ORIGINAL ARTICLE

Association of stress with anxiety and depression during pregnancy

Fouzia Gul,[1] Akhtar Sherin,[2] Mussarrat Jabeen,[3] Shajaat Ali Khan[4]

Abstract

Objective: To find out the association of stress with anxiety and depression during pregnancy and to identify common stressors in women.

Methods: This cross-sectional study was conducted at Divisional Headquarters Teaching Hospital, Kohat, Pakistan, from February 2011 to October 2012, and comprised pregnant women. Convenient sampling technique was used. The participants were administered Urdu-translated version of A-Z perceived stress scale and Aga Khan University anxiety and depression scale. Women with a score of >19 on the Aga Khan University scale were labelled as anxious and depressed. Data was collected on a pre-designed proforma. SPSS 17 was used for data analysis.

Results: There were 500 participants with an overall mean age of 28.3±6.3 years. The overall mean stress score on A-Z perceived stress scale was 12.93±5.19 and mean Aga Khan University anxiety and depression scale score was 28.58±13.82. Mean A-Z score was 14.18±4.881 in women with anxiety-depression and 9.75±4.58 in non-depressed women ($p<0.001$). Mean Aga Khan score in women with >10 stressors was significantly higher (32.18±13.79) compared to women with <10 stressors (19.87±9.30) ($p<0.01$). A-Z stressors score had significant positive correlation with the Aga Khan scale ($p<0.001$]. The most common stressors were concern about husband's worries and concern about feeling unwell during pregnancy, present in 433(86.6%) patients each, followed by concern about increase in the prices of everyday goods which was present in 364(72.8%) patients.

Conclusion: The magnitude of stress was significantly associated with high anxiety and depression during pregnancy.

Keywords: Psychological stress, Anxiety, depression, Pregnancy, A-Z stress scale, Aga Khan University anxiety and depression scale. (JPMA 67: 1803; 2017)

Introduction

Women are more likely to get anxiety, depression and somatic complaints as compared to men.[1] Pregnancy is considered as a stressful period that may provoke mental illness.[2] The perinatal period is particularly vulnerable to common psychiatric disorders.[1,3] Over the years, maternity blues, postnatal depression and puerperal psychosis were considered as important states of perinatal psychiatry.[4] According to World Health Organisation's (WHO) estimates, in developed countries 1 in 10 women and in developing countries 1 in 3 to 1 in 5 women have significant mental health problems during pregnancy and in postnatal period.[5] A systematic review on common perinatal mental disorders in low-and lower-middle-income countries showed a community-based prevalence of 19.7% (95% confidence interval [CI]: 19.2-20.1) in antenatal and 39.4% (95% CI: 38.6-40.3) in postnatal women.[3] The common psychiatric disorders during pregnancy are anxiety, depression and other mood disorders.[6]

[1,3]Department of Obstetrics and Gynaecology, [2]Department of Medicine, [4]Department of Psychiatry, Khyber Medical University (KMU), Institute of Medical Sciences (KMU-IMS), Kohat, KPK, Pakistan.

Correspondence: Fouzia Gul. Email: fgmeena@gmail.com

The prevalence of depression in pregnancy is 7.4% during the first trimester, 12.8% in the second trimester and 12.0% in the third trimester.[7] In Pakistan, anxiety and depression in pregnant women has been reported from 18% to 39%.[8,9]

Severe anxiety and depression during pregnancy is associated with adverse obstetric, foetal and neonatal outcome.[10] So far, studies have addressed the magnitude of anxiety and depression in pregnancy and the impact of these disorders on mother and child. However, very little has been studied about the underlying risk factors like maternal stress, a precursor of perinatal anxiety and depression. Women with stress have a higher prevalence of antenatal and postnatal anxiety and depression.[8] Studies have shown an association between antenatal stress and preterm delivery or low birth weight, or both.[11] Vesga-Lopez O. et al.[12] have showed that age, marital status, health status, stressful life events and history of traumatic experiences are all significantly associated with increased risk of psychopathology in pregnant and postpartum women. Mulder EJ et al. have shown that specific stress reduction in anxious pregnant women can reduce various maternal complications and unfavourable development of the unborn child.[13] Local studies from Pakistan have shown that stress factors may range from a

poor relationship with the husband to various social issues in the environment.[14,15]

The current study was planned to identify various stressors among the pregnant women in our set-up and to find out the association of stress with anxiety and depression in antenatal women.

