Annals of Clinical and Analytical Medicine

Relation between Passive Smoking and Depression among Pregnant Women Attending Primary Health Care Centers in Al-Madinah, Saudi Arabia

Abeer Ali Alarabi [(1)] *, Khadegah Salem [(2)], Osamah Ali Alarabi [(3)], Reham Daifallah Alharbi [(4)], Dareen Muneer Alraddadi (5)

(1) Senior Registrar- Preventive Medicine and Public Health, Institutional Excellence Department, King Salman Bin Abdulaziz Medical City, Saudi Arabia.
(2) Professor of Community and Preventive Medicine, Joint Program of Preventive Medicine, Saudi Arabia.
(3) Pharmacist, Clinical Pharmacy, Al-Zahra Hospital, Saudi Arabia.
(4) Consultant of Family Medicine, Public Health Department, King Salman Bin Abdulaziz Medical City, Saudi Arabia.
(5) Registrar of Preventive Medicine and Public Health, Health Awareness Department, King Salman Bin Abdulaziz Medical City, Saudi Arabia.

Received 25/12/2021; revised 16/01/2022; accepted 02/02/2022

*Corresponding author, Email: dr.research555@gmail.com

Abstract

Introduction: Depression during pregnancy is linked to several negative effects on the mother and fetus. Several factors, including passive smoking exposure were implicated in its risk. Little is known about this issue in Saudi literature. This study aimed to estimate the prevalence of depression in pregnant women and to investigate its association with passive smoking exposure during pregnancy.

Methods: A cross-sectional study was carried out in 8 primary health care centers in Madinah City, Saudi Arabia during the year 2018. The study analyzed data from 261 pregnant women attending the antenatal clinics at the studied centers. The data collection was based on self-administered questionnaire including socio-demographic and reproductive data, passive smoking exposure status, and data assessing depression symptoms. Appropriate statistical analyses were done including logistic regression analysis.

Results: The overall prevalence of depression symptoms was 54.79 (95% CI= 48.5-60.9), and it varied by the studied women's characteristics. The low prevalence of depression was found among older, highly educated, and housewife women, and among women receiving husband emotional support. Passive smoking exposure among the studied women was 26.05% (95% CI= 20.8-31.8%), and the risk of depression was increased among women reported passive smoking exposure outside home in the non-adjusted regression model (OR= 1.75; 95% CI= 1.02-2.99). This significant association, however, was disappeared in the adjusted model (OR= 1.5; 95% CI= 0.35-6.10).

Conclusions: A weak positive association between passive smoking exposure and the risk of depression was found. Young, low educated, and unemployment women as well as those reported partner violence, previous pregnancy complications, unplanned or unwanted pregnancy were at risk of depression.

Keywords: Passive smoking, Perinatal and antenatal depression, Pregnancy, Secondhand smoke, Primary health care, Saudi Arabia.

Introduction

Depression is a common worldwide disease, affecting 350 million people, and it is expected to be the second cause of debilitating illness in 2030 [1]. The burden of depression is 50% higher in females than in males affecting about 20% of women during their lifetime, whereby the likelihood increases during pregnancy [2]. It presents with sadness, decreased energy, loss of interest or pleasure, disturbed sleep or appetite, low self-worth, feelings of guilt, poor concentration and feelings of tiredness. It can cause the affected individual to suffer greatly and lead to poor function at work, school and in the family. At its worst, depression can lead to suicide [1].

Depression during pregnancy has a public health importance for the following reasons: First, the rate of depression is high during antenatal period and its prevalence during pregnancy is estimated to be between 7% and 20% in high income countries [3-6], while rates around 20% or more have been reported in low- and middle-income countries [7-10]. There are several studies addressing the prevalence of depression during pregnancy in Saudi Arabia to be 23.5% [11], 44.2 % [12], 54.5% [13] and 57.5% [14] which exceeded the levels of antenatal depression in other cultures. Second, it is the strongest risk factor for postnatal depression in both developed and developing countries [15-17]. The last reason was its associated several maternal and fetal outcomes; it can cause bleeding during pregnancy, spontaneous abortion, preeclampsia, caesarean section [18,19], premature birth [5,20,21], low birth weight [5,22], smaller head circumferences [22,23] admission to neonatal intensive care unit [NICU] [21], and developmental problems [24].

