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PREVALENCE OF ANXIETY, DEPRESSION AND
ASSOCIATED FACTORS AMONG PREGNANT WOMEN
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ABSTRACT

Background: Few studies have examined the relationship between antenatal depression, anxiety and domestic violence in pregnant women in developing countries, despite the World Health Organization's estimates that depressive disorders will be the second leading cause of the global disease burden by 2020. There is a paucity of research on mood disorders, their predictors and sequelae among pregnant women in Pakistan.

Aims: To determine the prevalence of anxiety and depression and evaluate associated factors, including domestic violence, among pregnant women in an urban community in Pakistan.

Methods: All pregnant women living in identified areas of Hyderabad, Pakistan were screened by government health workers for an observational study on maternal characteristics and pregnancy outcomes. Of these, 1,368 (76%) of eligible women were administered the validated Aga Khan University Anxiety Depression Scale at 20–26 weeks of gestation.

Results: Eighteen per cent of the women were anxious and/or depressed. Psychological distress was associated with husband unemployment ($p = 0.032$), lower household wealth ($p = 0.027$), having 10 or more years of formal education ($p = 0.002$), a first ($p = 0.002$) and an unwanted pregnancy ($p < 0.001$). The strongest factors associated with depression/anxiety were physical/sexual and verbal abuse; 42% of women who were physically and/or sexually abused and 23% of those with verbal abuse had depression/anxiety compared to 8% of those who were not abused.

Conclusions: Anxiety and depression commonly occur during pregnancy in Pakistani women; rates are highest in women experiencing sexual/physical as well as verbal abuse, but they are also increased among women with unemployed spouses and those with lower household wealth. These results suggest that developing a screening and treatment programme for domestic violence and depression/anxiety during pregnancy may improve the mental health status of pregnant Pakistani women.

Key words: pregnancy, depression, anxiety, Pakistan, measurement

INTRODUCTION

Historically, pregnancy has been viewed as a period of well-being that allowed women to feel biologically 'complete' and that provided 'protection' for some women against psychiatric disorders (Alshuler *et al.*, 1998; Dennis *et al.*, 2007). Although for many women, pregnancy is a time for enjoyment and fulfilment, evidence indicates that there is an increase in psychiatric morbidity, and particularly depression, during pregnancy for a proportion of women (Carter *et al.*, 2005; Fatoye *et al.*, 2004). Depression during the perinatal period can have devastating consequences, not only for the women experiencing it, but also for the women's children and family (Alder *et al.*, 2007; Burke, 2003). Antenatal depression and anxiety can also have a negative impact on the developing fetus (Allister *et al.*, 2001; Dieter *et al.*, 2001) and have been associated with premature births and lower birth weights (Field *et al.*, 2004; Rondo *et al.*, 2003).

Few studies have examined antenatal depression and anxiety among pregnant women in developing countries, despite World Health Organization (WHO) estimates that depressive disorders will be the second leading cause of global disease burden by 2020 (WHO, 2002). Rates of depressive illness in women of reproductive age are believed to be at least twice those observed in men (Ali & Amanullah, 2000; Mumford *et al.*, 1997; Murray & Lopez, 1996).

Using data from developed countries, Bennett and colleagues (2004) conducted a meta-analysis of 21 studies reporting rates of depression during pregnancy. Based on 19,284 pregnant women, the prevalence of depression was estimated at 7.4%, 12.8% and 12.0% during the first, second and third trimesters of pregnancy, respectively. Studies in developed countries suggest a link between domestic violence and antenatal depression and anxiety. A clinic-based study of Japanese pregnant women found that 5.4% experienced domestic violence during pregnancy and these women were significantly more likely to experience anxiety and depression (Kataoka *et al.*, 2005). Studies from Australia, the USA and Sweden have also found that domestic violence is associated with increased depression and anxiety (Austin *et al.*, 2005; Hathaway *et al.*, 2000).