Subjects and Methods

This cross-sectional study was conducted at the antenatal clinic of Divisional Headquarters Teaching Hospital, Kohat, Pakistan, from February 2011 to October 2012, and comprised pregnant women.

With a 40% assumed prevalence of depression and stress during pregnancy,[9] a sample size of 485 was to achieve 87% power to detect a 7% difference in prevalence using a two-sided Z test at 5% significance level. The number was rounded up to get a sample of 500 women.

The women were selected regardless of the period of gestation using convenient sampling technique. They were administered the Urdu-translated version of A-Z Perceived Stress Scale (AZSS),[16] and Aga Khan University Anxiety and Depression Scale (AKUADS).[17]

The AZSS scale was particularly developed for local use and based on stressors related to the social context of pregnant women residing in Pakistan. A modified version of AZSS was used on antenatal women in India as well.[18] AZSS can be administered by interviewers who have 10th grade schooling and can be utilised for all pregnant women who can clearly understand Urdu. A-Z Perceived Stress Scale comprises of stress-provoking factors like daily hassles, pregnancy-related hassles and major life events. The questions are content-specific. This score comprises of 30 stressors items and each item would be answered in Yes or No. Every 'yes' would be counted as 1 and 'no' as 0. The total would be the score for stress on the A-Z Stress Scale, representing the stress level for an individual woman. The score is dealt with on a continuum basis, with higher scores reflecting more stress.[16]

The AKUADS scale is a widely used indigenous instrument comprising 25 items, 13 psychological and 12 somatic. It was developed in Urdu language for screening of patients with anxiety and depression in Pakistan.[17] It has been validated and a cut-off score of 19 showed a sensitivity of 74% and negative predictive value of 88% for anxiety and depression.[19]

After taking informed consent, both these scores were administered to antennal women and their responses were recorded. A cut-off value of 19 was taken on AKUADS to identify patients with anxiety and depression and women with a score >19 were labelled as anxious and depressed.[19] For AZSS, there were 30 stressor items that represented the stress level for an individual woman and women with higher scores were taken as having more stress.[16] For analysis, women were categorised on AZSS score of 1-9, 10-18 and 19-30. Data was collected on a predesigned proforma. SPSS 17 was used for data analysis.

Ethical approval was taken from the institutional review board for bio-ethics (IRBB) of Khyber Medical University Institute of Medical Sciences, Kohat, Pakistan.

Results

There were 500 participants in the study. The overall mean age was 28.3±6.3 years [95% CI: 27.7, 28.8]. Age difference between those with and without anxiety/depression was not significant (p = 0.495). Moreover, 359(71.8%) women were anxious and depressed while 141(28.2%) women were not

Table-1: Frequency of top ten commonest stressors of a-z stress scale among 500 antenatal women.

Stressor	Anxious & Depressed* (n=359)	Not Anxious or depressed* (n=141)	Total (n=500)
(No.9) concern about husbands worries	323 (74.6%)	110 (25.4%)	433 (86.6%)
(No.23) concern about feeling unwell during pregnancy	323 (74.6%)	110 (25.4%)	433 (86.6%)
(No.16) concern about increase in the prices of every day goods	278 (76.4%)	86 (23.6%)	364 (72.8%)
(No.24) concern about waking up late due to pregnancy	270 (81.3%)	62 (18.7%)	332 (66.4%)
(No.21) concern about delay in household work due to pregnancy	258 (79.6%)	66 (20.4%)	324 (64.8%)
(No.8) concern about household responsibilities	246 (82.8%)	51 (17.2%)	297 (59.4%)
(No.12) concern about parents illness	217 (76.1%)	(23.9%)	285 (57%)
(No.7) concern about owing money	223 (81.1%)	52 (18.9%)	275 (55%)
(No.18) concern about children's illness	218 (79.3%)	57 (20.7%)	275 (55%)
(No.11) Concern about verbal abuse by husband	215 (78.8%)	58 (21.2%)	273 (54.6%)

*based on AKUADS cut off value of 19

AKUADS: Aga Khan University Anxiety and Depression Scale.

Table-2: Comparison of stress level with presence of Anxiety and Depression.

		Anxious & Depressed* (n=359)	Not-Anxious or Depressed* (n=141)	Total (n=500)	P value (Chi Square)
Stress Level#	1-10	74 (20.6%)	72 (51.1%)	146 (29.2%)	<0.001
	11-20	209 (58.2%)	61 (43.3%)	270 (54.0%)	
	21-30	76 (21.2%)	8 (5.7%)	84 (16.8%)	

#based on A-Z stress scale;
*based on AKU Anxiety and Depression Scale cut off value of 19
AKU: Aga Khan University.

anxious/depressed based on the AKUADS score.

