ORIGINAL ARTICLE

ASSOCIATION OF ANTENATAL DEPRESSION AND HOUSEHOLD FOOD INSECURITY AMONG PREGNANT WOMEN: A CROSS-SECTIONAL STUDY FROM SLUMS OF LAHORE

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Background: Pregnant women are more likely to develop antenatal depression due to multiple factors including sickness and death of close family member, unwanted pregnancy, unplanned pregnancy, economic and relationship difficulties. Food insecurity is a major issue in low resource settings, especially in developing countries. Malnourishment in pregnant women along with antenatal depression can lead to adverse effect on growth of foetus and can lead to adverse pregnancy outcomes. The aim of this study was to determine an association between food insecurity and antenatal depression among pregnant women living in slum settlements of Lahore. **Method:** A community based, cross-sectional study was conducted in slum settlements of district Lahore, with a sample of 367 pregnant women. Antenatal depression and household food insecurity was measured using Edinburgh Postnatal Depression Scale (EPDS) and Household food insecurity access scale (HFIAS). Data was entered and analysed in SPSS-20.0. Chi-square and multivariate logistic regression analysis was used to estimate effect of food insecurity on antenatal depression among pregnant women. **Results:** Prevalence of antenatal depression was 39.5% among pregnant women. Majority of the sample, i.e., 46% were food insecure. In an adjusted model, multivariate logistic regression showed existence of strong association between food insecurity and antenatal depression (AOR=2.58, 95%, CI: 1.64–4.075) in women surveyed. **Conclusion:** Study results show strong association between food insecurity and antenatal depression. Findings also suggest the need of an effective intervention at community level to combat food insecurity and antenatal depression in marginalized populations.

Keywords: Food insecurity; Antenatal; Slums; Nutrition; Pregnancy; Developing Country; Pakistan

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INTRODUCTION

The world today comprises of approximately 7 billion people among whom, 795 million people which is one in eight persons sleeps hungry every night.[1] Continuous efforts have been made to improve under nutrition and reduce hunger globally. Proportion of people suffering from under nutrition in 1990–92 was 23.2% globally and was reduced to 12.9% in 2012–14 following initiation of eradicate extreme poverty and hunger goal under the Millennium Development Goal in year 2000, which aimed to reduce proportion of people who suffer from hunger by 50% between years 1990 and 2015.[2] Since achievements have been made to meet MDG target, even then improvements are not evenly distributed among regions of developing countries.[3] Iran is the only country in Southern Asian region that has reduce poverty and hunger by 50% and has successfully achieved MDG target. Pakistan stands among those countries that have made little advancement towards achieving MDG target.[4]

An analysis of maternal nutritional status and its effect on child health in developing countries shows that confirms that sustainability of food security is becoming crucial with reference to changes in environment, climate and economic developments.[5] Financial constraints affect food quality and quantity of affected populations. Most prone to food crises situation are women and children, leading to malnutrition, resulting in anaemia and other micronutrient deficiencies in pregnant women and stunting in children.[5]

It is estimated that 54% of world's population is currently residing in urban areas and this count will increase to 66% by 2050. Most of this bump of urbanization will be seen mostly in Africa and Asia. In developing countries, over 863 million of urban population is living in slums.[6] Based on evidence from studies conducted in urban slums, population of those areas are more food insecure because of their poor socio-economic status, low household income and some other socio-demographic factors. A study done in Nairobi concluded that approximately half of the population of slums is food-insecure, i.e., only one household among five households is food secure.[7]

Food insecurity is not an individual level condition rather it exists at household level where every individual in the family suffers from it. However, it may affect different individuals differently.[8] As the energy, micro and macronutrient requirements increase during pregnancy healthy nutrition becomes vital for maintaining maternal and child health.[9]

Pregnant woman from low income and food insecure households harbour concerns about future nutritional demands of their unborn child and this generates feelings of hopelessness and pain.[10] Thus increases maternal stress during pregnancy and can be one indicator of increase in foetal defects.[11] According to World Health Organization (WHO) depressive disorders will be the second largest prevailing disease by 2020 at global level.[12] Depression has become a common illness. It is estimated that 350 million people worldwide are suffering suffer from varying severity of depression. In worst cases, depression becomes a cause of suicide. Women are more affected from depression than men.[13]

Pakistan stands on 77th position out of 109 countries in Global Food Insecurity Index. Food insecurity is prevalent in poor and vulnerable populations, i.e., women and children. These populations are more prone to food insecurity because of limited economic access towards adequate and diverse food.[14] Major portion of population residing in major cities of Punjab are more vulnerable to become food insecure. Households that are food secure right now may become food insecure in the near future due to risk induced vulnerability, i.e., death, sickness and unemployment.[15] In Lahore, several studies have been conducted that report about the prevalence of antenatal depression and the predictive factors. Prevalence of antenatal depression reported in different studies is 64.6%, 31.8%, 43% and 42.7%.[16–19] Relationship of depression in pregnant women who also suffer food insecurity at the same time has not been explored. According to National Nutritional Survey of Pakistan (2011), 58.1% of the households are food insecure.[20] This research was designed to investigate the prevalence of food insecurity and antenatal depression in the pregnant women of slum areas. The study also aimed to explore the effect of food insecurity on mental health of pregnant women in terms of depression.