Several factors have been implicated in the risk of depression during pregnancy. Of these factors active smoking was reported to have an association with depressive symptoms in the pregnant population [25]. Although smoking non-cigarette tobacco smoking [water pipe smoking] is gaining popularity in many parts of the world, limited research has been done on the health risks of water pipe use, particularly those related to maternal and fetal health. Furthermore, the effect of secondhand tobacco smoke [SHS], known also as passive smoking, from cigarette and non-cigarette tobacco on maternal and child health was received little attention, although the link between SHS and several health outcomes such as respiratory infections, ischemic heart disease, stroke, asthma and lung cancer have long been established [26].

Worldwide, more than a third of the population is regularly exposed to the harmful effects of SHS, and its involuntary exposure is more common in female. The general authority for statistics in Saudi Arabia in 2017 reported the percentage of passive smoking exposure among Saudi women to range from 20 to 40% [27]. Up till now, the literature showed a shortage of studies addressing the relation between depression symptoms among women during pregnancy and passive smoking exposure. To the best of our knowledge, no study has investigated this relation in Saudi Arabia including Madinah City. Therefore, this study aimed to investigate the association between exposure to passive smoking [including cigarettes and water pipes] the risk of depression symptoms among women during pregnancy.

Methods

The present cross-sectional analytic study was carried out at primary health care centers [PHCCs] in Madinah city, Saudi Arabia, during 2018, to estimate the prevalence of depression among pregnant women attending antenatal clinics at the studied centers and to investigate the association of depression with passive smoking [including cigarettes and water pipes] exposure among them.

Madinah city is the second holy city and is the fourth largest region in population in Saudi Arabia which include 2,132,679 [27]. The study conducted at the antenatal clinic of PHCCs in Madinah City. The city included 40 PHCCs, divided into 4 geographical sectors [East, West, North, and South], and each sector consist of 9-11 PHCCs. These centers serve as the first line of pregnant women care in the health system. The total number of pregnant women annually attending the PHCCs in Madinah region is about 50263 pregnant women [28].

Using the Epi Info™ 7 program, the study sample size was calculated based on data of a previous study of the prevalence of depression among pregnant women [29], an accepted error of 5% and confidence limit of 95%. The calculated sample size was 275. The overall received questionnaire was 272 with a response rate of 98.9%. Because of missing data, the final analysis was done on 261 women. Multistage random sampling technique was implemented in this study. In the first stage, Madinah city was divided into four sectors: North, South, East and West. In the second stage, two PHCCs were selected from each sector by a simple random sampling technique, in total eight centers; Al-Azhari, Al-Jurf, Al-Khaldiah, Al-Hizam, Al-salam, Al-Harrah alsharqiah, Al-Aziziah and Al-Duaitha. In the third stage, 35 pregnant women were invited to participate from each center. Every other participating woman attending for antenatal care during the study period in each health center was taken into the study until the maximum sample size reaches.

The data were collected through an Arabic structured self-administered questionnaire. The questionnaire was distributed 3 days per week to pregnant women by nurses of the studied center. All nurses were trained to ensure that the research was carried out according to the protocol and operation procedures. After obtaining consent, eligible participants were asked to complete the questionnaire. The questionnaire was developed and its questions were formulated according to the data available about the studied risk factors for depression symptoms during pregnancy. The questionnaire included data about the socio-demographic characteristics of the pregnant women including their age, level of education, marital status, employment status and income. The women's reproductive history was also recorded including gestational age, number of previous pregnancies, unplanned or unwanted pregnancy, history of pregnancy complications and history of previous abortions.

Passive smoking was assessed by two questions "Did you expose to passive smoking at home? and outside home? Answer by yes to any one of those 2 questions was considered positive exposure to passive smoke. Type of passive smoking- frequency and duration of exposure to passive smoking was also recoded. These two items were used from preexisting survey of socioeconomic determinants of exposure to secondhand smoke among pregnant women in SA [29].

Depression symptoms in pregnant women were assessed by using the valid Edinburgh Postnatal Depression Scale [EPDS]. The EPDS consists of 10 items. Each item of EPDS is scored in a 4-point Likert –type scale ranging from 0 to 30. The10 items used to assess how participants have been feeling in the past 7 days. Items 1, 2, and 4 are rated on a 4-point scale, ranging from 0 [yes, most of the time] to 3 [no, not at all], with a maximum score of 9. Items 3 and 5–10 have reversed scoring, from 3 [yes, most of the time] to 0 [no, not at all]. The total score is calculated by summing all of the participant responses, with higher scores reflecting a greater level of depression symptoms. The recommended cut-off score for depression symptoms is 10 or more in Arabic version in perinatal women. Even though the scale was initially developed for postpartum depression, Cox et al. [30,31] has been validated for use during pregnancy as well. For Arabic version of EPDS, the sensitivity

and specificity of the scale were 91% and 84%, respectively. The internal reliability of the scale was 0.84 according to Cronbach's alpha [32,33].