Overall mean stress score on AZSS was 12.93±5.19 and mean AKUADS score was 28.58±13.82. Mean AZSS score was 14.18±4.881 in women with anxiety-depression and 9.75±4.58 in women without anxiety-depression, with a very strong effect size (p<0.001). Mean AKUADS score in women with >10 stressors was significantly higher (32.18±13.79) compared to women with <10 stressors (19.87±9.30) (p<0.01).

The most common stressors were stressor-9 (concern about husbands worries) and stressor-23 (concern about feeling unwell during pregnancy) which were each present in 433(86.6%) participants (Table-1).

A-Z stressors score showed a moderately strong positive correlation with AKUADS score both using Pearson and Spearman correlation coefficients (r and rS(500)=0.54, p<0.001) (Figure-1).

Cross-tabulation analyses showed significant association of 3-tiered stress classification (stress scores 1 to 10, 11 to 20, and above 20) with the presence of anxiety and depression (p<0.001) (Table-2).

Women married to their cousins were significantly more stressed, albeit with a small effect size (p=0.019), but not more depressed and anxious than women married among non-relatives (p=0.593). On the contrary, women having exchange marriage situations were significantly more depressed, with medium effect size (p=0.014), but not more stressed compared with those married outside of an exchange bond (p=0.085).

Having more alive male children compared to females had no significant effect on the outcome of being stressed or depressed and anxious (p= 0.765 and p= 0.526). Although women with alive children were significantly more stressed (p= 0.002), but not more depressed and anxious compared to women without living kids (p= 0.330), both A-Z Stress Score (p= 0.001) and AKUADS score (p= 0.005) were significantly higher among women with more than 3 children.

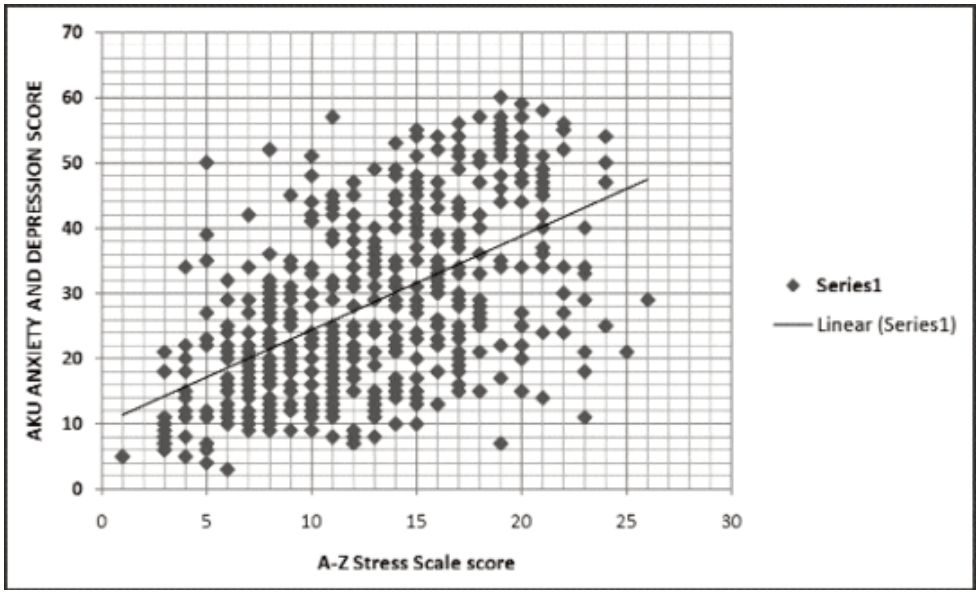

Figure-1: Scatter plot of Aga Khan University (AKU) anxiety and depression score and A-Z Stress Scale score.

Difference in the A-Z stress score among the three trimesters was not significant while that in AKUADS score significantly different, with a small effect size (p= 0.003). Scheffe's post-hoc test was significant for only one pairwise comparison, between the second and the third trimesters (p <0.005).