More research is needed to examine the prevalence of and risk factors for antenatal depression and anxiety among women in developing countries such as Pakistan. In general, rates of depression among Pakistani women may be as high as 66% (Hussain *et al.*, 2000). Married women in Pakistan appear to be at greater risk for depression than single women (Fikree & Bhatti, 1999; Khan & Reza, 1998). Kazi and colleagues (2006) reported that increasing age, lower educational levels, issues with a husband (abuse, extramarital affairs, not giving time to family and putting restrictions on the women) and in-laws (control, interference), heavy household work and pregnancy symptoms were significantly associated with total depression scores.

Depression and anxiety during pregnancy have not been systematically reported in Pakistan and are not commonly considered to be an indicator of women's health in this geographic region. Most prior studies of mental health during pregnancy in Pakistan have been hospital-based (Niaz, 2004) and therefore may have excluded women who did not obtain prenatal care in a clinical setting. The aims of the current study were to estimate the prevalence of and identify precursors for antenatal anxiety and depression among women participating in a community-based study in Hyderabad, Pakistan. Through the use of outreach health workers, we were able to screen women who received prenatal care in their homes. In addition, we examined the role of an abusive environment and the form of abuse (i.e. verbal vs. physical abuse) on a women's psychological distress during pregnancy because links could inform healthcare policy by increasing screening and providing interventions as a part of antenatal care.

METHODS

Study procedures

This research was conducted as a part of a prospective observational study of pregnant women in Hyderabad, Pakistan, an Urdu-speaking city of about one million inhabitants. The city is served by outreach health workers of the national programme for Family Planning and Primary Health Care Centres. The parent study examined a range of socio-demographic, psychosocial, nutritional and clinical factors associated with infectious morbidity and pregnancy outcomes among mothers and infants. The study was conducted by researchers from the Aga Khan University (AKU), Karachi, Pakistan together with US colleagues from the University of Alabama, Birmingham, Research Triangle Institute (RTI), and the National Institute of Child Health and Human Development (NICHD). The team is part of the NICHD Global Network for Women's and Children's Health Research, a multi-country research network.

Outreach workers, referred to as lady health workers (LHWs), were hired, trained and certified to conduct demographic, depression/anxiety and domestic violence interviews and to follow participants for periodic clinical evaluations. To protect confidentiality, the interviews were conducted without family members present. The structured interview was prepared in English, translated into Urdu and back-translated into English. The interview consists of open and close-ended questions with alternative responses (available upon request). A question-by-question manual of operations was prepared and interviewers trained and certified, to ensure that all the interviewers would interpret the items in a similar manner.

The study was approved by the Ethics Review Committee at AKU and the Institutional Review Boards of the UAB and RTI. Each subject provided informed consent. WHO ethical and safety guidelines for research in domestic violence were observed (WHO, 2001). To ensure that study participants received appropriate treatment for depression if indicated, we developed a referral mechanism for therapeutic counselling, with utilization of the services at individual discretion.

Participants

LHWs in four selected units of Hyderabad screened 2,205 potentially eligible participants during routine prenatal home visits and 1,659 came to the research clinic. Of these, 1,376 women met the inclusion criteria (20–26 weeks of pregnancy as confirmed by ultrasound and confirmation of permanent residence) and 1,369 (99%) gave informed consent to participate in the full study. Exclusions included a clinical diagnosis of a life-threatening condition and/or plans to deliver outside the project area.

Measures

Demographics. Demographic variables included the participant's age, level of formal education, any informal education received, employment status and husband's employment status. Because women in Pakistan are less likely to be employed or own substantial assets, we estimated socioeconomic status using a measure of overall household wealth. This measure, referred to as the household property index, scored the number of the following items owned by any member of the participant's household: home, cultivated land, vehicle, TV and/or refrigerator. In addition, all participants were asked their number of previous pregnancies and whether the current pregnancy was wanted.