MATERIAL AND METHODS

This descriptive cross-sectional study was conducted in slums of District Lahore, the capital city of province of Punjab. Slums that are registered with the Lahore Development Authority (LDA) were included in the survey. Total 170 slums of district Lahore are conceded as legal. Every registered slum constitutes some number of households. However, a total of 41,350 units (households) are included in these filed slums. Slums chosen for data collection were slums of Shahdara, Ravi Road, Data Darbar, Gohawa, Band Road, Ferozpur Road and Gulberg.

A sample size of 367 pregnant women was calculated by following cross sectional survey formula. Pregnant women of all trimesters of pregnancy living in registered slums and those who were enrolled in the list of lady health worker of that slum settlement were study population. Purposive sampling technique was employed to select slums, households in which pregnant women were living.

Standardized questionnaires were used for data collection. To measure levels of food insecurity a standardized questionnaire called Household food insecurity access scale (HFIAS) developed by USAID was adapted and applied.[21] HFIAS is a nine items scale that comprise of nine occurrence questions that are followed by the frequency-of-occurrence questions.

Households were categorized into four levels of food security that are food secure, mildly food insecure, moderately food insecure and severely food insecure. These categories were given according to response score of participant of household as per recall period of 4 weeks. A standardized protocol prescribed by USAID was used to operationalize HFIAS in Urdu Language. Thirty participants were included for pretesting. SPSS was used to compute reliability coefficient. Chronbach's alpha, measure to find reliability of a questionnaire[22], calculated was 0.84.

Edinburgh Postnatal Depression Scale (EPDS) was used to assess depression; this was also validated for use in antenatal period.[23] A recommended cut off score of ≥12 was used to evaluate the level of depression.

Data was cleaned, organized and entered in SPSS v. 20 for analysis. Descriptive, bivariate and multivariate analysis was carried out for analysis. Ethical considerations were taken from Internal Review Board (IRB) of Health Services Academy. Further permission for data collection was granted from the EDO Health, and Lady Health Worker Program district office of Lahore. Written consent was taken from pregnant women before data collection.

RESULTS

Data was cleaned, organized and entered in SPSS v.20. Descriptive stats were computed. Chi-square and regression analysis were calculated to analyse association between food insecurity and antenatal depression. Among the sample of 367 pregnant women, 39.5% pregnant women were depressed and 46% were food insecure. Results of the study revealed that pregnant women who were food insecure, were 2.5 times more prone to antenatal depression than those who were from food secure households (AOR= 2.58, 95%, CI: 1.64–4.075).

A total of 367 women were included in the study. Average age of the mothers was 26.05 years ranging from 18 to 45 years. About half of them (48.5%) were between the ages of 21–26 years and 40.9% of pregnant women were in their 3rd trimester of pregnancy. Most of the women were Muslims (90.5%) while the rest were Christian (9.5%). A majority of women were illiterate (32.7%) and only 19.1% had a

matriculation level qualification. Only 60 women among whole sample had more than 3 living children.

Mean household size was 6.4 and bulk of the sample (71.4%) had household size of ≤7 persons. Most of the women's husband income was greater than 13,000 per month with the mean (SD) of husband's income was 17,128.8 (9827.6). (Table-1) Almost 60% of the pregnancies were unplanned and 26.4% were unwanted. One hundred one (27.5%) pregnant women reported death of some family member in past 1 year. Intimate partner violence was reported by 21 (5.7%) of pregnant women and 4 (1.08%) women out of the total sample were living separately from their husband. (Table-1)

About one-third (39.5%) of pregnant women were screened positive for antenatal depression. A total of 48 (13.07%) of women were having suicidal thoughts. Only 9 (2.5%) women from total sample were having these thoughts quite often.

Half of women (54%) were food secure and rest 46% had food insecurity. Out of the total sample of pregnant women 47 (12.8%) were mildly food insecure, 47 (12.8%) were moderately food insecure and 75 (20.4%) were severely food insecure. (Table-2)

Table-3 reports independent associations of significant dependent variables with outcome of interest i.e. antenatal depression. Antenatal depression shows a positive association with maternal age (p-value 0.013). Independent variables i.e. unwanted pregnancy (p-value 0.04), death of close relative within 1 year (p-value 0.006) and intimate partner violence (p-value 0.001) showed statistically significant relationship with antenatal depression.