Analysis of variance (ANOVA) showed significantly different AZSS Score between occupations, with small effect size (p = 0.019), Scheffe's post-hoc test being significant for only one pairwise comparison,

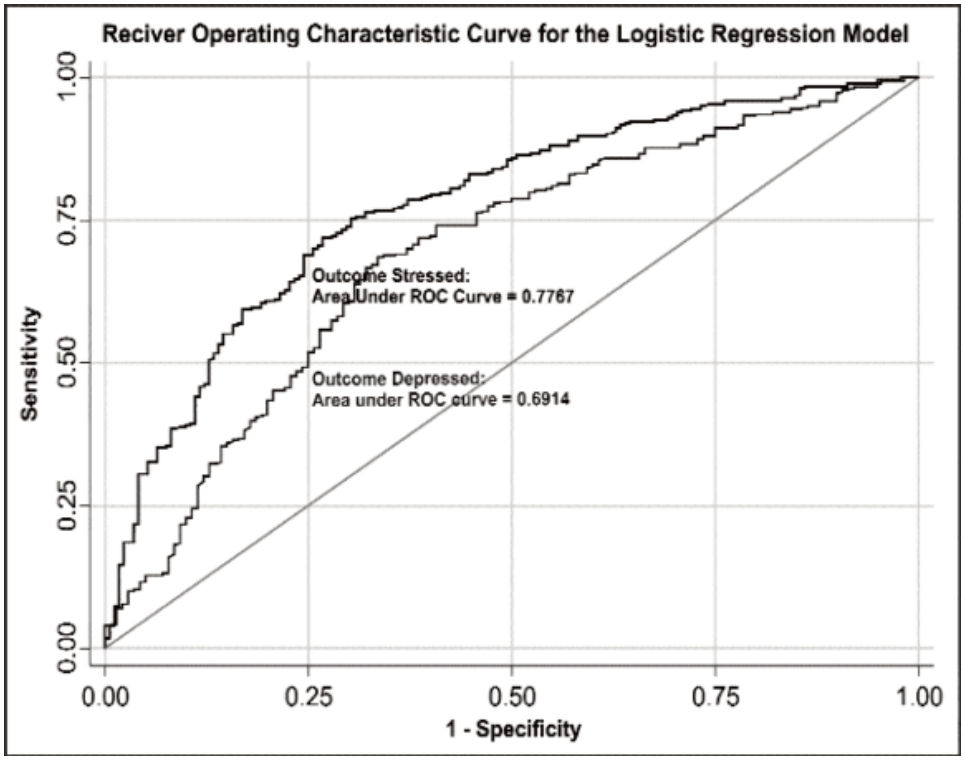

Figure-2: Receiver Operating Characteristics for the Logistic regression Model.

between women with profession and housewives (p=0.031). Differences in stress levels between women working on daily wages and those with a profession or housewives were not significant (p=0.957 and p=0.916).

Both AZSS score (p <0.001) and AKUADS scores (p<0.001) differed significantly between the two socio-economic groups, with those having incomes in excess of Rs10,000 per month being less stressed and depressed-anxious compared to those with income less than Rs10,000 per month.

Empirical cut-point estimation of stress score for positive anxiety-depression using Liu method showed a sensitivity of 0.67 and specificity 0.71 at the empirical optimal cut-point of stress score of11, with the area under receiver operating characteristic (ROC) curve at cut-point of 0.69.

Logistic regression model for the binary outcome of 'being stressed' compared with the outcome of 'being depressed' showed a larger likelihood ratio (p<0.001), pseudo r-squared value (0.2 vs. 0.09), and area under the ROC curve (78.22 vs. 69.22) (Figure-2).

For the outcome of 'being stressed', family income above Rs10,000 per month, and the husband's status being skilled (driver, tailor, shopkeeper, etc.) showed a protective effect against stress (odds ratios [OR]0.56 and 0.72; p=0.028 and p=0.002) while being 'anxious-depressed' had a positive association with stress (OR 3.89, p<0.001).

For the binary outcome of 'being depressed', the logistic regression model detected only one significant predictor, i.e. the status of 'being stressed' (OR 5.76, p<0.001).

The overall goodness of fit assumption held for both the models (2 (376) = 398.8 and (2 (372) = 357.4, p=0.200 and p=0.698).

Discussion

Our study showed high frequency (71.8%) of anxiety and depression among pregnant women. Overall, 70.8% of antenatal women had perceived at least 11 or more stressors during pregnancy. In this study, 79.4% of anxious/depressed women had more than 10 stressors. Mean AZSS score in anxious/depressed women was significantly higher than in non-anxious/depressed women. Mean AKUADS score in women with >10 stressors was significantly higher (32.18±13.79) as compared to women with <10 stressors (19.87± 9.30). Frequency of depression was 50.7%, 77.4% and 90.5% in women with AZSS score of 1-10, 11-20 and 21-30, respectively.