In addition, social support-WAST-SF; Woman Abuse Screening Tool-Short form scale, which has been an effective tool for initially screening for the presence of partner violence with sensitivity of 92% and specificity of 56-68% [34]. Scores are computed on the basis of a criterion cutoff score of 1, which involves assigning a score of 1 to the most extreme positive responses for each of the 2 items [i.e., "a lot of tension" and "great difficulty"] and a score of 0 to the other response options [35]. This scale was translated to Arabic then reviewed by an expert Arabic-English linguist with back translation.

The collected data were analyzed using the SAS software package [version 9.0] [36]. Data were presented using frequency number and percent and mean ± SD as appropriate. The prevalence of passive smoking as well as the depression among the studied pregnant women was assessed and its 95% confidence interval was calculated. Comparison of passive smoking and depression among the studied women by their personal factors and pregnancy related factors was done using Chi square and Fischer Exact tests, as appropriate. P values ≤ 0.05 were used as indicators of statistical significance differences. Univariate and multivariate logistic regression analysis was done to examine the association between depression and passive smoking at and outside home among the studied women while controlling the effect of personal and husband related factors. These factors include age, educational level, income, employment, husband's emotional and financial support and relation and partner violence. Ethical approval was obtained from the Institutional Review Board, General Directorate of Health Affairs in Madinah City. Informed consent was obtained from participants who agreed to participate with assurance of confidentiality and privacy of the collected data.

Results

The prevalence of depression study among the studied 261 pregnant women was 54.79 (95% CI= 48.5-60.9). This prevalence was found to vary by women's characteristics and by passive smoking exposure. Table 1 shows the distribution of depression among the studied women by their personal factors. The low prevalence of depression was found among older women (≥ 30 years), highly educated women, low-income family level and housewife women. The depression was found to be significantly low among women receiving husband emotional support, and those reported no tension in relation with their husband. Among women reported partner violence, however, the depression was significantly as high as 64.7%.

Table 2 presents the distribution of depression among the studied women by pregnancy related factors. The depression was insignificantly high in women reported no and more than 5 previous pregnancies (49.35 and 52.6%). The prevalence was also high among women reported abortions. The current pregnancy trimester showed no significant difference in depression distribution, although the depression was high among women in the 2nd and 3rd trimester; 57% and 60%, respectively. Previous pregnancy complications and the planned and unwanted current pregnancy showed significant high rate of depression; 75%, 46%, and 59%, respectively.

Table 3 presents the distribution of depression among the studied women by passive smoking related factors. Although the prevalence of depression was slightly higher in overall passive smoking (55.9% vs. 54.4%) and passive smoking at home (55.8% vs. 54.2%), no statistically significant differences were detected. In women reported passive smoking outside home, the prevalence of depression was 61.6% among them compared to 50.6% among women not exposed, although not significant (p= 0.08). Table 4 presents the association of depression among the studied women by their passive smoking factors. The odds ratio (OR) was weakly increased among women reported overall and at home passive smoking where the risk of depression among these women was 1.20 and 1.12, respectively. Adjusting these risks by the personal and husband related factors, however, was reduced the risk by 20% and 15%, respectively. Among women reported passive smoking outside home showed high significant risk of depression with an adjusted OR of 1.75 (95% CI= 1.02-2.99).

Table (1): Distribution of depression among the studied women by their personal and husband related factors