The Aga Khan University Anxiety and Depression Scale (AKUADS). The AKUADS, developed in the Urdu language, was designed and validated to screen for depression and anxiety in Pakistan (Ali *et al.*, 1998). The current study used the validated 13-item short form of the AKUADS (AKUADS-SF), which omits items on the somatic symptoms from the original scale to improve its diagnostic validity with a pregnant population (Karmaliani *et al.*, 2007; Karmaliani *et al.*, 2006). Each AKUADS-SF item has four response options (never, sometimes, often, always) scored from 0 to 3 (Table 3). Total scores on the scale ranged from 0 to 39 with higher scores indicating more psychological distress. In an earlier study, we assessed the diagnostic validity of the AKUADS-SF, using the psychiatrist-administered Diagnostic and Statistical Manual of Mental Disorders – fourth edition (DSM-IV) criteria for depression and anxiety as the gold standard criterion (Karmaliani *et al.*, 2007, for details). Using receiver-operating curve analyses, we identified a score of 13 as the most appropriate cut-off point for optimizing the sensitivity and specificity of the AKUADS-SF for diagnosing depression/anxiety. Therefore, in the current study we classified those with a score of 13 or higher as meeting the criterion for antenatal depression/anxiety. The Cronbach's α for the AKUADS-SF was 0.83 in the current study.

Domestic violence. As a part of the interview, participants were asked whether they been verbally, physically or sexually abused in the six months prior to the current pregnancy. Based on responses to these questions, participants were grouped into three levels: (1) no abuse; (2) verbal abuse only; and (3) physical and/or sexual abuse. Because of the small percentage of respondents indicating sexual abuse alone and the physical nature of sexual abuse, physical and sexual abuse were combined for analyses.

Statistical analysis

First, we estimated the prevalence of depression/anxiety in our sample by calculating the percentage of respondents who met the criterion for depression/anxiety based on their AKUADS-SF scores. To examine the magnitude of depression/anxiety in our sample, we also computed the mean and standard deviation for the AKUADS-SF scores.

We then explored differences in prevalence of depression/anxiety according to the following demographic and background characteristics: age, formal education, employment, husband's employment, property index, wanting the current pregnancy, number of previous pregnancies and domestic violence reported during the six months prior to the current pregnancy. χ^2 tests were used for comparisons of whether respondents met the criterion for depression/anxiety while t-tests and analyses of variance were used for comparisons of mean AKUADS-SF scores by demographics.

Finally, we sought to identify the most salient predictors of psychological distress that may be used to target future interventions. We conducted a logistic regression model predicting depression/anxiety based on the demographic and background variables to determine which variables remained significant after controlling for other possible predictors.

RESULTS

Most participants (69%) were between 21 and 30 years of age and 67% had some formal education (Table 1). Twelve per cent were employed and 78% of their husbands had permanent employment. Fifty six per cent had households that owned three or more of the five items included

Table 1
Prevalence of depression/anxiety by participant characteristics

Variable	Overall sample		Depression/Anxiety	
	<i>n</i>	%	% with dep/anx	AKUADS-SF mean (SD)
All participants	1,368	100	18	7.7 (5.7)
Age				
20 years or less	172	13	19	7.6 (6.2)
21–25 years	480	35	17	7.5 (5.7)
26–30 years	459	34	18	7.7 (5.5)
More than 30 years	257	19	20	8.1 (5.9)
Formal education				
10 years or more	467	34	18	7.7 (5.8)
1–9 years	448	33	19	7.9 (5.7)
None	453	33	17	7.4 (5.6)
Informal education				
Yes	1,001	73	18	7.8 (5.8)
No	367	27	18	7.3 (5.5)
Employment				
Employed	167	12	21	8.2 (6.1)
Not employed	1,199	88	18	7.6 (5.6)
Husband's employment ^{a,b}				
Permanent job	1,073	78	17	7.3 (5.6)
Temporary/seasonal job	238	17	22	8.7 (5.7)
No job	54	4	30	9.9 (7.3)
Property index ^{a,b}				
High (3–5 items)	762	56	16	7.2 (5.6)
Low (0–2 items)	606	44	21	8.2 (5.9)
Number of previous pregnancies ^{a,b}				
0	255	19	21	7.4 (6.0)
1–2	426	31	14	7.1 (5.3)
3 or more	686	50	20	8.1 (5.8)
Wanted this pregnancy ^{a,b}				
Yes	818	60	14	7.0 (5.2)
No	504	37	24	8.9 (6.3)
Domestic violence within six months of this pregnancy ^{a,b}				
Physical and/or sexual abuse	208	15	42	11.8 (5.8)
Verbal abuse only	408	30	23	9.0 (5.9)
No abuse	707	52	8	5.7 (4.6)