AZSS score is significantly associated with AKUADS score (r= 0.542), hence increasing in level of stress has moderately strong association with an increase in the level of anxiety and depression. The most common stressors were concern about husband's worries and stressor and concern about feeling unwell during pregnancy.

In this study, the frequency of anxiety and depression among pregnant women is much higher than 19.7% reported in low-and lower-middle-income countries[3] and 18-39% reported from Pakistan.[8,9] This unexpected variation could be partially explained by the fact that the catchment area of our hospital includes the tribal and settled area of Khyber Pakhtunkhwa with high burden of internally displaced persons. This area has been adversely affected by worst terrorism which can significantly affect

the mental health of the people.[20,21] Another explanation could be the use of self-reported symptom measures instead of diagnostic assessment or psychiatric interview resulting in higher prevalence of anxiety and depression in pregnancy.[7] Similarly, many somatic symptoms of normal pregnancy like dyspepsia, bodyaches, sleep and appetite change can be wrongly attributed to psychiatric manifestations in pregnancy, leading to false positive results.[22]

In this study, stress level in antenatal women was very high and about 70.8% of women had perceived more than 10 stressors during pregnancy. Very limited research has been conducted on stress level during pregnancy in Pakistan. Khan M.N. et al.[21] reported 38.1% prevalence of psychological distress in pregnant women in Swat. This study, however, used a different instrument, i.e. WHO self-reporting questionnaire (SRQ-20), for measuring psychological distress which has some problems in its content validity for neurotic items.[23] In India, stress was reported in more than half of the antenatal women by Maria P. et al.[18]

A positive correlation was observed for A-Z stressors score with AKUADS anxiety and depression score; increase in stress level was associated with rise in the level of anxiety and depression in antenatal women. Lancaster et al. in their systematic review showed a significant association of life stress with depressive symptoms during pregnancy.[24] Common stressors perceived by anxious and depressed women were about husband's worries, state of well-being during pregnancy and increase in the prices of everyday goods. A systematic review from Pakistan showed that social problems, low family income, lack of autonomy, age, women living in unitary/joint households, longer duration of marriage, marital disputes, relational problems with in-laws, verbal abuse by in-laws, too many children and absence of confiding relationship with husband are generally associated with risk of anxiety and depressive disorders in women.[25]

This study has important clinical implication, as it showed strong positive correlation of common, country-specific stressors with antenatal anxiety and depression. Maternal psychological health during pregnancy has strong implication on obstetric, foetal and neonatal outcome.[10,11] Identifying and addressing these stressors in time may help to reduce the incidence of anxiety and depression in pregnancy and hence help in preventing the adverse obstetric, foetal and neonatal outcome.

Although this study is unique to address the frequency of local stressors and their association with anxiety and depression in Pakistani antenatal women, there are certain limitations to this study. This was a hospital-based study with bias of over-representation of women having facility of antenatal care and not representing the women in community. The use of self-reported symptom measures as sole diagnostic tool without psychiatric interview could be a reason for higher prevalence of anxiety and depression in pregnancy in this study.

Conclusion

Level of stress and frequency of anxiety and depression was alarmingly high in our study population. The most common stressors were concerns of women about husband's worries, feeling unwell during pregnancy and increase in the prices of everyday goods. Increase in the number of stressors is significantly associated with increase in the level of anxiety and depression during pregnancy. Further studies are needed to establish the cause and effect between stress and anxiety/depression in antenatal women. Moreover, community-based studies are needed for the study of local stressors in antenatal women with emphasis on the use of psychiatric interview as additional diagnostic tool for estimating the true prevalence of anxiety and depression in antenatal women.

Acknowledgment: We are thankful to Dr Syed Basahart Hussain Gillani for his valuable help in analysis and interpretation of data.

Disclaimer: The manuscript was presented at Royal College of Obstetricians and Gynaecologists (RCOG) World Congress 2014 as poster in Hyderabad, India, on March 28, 2014.

Conflict of Interest: None.

Source of Funding: None.

