who experienced no such events. The factors, which were significant in bivariate analysis but not in multivariate analysis, were multiple pregnancies ($aOR = 0.254$, 95% $CI = 0.139$—2.919), physical violence ($aOR = 0.840$, 95% $CI = 0.673$—3.342), psychological violence ($aOR = 1.149$, 95% $CI = 0.467$—1.411) and sexual violence ($aOR = 0.251$, 95% $CI = 0.172$—1.632).

4. Discussion

The present study showed no significant association between PPD symptoms and sociodemographic variables, such as caste/ethnicity, religion, type of marriage, education, occupation and economic condition. The finding was consistent with that of Jossefon et al. [36] who reported no relation between PPD symptoms and sociodemographic factors. Nevertheless, the present result contradicted those of other studies [15,37,38], in which depression is observed with low socioeconomic status, low education, low income, unemployed, unmarried, young age and extended families. The PPD symptoms are also observed in young age in the study of Fisher et al. [16]. In the present study, a majority of people were young, living in nuclear family and with arranged marriage, which are expected in Nepalese context. Thus, these factors resulted in no PPD symptoms. Moreover, more than two-thirds of the participants attained high-level education. Consequently, the findings may be insignificant with socio-demographic data. The ability to understand information regarding puerperal period and lifestyle modification after delivery of participants with high-level education may

be influenced. They may also be well aware of the complication that may arise due to different changes in their body. Low-level education may impair access to health education, adoption of healthy behaviour and social mobilisation for the improvement of living condition. Similarly, half of the participants were in the upper wealth category, which may also be the reason for insignificant result.

Given the considerably few participants with previous history of depression and complication during pregnancy, no significant association was found with depressive symptoms in bivariate and multivariate analyses. However, Saleh and Turkapur [39] found that past psychiatric history and previous history of depressive symptoms and difficult labour are regarded as predictors of PPD. Delivery type was also found insignificant in both bivariate and multivariate analyses. However, the study conducted by Clarke in Nepal explored many psychological distresses in women who delivered via caesarean section [24]. In the present study, no significant association was found with the place of delivery. Most of the participants (96%) indicated institutional delivery, which may be the reason for the insignificant result.

In bivariate analysis, a significant association was observed with physical, sexual and psychological violence, whereas the association was insignificant in multivariate analysis. Similar finding was obtained from a prospective cohort study conducted in Recifi, Brazil in 2006; this study showed that women who reported physical and sexual violence are likely to experience PPD, but this association is reduced with adjusted confounding factors [19]. This result was also consistent with those of other studies [15,18,20,39]. Exposure

to any form of violence may affect mental health and impair access to health services, the adoption of healthy behaviour and the support from family and society, as well as result in feeling of loneliness, low self-esteem and depressive symptoms. By contrast, Budathoki [9] found no statistically significant relationship between different forms of violence and PPD symptoms. Given the few numbers of participants who experienced different forms of violence, the result may be insignificant with depressive symptoms in multivariate analysis.

Significant association was detected with multiparity in bivariate analysis, but it was insignificant in multivariate analysis. Ho-Yeen and Saleh identified multiparity as a predictor for PPD symptoms [18,21]. In our study, as expected in Nepalese context, more than half of the participants had more than one child which may be the reason for the insignificant result.

Multivariate analysis identified poor relationship with husband as a predictor of PPD symptoms in the present study, and this finding was consistent with those in other studies [4—6,9,17,40,41]. This result may also be affected with the support that they received from their spouse and family and that they had no one to talk and ask for help. They may also experience difficulty in discussing their problems and changes experienced during postpartum period with their husbands. Suppression of women's feelings and emotions may aggravate the depressive symptoms. Furthermore, emotional support enhances self-esteem and helps build confidence during the most challenging period.

Among the pregnancy- and birth-related characteristics, the women without adequate rest during pregnancy presented higher risk of developing PPD symptoms than those of women with adequate rest during pregnancy and delivery. This result was consistent with that of Saleh et al. [21]. Inadequate rest may inhibit cognitive functioning necessary for new parents to understand their infant's health problems and their participation in care taking. Adequate rest enhances interaction with family members and other relatives. Thus, emotional support may decrease the chance of depression. Women, who are highly engaged in household works may lead to considerable social and family troubles. In Nepalese culture, women should maintain the family within their assigned role. They are responsible for child caring and rearing, and husbands are not supposed to share the workload of child care. Nepalese women also assume multiple roles of taking care of household duties and their in-laws.

In the present study, PPD symptoms were found significant with stressful life events in previous year; this result was comparable to that of Ho-Yeen et al. [18,39,42]. Stressful life events may decrease the capacity to tolerate any change in life. Delivery and postnatal period is a completely new and challenging situation that can aggravate the mood swing and may play a role in the development of depressive symptoms. Stressful life events also cause negative feelings in patients with increased feeling of hopelessness and helplessness with increasing depressive episode.

This study identified several factors associated with postnatal depressive symptoms and provided insights into the causes of PPD symptoms in Nepal. However, this hospital-based study holds some limitations which limit its generalisation. This study was also cross-sectional, and it presented limited capability to evaluate causal links for PPD symptoms. Moreover, conducting a study on each reported risk factor is impossible; only frequently reported risk factors in the literature were evaluated.

5. Conclusion

Given their considerable effects on maternal and child health, assessment and management of PPD symptoms are critical but not integral in mental health and maternal health care programs in Nepal. This study has not yet been recognised as a valid public health problem in the country, as evidenced by the scarce research activity in this subject. The study findings illustrated that family-, pregnancy- and birth-related factors, such as adequate rest during pregnancy and delivery, abortion history, marital dissatisfaction, stressful life events in previous year and relationship with husband, are independent factors associated with PPD symptoms. The identified associated factors of PPD symptoms that are modifiable can be targeted for screening and intervention as a preventive measure.

Authorship

BRB worked on the design of the work, literature review, data collection, analysis and interpretation, drafting and finalisation of the article. NB carried out the literature review, data collection and critical input in drafting the manuscript.

Conflicts of interest

The authors declare no competing interest.

Acknowledgement

Appendix A. Supplementary data

Supplementary data related to this article can be found at https://doi.org/10.1016/j.ijnss.2018.04.011.

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