Depression/anxiety is defined as an AKUADS-SF score ≥ 13

^a Mean AKUADS-SF scores varied significantly by characteristic ($p < 0.05$) based on analysis of variance

^b Percentage of respondents with depression/anxiety varied significantly ($p < 0.05$) based on χ^2 test

in the property index. Nineteen per cent were pregnant for the first time and 60% reported that the pregnancy was wanted. About half of the participants (45%) experienced domestic violence in the six months prior to pregnancy with 30% reporting verbal abuse only and 15% reporting physical and/or sexual abuse.

Overall, 18% of participants met the cut-off point for depression/anxiety (Table 1). In this univariate analysis, having a husband who was unemployed, having a low property index, a first pregnancy, an unwanted pregnancy and a history of both verbal and physical and/or sexual abuse all were associated with a AKUADS-SF score of > 13 . Most interestingly, 42% of women who experienced physical and/or sexual abuse and 23% experiencing verbal abuse only had depression/anxiety compared to 8% who reported no abuse. We also evaluated the mean (and standard deviation) of the AKUADS-SF score associated with each characteristic. The overall mean score was 7.7 (5.7). Each of the characteristics associated with a significant increase in the percentage of scores > 13 was also associated with a significant increase in the mean score. For example, the mean AKUADS-SF scores increased with increasing severity of abuse. Women reporting no abuse had a mean score of 5.7, while those reporting verbal abuse only had a mean score of 9.0, and those reporting physical and/or sexual abuse had a mean score of 11.8 ($p < 0.001$).

The logistic regression model results showed that after controlling for the other variables in the model, women with 10 or more years of formal education were more often depressed than those with no formal education ($OR = 2.01, 1.30-3.10$) as were women with one to nine years of formal education ($OR = 1.52, 1.03-2.25$) (Table 2). Women whose husbands had no job were significantly more depressed/anxious ($OR = 2.10, 1.07-4.12$) compared to those whose husbands had a permanent job. In addition, women who had low scores on the property index (two or fewer items owned by their household) were more likely to exhibit depression/anxiety ($OR = 1.44, 1.04-1.99$). Women in their first pregnancy were more likely to exhibit depression/anxiety than those who had been pregnant before ($OR = 2.31, 1.37-3.92$). Women who did not want the current pregnancy also were more likely to be depressed/anxious ($OR = 1.94, 1.40-2.69$). In addition, there was a strong relationship between prior domestic violence and depression/anxiety during pregnancy. Women who were physically and/or sexually abused during the six months prior to their pregnancy were far more likely to have depression/anxiety as compared to those who did not experience any abuse ($OR = 9.25, 6.11-14.00$). Similar, but not quite as striking, results were found for women reporting verbal abuse only ($OR = 4.04, 2.81-5.81$). These findings are consistent with the means and prevalence rates (Table 1).

Given the strong association between history of domestic violence and antenatal psychological distress, we explored the depression and anxiety symptoms reported by women who experienced different levels of abuse, based on responses to the individual AKUADS-SF items (Table 3). The most commonly reported symptoms overall were anxiety (33%), worry (34%), lack of interest in daily activities (18%) and crying (16%). For each symptom, there was a significant trend of greater symptoms according to increasing level of abuse from no abuse to physical/sexual abuse. For example, 58% of women who had been physically and/or sexually abused reported that they were often or always worried compared to 45% of those who were verbally abused and 23% of those who reported no abuse. Similarly, about half the women (51%) experiencing physical/sexual abuse and 37% experiencing verbal abuse only reported feeling anxious often or always, compared to 26% who experienced no abuse. Four per cent of women who experienced physical/sexual abuse prior to pregnancy thought often or always about taking their own lives compared to 1% of those experiencing no abuse or verbal abuse only.