References

1. WHO. Gender and women's mental health. [Cited 2015 August 5]. Available from: URL: http://www.who.int/mental_health/prevention/genderwomen/en/.
2. Cunningham FG, Leveno KJ, Bloo SL, Hauth JC, Gilstrap L, Wenstrom KD. William's Obstetrics. New York, NY: McGraw-Hill Medical Publishing Division; 2005.
3. Jane F, Cabral de MM, Vikram P, Atif R, Thach T, Sara H, et al. Prevalence and determinants of common perinatal mental disorders in women in low- and lower-middle-income countries: a systematic review. Bull World Health Organ 2012; 90: 139-49.
4. Munk-Olsen T, Laursen TM, Pedersen CB, Mors O, Mortensen PB. New parents and mental disorders: a population-based register study. JAMA 2006; 296: 2582-9.
5. Millennium Development Goal 5 - improving maternal health: Improving Maternal Mental Health. Department of Mental Health and Substance Abuse. World Health Organization, 2008.
6. Fairbrother N, Young AH, Janssen P, Antony MM, Tucker E. Depression and anxiety during the perinatal period. BMC Psychiatry 2015; 15: 206.

7. Bennett HA, Einarson A, Taddio A, Koren G, Einarson TR. Prevalence of depression during pregnancy: Systematic review. Obstet Gynecol 2004; 103: 698-709.
8. Rahman A, Iqbal Z, Harrington R. Life events, social support and depression in childbirth: perspectives from a rural community in the developing world. Psychol Med 2003; 33: 1161-7.
9. Hamid F, Asif A, Haider II. Study of anxiety and depression during pregnancy. Pak J Med Sci 2008; 24: 861-4.
10. Alder J, Fink N, Bitzer J, Hösli I, Holzgreve W. Depression and anxiety during pregnancy: A risk factor for obstetric, fetal and neonatal outcome? A critical review of the literature. J Matern Fetal Neonatal Med 2007; 20: 189-209.
11. Dayan J, Creveuil C, Herlicoviez M, Herbel C, Baranger E, Savoye C, et al. Role of anxiety and depression in the onset of spontaneous preterm labour. Am J Epidemiol 2002; 155: 293-301.
12. Vesga-Lopez O, Blanco C, Keyes K, Olfson M, Grant BF, Hasin DS. Psychiatric Disorders in Pregnant and Postpartum Women in the United States. Arch Gen Psychiatry 2008; 65: 805-5.
13. Mulder EJ, Robles de Medina PG, Huizink AC, Van den Bergh BR, Buitelaar JK, Visser GH. Prenatal maternal stress: Effects on pregnancy and the (unborn) child. Early Hum Dev 2002; 70: 3-14.
14. Husain N, Creed F, Tomenson B. Depression and social stress in Pakistan. Psychol Med 2000; 30: 395-402.
15. Rabbani F, Raja FF. The minds of mothers: maternal mental health in an urban squatter settlement of Karachi. J Pak Med Assoc 2000; 50: 306-12.
16. Kazi A, Fatmi Z, Hatcher J, Niaz U, Aziz A. Development of a stress scale for pregnant women in the South Asian context: the A-Z Stress Scale. East Mediterr Health J 2009; 15: 353-61.
17. Ali BS, Reza H, Khan MM, Jehan I. Development of an indigenous screening instrument in Pakistan: the Aga Khan University Anxiety and Depression Scale. J Pak Med Assoc 1998; 48: 261-5.
18. Maria P, Murlidhar VP, Asha K, Anice G, Judith AN, Baby SN, et al. Stress among Antenatal Women in India. Int J Nurs Care 2014; 2: 63-7.
19. Ali BS. Validation of an indigenous screening questionnaire for anxiety and depression in an urban squatter settlement of Karachi. J Coll Physicians Surg Pak 1998; 8: 207-11
20. Khan AM, Sarhandi I, Hussain J, Iqbal S, Taj R. Impact of Terrorism on Mental Health. Ann Pak InstMed Sci 2012; 8: 46-9.
21. Khan MN, Chiumento A, Dherani M, Bristow K, Sikander S, Rahman A. Psychological distress and its associations with past events in pregnant women affected by armed conflict in Swat, Pakistan: a cross sectional study. Confl Health 2015; 9:37.
22. Meades R, Ayers S. Anxiety measures validated in perinatal populations: a systematic review. J Affect Disord 2011; 133:1-15.
23. World Health Organization. User guide to the Self-reporting questionnaire. WHO, Geneva, 1994. [Online] [Cited 2015 May 16]. Available from: http://whqlibdoc.who.int/hq/1994/WHO_MNH_PSF_94.8.pdf
24. Lancaster CA, Gold KJ, Flynn HA, Yoo H, Marcus SM, Davis MM. Risk factors for depressive symptoms during pregnancy: A systematic review. Am J Obstet Gynecol 2010; 202: 5-14.
25. Mirza I, Jenkins R. Risk factors, prevalence, and treatment of anxiety and depressive disorders in Pakistan: systematic review. Br Med J 2004; 328: 794.