Characteristics	Depression		P value**
	Yes (n= 143)	No (n= 118)	
Age in years			
< 30	87 (61.3)	55 (38.7)	
≥ 30	56 (47.1)	63 (52.9)	0.020*
Educational level			
Basic	18 (75.0)	6 (25.0)	
High school	58 (61.0)	37 (39.0)	
University and higher	67 (47.2)	75 (52.8)	0.010*
Family income/month			
< 5000 SR	62 (64.5)	34 (35.5)	
5000-10000 SR	62 (50.4)	61 (49.6)	
≥ 10000 SR	19 (45.3)	23 (54.7)	0.040*
Employment			
House wife	101 (58.0)	73 (42.0)	
Student	13 (56.5)	10 (43.5)	
Employee	29 (45.3)	35 (54.7)	0.210
Husband emotional support			
Yes	64 (46.0)	75 (54.0)	
No	79 (65.0)	43 (35.0)	0.002*
Husband financial support			
Yes	77 (51.0)	74 (49.0)	
No	66 (60.0)	44 (40.0)	0.150
Husband relation			
No tension	63 (42.8)	84 (57.2)	
Some tension	68 (68.7)	31 (31.3)	
A lot of tension	12 (80.0)	3 (20.0)	<0.001*
Partner violence			
Yes	75 (64.7)	41 (35.3)	
No	68 (46.9)	77 (53.1)	0.004*

*Significant p value.

**Chi square tests were used.

That risk, however, with decreased to 1.5 when adjusted by personal and husband related factors. Table 5 presents the risk of depression among the studied women by smoking patterns. The risk of depression was increased by 15% among women reported exposure to cigarette smoke at home, although not significant (OR = 1.15; 95% CI = 0.62-2.01). Among women reported shisha exposure at home, the risk was decreased by 30%, although not significant with an adjusted of 0.70 (95% CI= 0.20-2.56). The risk of depression was increased by increasing the number of smoked cigarettes at home. The risk was 1.30 (95% CI= 0.55- 3.20) among those women reported exposure to 10-20 cigarettes/day, and it was 1.50 (95% CI = 0.35-6.10) among women reported exposure to more than 20 cigarette/day at home. Compared to less exposure women (< one hour per day), the risk of depression was increased by 15% among women reported smoke exposure at home of 1-2 hours a day with an adjusted OR of 1.15 (95% CI= 0.55-2.45). The risk was increased by 65% among women exposed to smoke at home of more than 2 hours a day with an adjusted OR of 1.65 (95% CI= 0.65- 4.20).

Discussion

The prevalence of depression in the current study was 54.79 [95% CI= 48.5-60.9] according to [EPDS]. This prevalence of depression in similar Saudi studied in Riyadh and Makkah region was found to range from 23.5% to 57.5% [11-14]. Similar to the present study finding, a study conducted in Jordon and reported a prevalence of depression among the pregnant women to be 57% [37]. The reported prevalence in this and other mentioned studies was higher particularly in comparison to findings from other Arab countries, as it was 24.3% in Oman [38]. It was also higher in comparison with regional and international studies. A recent study conducted in china on 2176 pregnant women, 10.5% and 2.0% were classified as having probable and severe depressive symptoms [39]. It was 14.8% in Spain [40], 0.8% in Finland [21], and 19.3% in Japan [41]. The observed wide variations in reported prevalence rates could stem from differences in study setting, sampled population, or measurement and assessment tools. This also might be the result of high-quality antenatal care and fewer excessive stressful life events experienced by women in those countries.

The prevalence of depression in this study was varied by women's age, educational level and family income, with low prevalence was found in older women [≥ 30 years] and highly educated women. The finding regarding family income was consistent with Bawahab et al. [14] findings, where a significantly higher proportion of those with antenatal depression reported family financial problems [14]. Also, the result of a study carried out by Moawed et al [12] revealed a relationship between maternal age, level of education, and monthly income of the family and depression symptoms. All these results were in the same line with

Marcus et.al [37] who concluded that among risk factors of antenatal depression were the young age and low educational level of the studied women [42].

Factors that were closely linked with antenatal depression in this study were unintended pregnancy and lack of support from the partner. These factors were also reported in similar previous report [13]. Since the quality of partner support is closely linked to perinatal mental health, women with husbands who welcome the pregnancy and provide support [emotional and financial] help facilitate positive mental health outcomes. Unplanned pregnancy was a significant risk factor for antenatal depression in Al-Azri et al. study conducted on Omani women [38]. Another study was also indicated that couples with unplanned pregnancies experienced higher levels of marital conflict following delivery than couples with planned pregnancies [43]. A planned pregnancy ensures that the woman is more prepared for the realities of pregnancy and childbearing whereas unplanned or unintended pregnancies may increase the risk of antenatal depression because of difficulties in balancing maternal needs and other responsibilities at home or work [38].