DISCUSSION

Using the AKUADS-SF scale, we found that nearly 20% of the pregnant urban Pakistan population met the criteria for depression/anxiety. These data are comparable to other reports characterizing

Table 2
Logistic regression model of depression/anxiety during pregnancy

Variable	OR	95% CI	<i>p</i>
Age			
More than 30 years	1.83	0.97, 3.45	0.063
26–30 years	1.24	0.69, 2.20	0.475
21–25 years	1.31	0.77, 2.24	0.322
20 years or less	REF		
Formal education			
10 years or more	2.01	1.30, 3.10	0.002
1–9 years	1.52	1.03, 2.25	0.036
None	REF		
Informal education			
Yes	0.94	0.66, 1.35	0.748
No	REF		
Employment			
Employed	1.12	0.72, 1.75	0.609
Not employed	REF		
Husband's employment			
Permanent job	REF		
Temporary/seasonal job	1.16	0.78, 1.72	0.462
No job	2.10	1.07, 4.12	0.032
Property index			
High	REF		
Low	1.44	1.04, 1.99	0.027
Number of previous pregnancies			
3 or more	REF		
1–2	0.78	0.53, 1.16	0.221
0	2.31	1.37, 3.92	0.002
Wanted this pregnancy			
Yes	REF		
No	1.94	1.40, 2.69	< 0.001
Domestic violence within six months of this pregnancy			
Physical and/or sexual abuse	9.25	6.11, 14.00	< 0.001
Verbal abuse only	4.04	2.81, 5.81	< 0.001
No abuse	REF		

n = 1,313; AUC = 0.76; REF = reference category

women's mental health in Pakistan. A study of the general population of women in the northern area of Pakistan using the AKUADS questionnaire found that 17% were anxious or depressed (Dodani & Zuberi, 2000). The prevalence of depressive disorders was 25% among women from southern Kahuta, Pakistan in the third trimester of pregnancy (Rahman *et al.*, 2003). Elsewhere in the region, the prevalence of depression was reported at about 16% among South Indian women during the third trimester of pregnancy (Chandran *et al.*, 2002) and among pregnant women in Hong Kong (Leung *et al.*, 2004).

Although the rates of depressive symptoms in our study are comparable to other data from Pakistan and elsewhere in Asia, the prevalence is low compared to the 25–75% overall rates

Table 3
Percentage of participants responding 'always' or 'often' to
AKUADS-SF items by history of domestic violence

Item	All participants (%)	Domestic violence prior to pregnancy			<i>p</i>
		No abuse (<i>n</i> = 707)	Verbal abuse only (<i>n</i> = 408)	Physical/sexual abuse (<i>n</i> = 208)	
1. Sleeping less	25	22	28	33	0.003
2. Lack of interest in daily activities	18	12	25	26	< 0.001
3. Lost interest in hobbies	15	11	19	20	< 0.001
4. Anxious	33	26	37	51	< 0.001
5. Sensation of impending doom	9	5	13	17	< 0.001
6. Difficulty in thinking clearly	8	4	8	19	< 0.001
7. Prefer to be alone	8	5	11	12	< 0.001
8. Felt unhappy	14	9	16	26	< 0.001
9. Felt hopeless	10	5	14	21	< 0.001
10. Felt helpless	10	5	13	22	< 0.001
11. Worried	34	23	45	58	< 0.001
12. Cried	16	9	22	33	< 0.001
13. Thought of taking life	1	1	1	4	0.005

p-value based on Cochran-Armitage trend test

of anxiety and depression reported in community surveys in Pakistan (Mumford *et al.*, 1997; Ali *et al.*, 1998; Ali & Amanullah 2000; Husain *et al.*, 2000). The experience of pregnancy may be different for this cohort of women from Hyderabad, Pakistan, which has access to skilled pregnancy care. Hormonal changes during pregnancy may protect them from mood disorders. Local cultural influences may encourage their families to be more supportive and caring towards pregnant women, thus moderating mood disorders. Alternatively, because pregnancy is considered as an experience of celebration in Pakistan, women may inhibit negative feelings and experiences because an unborn child is considered a gift of nature. The prevalence of depression and anxiety symptoms may also be affected by the time point during pregnancy at which symptoms are assessed (Bennett *et al.*, 2004). In our study, women completed the self-report measure at 20–26 weeks, a time window in which depression/anxiety may be lower than later in pregnancy or postpartum.