Statistical analysis shows that food insecurity and antenatal depression were strongly associated (p-value <0.05). Analysis also revealed that pregnant women who were food insecure were more depressed (53.3%) than those who were food secure (27.8%).

Crude odds ratio (COR) and adjusted odds ratio (AOR) together with confidence interval (CI) are described in table-4. Bivariate logistic regression analysis was carried out on only those variables that had a p-value <0.05. Crude (unadjusted) odds ratios were computed for each significant variable separately. Pregnant women of age >32 years were more depressed (COR: 3.03, CI: 1.2–7.15) than any age category group. Category of maternal age (15–20) was kept as reference category.

Women who had an unwanted pregnancy were 1.65 times more depressed than others. Likewise, intimate partner violence (COR: 5.38, CI: 1.92–15.04) and close family member death within past one year (COR: 1.94, CI: 1.24–3.14) were more depressed than those who were not enduring such circumstances.

In order to minimize influence of confounders and to compute robust result for analytical process, multivariate forward stepwise logistic regression analysis was performed. This enabled to ascertain independent association of food insecurity and antenatal depression. Adjusted odds ratios (AOR) were calculated by following this process. Other independent variables were added as covariates with explanatory variable (food insecurity).

Those independent variables were maternal age, unwanted pregnancy, death of close relative within one year and intimate partner violence. In third step, unwanted pregnancy was eliminated from model due to insignificant p-value of 0.28. Adjusted model revealed that pregnant women who were living in food insecure households were 2.5 times more exposed to antenatal depression than those who were living in food secure households. (Table-4)

Table-1: Socio-demographic and Socio-economic characteristics of the sample

Sr. No	Characteristics	n (%)
1.	**Maternal Age (in years)**	
	15–20	49 (13.4)
	21–26	178 (48.5)
	27–32	98 (26.7)
	>32	42 (11.4)
2.	**Pregnancy Trimester**	
	1st	76 (20.7)
	2nd	141 (38.4)
	3rd	150 (40.9)
3.	**Religion**	
	Muslim	332 (90.5)
	Christian	35 (9.5)
4.	**Maternal Education Level**	
	Illiterate	120 (32.7)
	Primary	65 (17.7)
	Middle	54 (14.7)
	Matriculation	70 (19.1)
	Inter	33 (9.0)
	Above inter	25 (6.8)
5.	**Husband's Monthly Income***	
	Equal or less than 13,000	168 (45.7)
	>13,000	199 (54.2)
6.	**Household Size*****	
	≤7	262 (71.4)
	>7	105 (28.6)
7.	**Unplanned Pregnancy**	
	Yes	222 (60.4)
	No	145 (39.5)
8.	**Unwanted Pregnancy**	
	Yes	97 (26.4)
	No	270 (73.5)
9.	**Sick close family member**	
	Yes	94 (25.6)
	No	273 (74.3)
10.	**Death of some close relative**	
	Yes	101 (27.5)
	No	266 (72.4)
11.	**Recent Job Loss of Husband**	
	Yes	11 (2.9)
	No	356 (97.0)
12.	**Intimate Partner Violence**	
	Yes	21 (5.7)
	No	346 (94.2)
13.	**Separation from Husband**	
	Yes	4 (1.08)
	No	363 (98.9)

Table-2: Prevalence of depression and food insecurity among the whole sample (n=367)

Sr. No	Characteristics	n (%)
1.	**Antenatal Depression**	
	Yes	145 (39.5)
	No	222 (60.5)
2.	**Suicidal Thoughts**	
	Hardly ever	19 (5.2)
	Sometimes	20 (5.4)
	Yes, Quite often	9 (2.5)
3.	**Food Insecurity**	
	Yes	169 (46)
	Mild	47 (12.8)
	Moderate	47 (12.8)
	Severe	75 (20.4)
	No	198 (54)

Table-3: Association of food insecurity and significant independent variable with depression status

	Antenatal Depression		
	Yes (n=145)	No (n=222)	
Variable Category	n (%)	n (%)	*p*-value
Unwanted Pregnancy			
Yes	47 (48.5)	50 (51.5)	**0.048**
No	98 (36.3)	172 (63.7)	
Death of some close relative (within 1 year)			
Yes	52 (51.5)	49 (48.5)	**0.006**
No	93 (35.0)	173 (65.0)	
Intimate Partner Violence			
Yes	16 (76.2)	5 (23.8)	**0.001**
No	129 (37.3)	217 (62.7)	
Food Insecurity			
Yes	90 (53.3)	79 (46.7)	**0.000**
No	55 (27.8)	143 (72.2)	