Consistent with the study findings that depression prevalence was high among women reported partner violence and with history of pregnancy complication, systematic reviews have also showed difficult or strained marital relationships marked by violence and disharmonies have been shown to increase rates of antenatal depression [44]. Also, women with past pregnancy complications, with a history of pregnancy loss, pregnancy terminations, stillbirth, preeclampsia or gestational diabetes mellitus were also found to be more likely to experience antenatal depression [45,46]. The overall prevalence of passive smoking among pregnant women in the current study was 26.05% [95% CI= 20.8-31.8%].

There was a weak positive association between passive smoking exposure and the risk of depression, particularly among women reported passive smoking exposure outside home in the non-adjusted regression model [OR= 1.75; 95% CI= 1.02-2.99]. This significant association, however, was disappeared in the adjusted model [OR= 1.5; 95% CI= 0.35-6.10].

Table (2): Distribution of depression among the studied women by pregnancy related factors

Characteristics	*Depression*		*P value*
	Yes [n= 143]	**No** [n= 118]	
Previous pregnancies			
No	35 [49.3]	36 [50.7]	
1-5	98 [37.3]	73 [62.7]	
> 5	10 [52.6]	9 [47.4]	0.510
Previous abortion			
No	91 [51.4]	86 [48.6]	
1-5	45 [60.0]	30 [40.0]	
> 5	7 [77.8]	2 [22.2]	0.160
Previous pregnancy complications			
Yes	24 [75.0]	8 [25.0]	
No	119 [52.0]	110 [48.0]	0.010*
Currant pregnancy trimester	39 [47.5]	43 [52.5]	
1st trimester	65 [57.0]	49 [43.0]	
2nd trimester	39 [60.0]	26 [40.0]	0.260
3rd trimester			
Planned current pregnancy	18 [46.0]	21 [54.0]	
Unplanned	61 [59.0]	42 [41.0]	
Unwanted	37 [46.0]	43 [54.0]	
Unplanned and unwanted	12 [31.0]	27 [69.0]	0.040*
Planned and wanted			

Also, the risk was insignificantly increased among women reported exposed passive smoking exposure for more than 20 cigarettes [OR= 1.5; 95% CI= 0.35-6.10] and > 2 hours/day [1.65; 95% CI= 0.65-4.2]. Tan et al. [47] showed significant association of passive smokers in moderate to severe depressive symptoms but not significant for mild depressive symptoms.

The exposure by type of smoking, however, did not show an association with the risk of depression in this study. Consistent with this finding; a recent study carried out in Thailand by Kalayasiri et al. [48] found that women exposed to passive smoking were not associated with postpartum depressed women. The present study is an ante-natal clinic-based study with a high response rate, and this supports the robustness of the study findings. The study has also presented the risk of depression associated with the studied personal characteristics as well as with the main independent study variable (passive smoking exposure) in crude and adjustment values.

Table (3): Distribution of depression among the studied women by passive smoking related factors

Characteristics	Depression		P value
	Yes [n= 143]	**No** [n= 118]	
Passive smoking at home and outside home No Yes	105 [54.4] 38 [55.9]	88 [46.6] 30 [44.1]	0.830
Passive smoking at home No Yes	95 [54.2] 48 [55.8]	80 [46.8] 38 [44.2]	0.810
Passive smoking outside home No Yes	82 [50.6] 61 [61.6]	80 [49.4] 38 [38.4]	0.080

According to the best available knowledge, this study is the first to address this important issue in Saudi Arabia using a valid and reliable depression questionnaire form.

Limitations of this study should not also be overlooked. Being cross-sectional design, in which both cause and effect are measured at the same time; therefore, the causality of association could not be confirmed. Measuring passive smoke exposure without validation with blood or urine cotinine levels as a biological marker of smoking exposure may carry the potential of information bias.

Though cotinine is a sensitive method of assessing active and passive smoking, if it is not available, self-reported SHS exposure might provide a good estimation of such exposure. According to Chiu et al. [50], cotinine levels in the urine and blood of pregnant women were significantly correlated with their self-reported information provided using a questionnaire, and thus, the self-reported information in the current study could be considered to be fairly accurate.

Conclusions

In conclusion, the study suggests that younger women, low educated women, unemployment, women reported partner violence, women with previous pregnancy complications, unplanned or unwanted pregnancy as possible factors that are associated with depression during pregnancy among the studied women. The finding of non-significant association between passive smoking and depression among pregnant women in the present study doesn't diminish its importance as public health concerns. Future Saudi research should be focused on planning a large national study all over the Kingdom to gain more epidemiologic knowledge about this important issue.