This study had a number of strengths as well as limitations. Its strengths included the fact that it was community based and included all women whether they sought care in the formal system or delivered at home with a traditional birth attendant. We used a measure of anxiety/depression that had been validated on similar populations of pregnant women, and also took great care to preserve the confidentiality of the subjects. Limitations included the fact the study population was peri-urban and likely had more resources than many Pakistani women. The results therefore may not be generalizable to all Pakistani pregnant women. Also, while the AKUADS-SF scale has been well validated, the data for it and especially for abuse were collected by self-report, and there is no way to confirm the accuracy of responses. Women who are depressed/anxious may have differential reporting of abuse than other women experiencing the same behaviour. Nevertheless, we believe the relationship between abuse and anxiety/depression is strong and likely to be causal.

The majority of the women (87%) in our study were homemakers who had no independent income; an additional 10% of the women worked from home. The employment rate (13%) is similar to rates reported previously for the general female population living in urban areas of Pakistan (Social Policy and Development Centre, 2001). Although a woman's employment status was not significantly associated with depression/anxiety, her husband's unemployment was significantly associated with depression/anxiety. In this society where the husband's income is usually the primary household income, it seems reasonable that depression/anxiety would be closely related to the husband's employment status. These results are also consistent with our findings that lower household wealth was associated with higher levels of depression/anxiety.

Our results also suggest a strong link between level of abuse and magnitude of depression/anxiety, consistent with studies from other developing and developed countries that have found associations between domestic violence and poor mental health during the childbearing period (Campbell *et al.*, 1995; Ceballo *et al.*, 2004; Kumar *et al.*, 2005). In the current study, women who were in an abusive environment during the six months before their pregnancy were at greater risk of developing depression/anxiety during pregnancy. Forty two per cent of the women who were physically and/or sexually abused and 23% of those who were verbally abused met the criteria for depression/anxiety, compared to only 8% of those who were not abused. In addition, among those who were physically/sexually abused, 4% said they thought often or always about taking their life, suggesting a significant risk to the mother and her unborn child.

The results of this study suggest that antenatal service providers should routinely screen women for depression and anxiety during pregnancy, just as they routinely screen for other risk factors of potential harm to mothers and infants, with referral offered to appropriate services. The AKUADS-SF provides an effective screening tool that can be easily and quickly administered by clinicians and outreach health workers in Pakistan. Based on a meta-analysis, antenatal depression and anxiety were identified as two of the five strongest predictors of postpartum depression (Robertson *et al.*, 2004), which in turn has been associated with poor child outcomes. Intervening early may stop this progression and improve maternal and child outcomes.

Given the limited health resources in developing countries such as Pakistan, the study results could be used to target interventions to groups that are likely to be at greatest risk for depression/anxiety during pregnancy and require closer monitoring. In particular, we found that women who had been either verbally or physically/sexually abused were at high risk for antenatal depression/anxiety, suggesting that health workers should also screen for abuse as a part of routine prenatal care. Other factors associated with depression/anxiety included a first pregnancy, lower socio-economic status and an unwanted pregnancy.

CONCLUSION

A sizable portion of pregnant women in Pakistan experienced depression/anxiety during pregnancy. Further research is needed to assess the relationship of anxiety and depression, especially in the context of abuse, among pregnant women and to determine whether programmes aimed at prevention/treatment of depression/anxiety in a Pakistani pregnant population will result in improved sense of well-being and improved health for mothers and their children.

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