Table-4: Un-adjusted and Adjusted odds ratio of Factors associated with antenatal depression

Factors	COR	95% CI	AOR*	95% CI
Maternal Age (in years)				
15–20	1.0		1.0	
21–26	1.02	0.549–2.107	1.16	0.574-2.376
27–32	1.61	0.786–3.307	1.72	0.809-3.657
>32	3.03	1.2–7.153	2.77	1.125-6.818
Death of Close Relative (within 1 year)				
Yes	1.94	1.241–3.141	1.95	1.198-3.194
No	1.0		1.0	
Intimate Partner Violence				
Yes	5.38	1.92–15.041	4.02	1.375–11.782
No	1.0		1.0	
Food Insecurity				
Yes	2.96	1.920–4.570	2.58	1.641–4.075
No	1.0		1.0	

*Multivariate Forward stepwise logistic regression

DISCUSSION

Pregnancy is a challenging time for women and there are multiple factors that affect their physical and mental health of pregnant women. Previous studies conducted in Pakistan have screened depression during pregnancy. In this study, an attempt was made to establish an association of food insecurity and depression among pregnant woman from low income and poor households.

Study results have established a direct relationship of household food insecurity with mental health of pregnant women. Prevalence of food insecurity and antenatal depression computed from data analysis were 46% and 39.5% respectively. Pregnant women living in food insecure households were 2.5 times more depressed during pregnancy than those who were from food secure households. This study also included other independent variables, i.e., sickness and death of close family member, intimate partner violence, unwanted and unplanned pregnancy, low monthly income and separation from husband that can be cause of antenatal depression.

Studies conducted in Pakistan have showed the prevalence of antenatal depression among pregnant women as 64.6%, 31.8%, 43%, 42.7%, 48.4% and 33.8%.[16–19,24,25] Some studies from Pakistan show similar prevalence of antenatal depression as reported in this study.[17–19,25] However, studies conducted in other South Asian countries have found a lower prevalence of antenatal depression than reported in current study.[26–28] The higher rates of antenatal depression in Pakistan among pregnant women require robust programs and interventions for pregnant women to combat antenatal depression.

There are other factors that affect pregnant women and lead to depression. A systematic review shows that intimate partner violence and mental health of a pregnant woman have a significant positive association with each other.[29] Prevalence of intimate partner violence reported in studies of South Asia is very much higher than this study.[30–32] Some other studies have found that unwanted and unplanned pregnancies also negatively affect mental health of women and pushes her towards antenatal depression.[33,34] Present study found no such association in finding of the results.

A traumatic event in family, such as death of some family member happened in the past also causes an effect the mental health of a pregnant woman and become a cause of depression. The results of this study show substantial association with the death of close family member over past. However, a study conducted in Swat, Pakistan does not show any association with antenatal depression.[35] However, some other studies confirm that recent adverse life events, i.e., death and sickness of close relative become risk factors of antenatal depression among pregnant women.[36,37]

The prevalence of food insecurity reported in urban slums of India is quite higher (77.2%) than finding of this study.[38] Another study of Indian slums showed prevalence of food insecurity as 51% that is

consistent with present study findings.[39] Moderate food insecurity evaluated in sample of another slum population is same with the results of current study.[40] The data from slums of the capital city of Bangladesh show coherent findings of moderate and severe food insecurity as reported in current study.[11] Rates of moderate food insecurity measured in one disadvantage district of Nepal, where a large population lives in slums and shanties, were similar with results of this study, i.e., 12.0%. However, overall proportion of food insecure population was much less than reported in current study.[41] The prevalence of food insecurity was measured among poor households of food deficit district of Nepal. Prevalence reported by Nepali researchers was 69% which is much higher than reported in present study.[42] Prevalence of household food insecurity reported in National Nutritional Survey of Pakistan is 58.1% which is slightly higher than the prevalence of food insecurity of this study.[20]

CONCLUSION

The present study concluded that pregnant women who were living in food insecure households were 2.5 times more depress during antenatal period. Results suggest that there is a need to conduct screening process for antenatal depression among pregnant women at community and facility level. Introducing conditional food voucher system for pregnant women of low resource settings is essential in order to prevent worst pregnancy outcomes due to undernourishment during pregnancy.

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AUTHORS' CONTRIBUTION

HA: Conceptualization of study, data collection, analysis, first draft. HA & MS: Revised and contributed to the final manuscript. KM: assisted in data analysis. KM & FS: Contributed in manuscript design. All authors have read and approved the final draft.

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