Acknowledgment

The authors would like to thank all women participated in this study. They also acknowledge official staff in the entire visited primary health care centers for their help and cooperation.

Conflict of interests

The authors declared no conflict of interests

References

. Debora MacKenzie. WHO predicts death and disease in 2030 | New Scientist 2006.
Available from: https://www.newscientist.com/article/dn10665-who-predicts-death-and-disease-in-2030/ [Accessed on Feb., 12, 2018]:
2. WHO | Depression. WHO. 2016 [Accessed on Feb., 12, 2018]
Available from:http://www.who.int/mental_health/management/depression/en/

3. Lee AM, Lam SK, Marie S, Mun S. Prevalence , Course , and Risk Factors for Antenatal Anxiety and Depression. 2007;110[5]:8-10.

4. Melville JL, Gavin A, Guo YG, Fan M, Katon WJ. Depressive disorders during pregnancy: Prevalence and risk factors in a large urban sample. Obstet Gynecol. 2010;116[5]:1064-1070.

5. Eastwood J, Ogbo FA, Hendry A, Noble J, Page A, Early Years Research Group [EYRG]. The Impact of Antenatal Depression on Perinatal Outcomes in Australian Women. PLoS One [Internet]. 2017;12[1]:e0169907.

6. Ashley JM, Harper BD, Arms-Chavez CJ, LoBello SG. Estimated prevalence of antenatal depression in the US population. Arch Womens Ment Health. 2016;19[2]:395-400.

7. Golbasi Z, Kelleci M, Kisacik G, Cetin A. Prevalence and correlates of depression in pregnancy among Turkish women. Matern Child Health J. 2010;14[4]:485-491.

8. Faisal-Cury A, Menezes P, Araya R, Zugaib M. Common mental disorders during pregnancy: prevalence and associated factors among low-income women in São Paulo, Brazil. Arch Womens Ment Health 2009;12[5]:335-343.

9. Husain N, Cruickshank K, Husain M, Khan S, Tomenson B, Rahman A. Social stress and depression during pregnancy and in the postnatal period in British Pakistani mothers: a cohort study. J Affect Disord 2012;140[3]:268-276.

10. Abujilban SK, Abuidhail J, Al-Modallal H, Hamaideh S, Mosemli O. Predictors of antenatal depression among jordanian pregnant women in their third trimester. Health Care Women Int 2014;35[2]:20020-15.

11. Anizi HO Al, Shams TM, Habib FM, Saied HI. The Prevalence of Perinatal Depression in KAMC and Associated Factors. 2012;19.

12. Moawed S, Gemaey E, Al-Mutairi HA. Prevalence of Depression among Saudi Pregnant Women. IOSR J Nurs Heal Sci Ver IV 2015;4[2]:2320-1940.

13. Alotaibe H, Elsaid T, Almomen R. The prevalence and risk factors for antenatal depression among pregnant women attending clinics in riyadh , saudi arabia. ejpmr. 2016;3[12]:60-67.

14. Bawahab J, Alahmadi J, Ibrahim A. Prevalence and determinants of antenatal depression among women attending primary health care centers in Western Saudi Arabia. Saudi Med J 2017;38[12]:1237-1242.

15. Heron J, O'Connor TG, Evans J, Golding J, Glover V. The course of anxiety and depression through pregnancy and the postpartum in a community sample. J Affect Disord [Internet]. 2004;80[1]:65-73.

16. Norhayati MN, Nik Hazlina NH, Asrenee AR, Wan Emilin WMA. Magnitude and risk factors for postpartum symptoms: A literature review. J Affect Disord 2015;175:34-52.

17. Silva R, Jansen K, Souza L, Quevedo L, Barbosa L, Moraes I, et al. Sociodemographic risk factors of perinatal depression: a cohort study in the public health care system. 2012;34[2]:143-148.

18. Depression: assessing the causes | RCM. 2007 [Accessed on Feb., 12, 2018]

Available from: https://www.rcm.org.uk/news-views-and-analysis/analysis/depression-assessing-the-causes

19. Lusskin SI, Pundiak TM, Habib SM. "Perinatal depression: Hiding in plain sight": Erratum. Can J Psychiatry / La Rev Can Psychiatr 2007;52[11]:692. A

20. Grigoriadis S, VonderPorten EH, Mamisashvili L, Tomlinson G, Dennis C-L, Koren G, et al. The impact of maternal depression during pregnancy on perinatal outcomes: a systematic review and meta-analysis. J Clin Psychiatry 2013;74[4]:e321-341.

21. Räisänen S, Lehto SM, Nielsen HS, Gissler M, Kramer MR, Heinonen S. Risk factors for and perinatal outcomes of major depression during pregnancy: a population-based analysis during 2002-2010 in Finland. BMJ 2014;4[11]:e004883.

22. Brittain K, Myer L, Koen N, Koopowitz S, Donald KA, Barnett W, et al. Risk factors for antenatal depression and associations with infant birth outcomes: Results from a south african birth cohort study. Paediatr Perinat Epidemiol. 2015;29[6]:504-514.

23. Barros MC de M, Mitsuhiro SS, Chalem E, Laranjeira RR, Guinsburg R. Depression during gestation in adolescent mothers interferes with neonatal neurobehavior. Rev Bras Psiquiatr. 2013;35[4]:353359.

24. Stein A, Pearson RM, Goodman SH, Rapa E, Rahman A, McCallum M, et al. Effects of perinatal

mental disorders on the fetus and child. Lancet 2014;384[9956]:1800–19.

25. Goodwin ARD, Cheslack-postava K, Nelson DB, Smith PH, Wall MM, Hasin DS, et al. Smoking during pregnancy in the United States, 2005–2014: The role of depression. Drug Alcohol Depend 2017; Available from: http://dx.doi.org/10.1016/j.drugalcdep.2017.06.021.

26. Health CO on S and. Smoking and Tobacco Use; Fact Sheet; Health Effects of Cigarette Smoking. 2016.

27. Statistics GA of. Population Characteristics surveys. 2017.

28. Saudi Ministry of Health. Statistical Book for the year 1436 [Internet]. Saudi Ministry of Health. Riyadh, Saudi Arabia: MOH.; 2016. 28-49 p. Available from: http://www.moh.gov.sa/en/Ministry/Statistics/book/Documents/StatisticalBoo-1436.pdf%0Ahttp://www.moh.gov.sa/ministry/statistics/book/pages/default.asp

29. Alghamdi AS, Faisal Jokhadar H, Mohammed Alghamdi I, Abdullah Alsohibani S, Alqahtani OJ, Wahabi HA. Socioeconomic Determinants of Exposure to Secondhand Smoke Among Pregnant Women. Int J Women's Heal Reprod Sci 2016;4[2]:59-63.

30. Bergink V, Kooistra L, Lambregtse-van den Berg MP, Wijnen H, Bunevicius R, van Baar A, et al. Validation of the Edinburgh Depression Scale during pregnancy. J Psychosom Res 2011;70[4]:385-389.

31. Pajulo M, Savonlahti E, Sourander A, Helenius H, Piha J. Antenatal depression , substance dependency and social support. 2001;65:9-17.

32. Ghubash R, Abou-Saleh MT, Daradkeh TK. The validity of the Arabic Edinburgh Postnatal Depression Scale. Soc Psychiatry Psychiatr Epidemiol 1997;32[8]:474–6.

33. Department of Health Government of Western Australia. The Edinburgh Postnatal Depression Scale [EPDS], Translated into languages other than English. Child Fam Emot well-being. 2006;1-271.

34. WAST Screen for Intimate Partner Violence [Accessed on Jan., 28, 2018]

https://fpnotebook.com/prevent/Exam/WstScrnFrIntmtPrtnrVlnc.htm

35. Brown J, Lent B, Schmidt G, Sas G. Application of the Woman Abuse Screening Tool [WAST] and WAST-short in the family practice setting. J Fam Pract. 2000;49[10]:896-903.

36. SAS Institute Inc. Proprietary Software Release 9.0. for Windows. Cary, NC, 1999.

37. Al-Azri M, Al-Lawati I, Al-Kamyani R, Al-Kiyumi M, Al-Rawahi A, Davidson R, et al. Prevalence and risk factors of antenatal depression among Omani women in a primary care setting: Cross-sectional study. Sultan Qaboos Univ Med J. 2016;16[1]:e35-41.

38. Takegata M, Ohashi Y, Lazarus A, Kitamura T. Cross-National Differences in Psychosocial Factors of Perinatal Depression : A Systematic Review of India. :1–21.

39. Huang J, Wen G, Yang W, Yao Z. The association between second-hand smoke exposure and depressive symptoms among pregnant women. Psychiatry Res 2017;256:469–74.

40. de la Fe Rodríguez-Muñoz M, Le H-N, de la Cruz IV, Crespo MEO, Méndez NI. Feasibility of screening and prevalence of prenatal depression in an obstetric setting in Spain. Eur J Obstet Gynecol Reprod Biol 2017;215:101-105.

41. Miyake Y, Tanaka K, Okubo H, Sasaki S, Furukawa S, Arakawa M. Reply to Letter to the Editor to "Soy isoflavone intake and prevalence of depressive symptoms during pregnancy in Japan: baseline data from the Kyushu Okinawa Maternal and Child Health Study." Eur J Nutr 2017;56[4]:1795.

42. Lancaster CA, Gold KJ, Flynn HA, Yoo H, Marcus SM, Davis MM. Risk factors for depressive symptoms during pregnancy: a systematic review. Am J Obs Gynecol. 2010;202[1]:5-14.

43. Bouchard G, Boudreau J, Hébert R. Transition to parenthood and conjugal life: Comparisons between planned and unplanned pregnancies. J Fam Issues 2006;27[11]:1512-1531.

44. Biaggi A, Conroy S, Pawlby S, Pariante CM. Identifying the women at risk of antenatal anxiety and depression: A systematic review. J Affect Disord. 2016;191:62–77.

45. Hu R, Li Y, Zhang Z, Yan W. Antenatal depressive symptoms and the risk of preeclampsia or operative deliveries: a meta-analysis. PLoS One 2015;10[3]:e0119018.

46. Blackmore ER, Côté-Arsenault D, Tang W, Glover V, Evans J, Golding J, et al. Previous prenatal

loss as a predictor of perinatal depression and anxiety. Br J Psychiatry 2011;198[5]:373-378.

47. Tan S, Courtney LP, El-Mohandes AAE, Gantz MG, Blake SM, Thornberry J, et al. Relationships Between Self-Reported Smoking, Household Environmental Tobacco Smoke Exposure and Depressive Symptoms in a Pregnant Minority Population. Matern Child Health J. 2011;1–10.

48. Kalayasiri R, Supcharoen W, Ouiyanukoon P. Association between secondhand smoke exposure and quality of life in pregnant women and postpartum women and the consequences on the newborns. Qual Life Res [Internet]. 2018;0[0]:0. Available from: http://dx.doi.org/10.1007/s11136-018-1783-x

49. Lam E, Kvaavik E, Hamer M, Batty GD. Association of secondhand smoke exposure with mental health in men and women : Cross-sectional and prospective analyses using the UK Health and Lifestyle Survey. Eur Psychiatry 2012;28[5]:276–81.

50. Chiu H, Wu HI, Kuo H. The relationship between self-reported tobacco exposure and cotinines in urine and blood for pregnant women. 2008;6[2000]:4-9..

Table (4): Association of depression with the studied passive smoking factors among the studied women

Passive smoking	Unadjusted OR [95% CI]	Adjusted OR [95%CI] *
Passive smoking at and outside home		
No	1.00 [Ref.]	1.00 [Ref.]
Yes	1.20 [0.68-2.15]	0.80 [0.45-1.50]
Passive smoking at home		
No	1.00 [Ref.]	1.00 [Ref.]
Yes	1.12 [0.64-1.93]	0.85 [0.50-1.50]
Passive smoking outside home		
No	1.00 [Ref.]	1.00 [Ref.]
Yes	1.75 [1.02-2.99] **	1.50 [0.90-12.60]

*Adjusted by personal factors and husband emotional and financial support and relation
**Significant

Table (5): Risk of depression among the studied women according to smoking patterns

Number of cigarettes	Depression	No depression	OR*	95% CI
< 10 cigarette per day	27	24	1.00	Ref.
10-20 cigarette per day	15	10	1.30	0.55-3.20
> 20 cigarette per day	6	4	1.50	0.35-6.10
Smoke type				
Cigarette	34	26	1.15	0.62-2.01
Shisha	4	4	0.70	0.20-2.56
Both	19	8	1.00	Ref.
Duration of exposure				
< one hour/day	19	18	1.00	Ref.
1-2 hours/day	16	12	1.15	0.55-2.45
> 2 hours/day	13	8	1.65	0.65-4.20

*Adjusted by personal factors, pregnancy factors and husband emotional and financial support, relation and violence