Research Article

Assessment of Household Food Insecurity and its Association with Mental Distress Among Pregnant Women Presenting in Tertiary Care Hospital, Lahore: A Cross-Sectional Study

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Abstract

Background: Food insecurity affects millions of individuals worldwide, including pregnant women, compromising their health and well-being. Adequate nutrition during pregnancy is crucial for the mother's and fetus's health. Despite its significance, food insecurity's impact on pregnant women's mental health is understudied.

Objectives: The objective of the study was to determine the prevalence of food insecurity during pregnancy among women presenting in a Tertiary Health Care Hospitals and its association with mental distress.

Methods: The present cross-sectional study was conducted on 83 pregnant women who visited Lady Aitchison and Lady Willingdon (Tertiary Health Care Hospitals) during their gestation period in 2024. The questionnaire was designed based on SRQ-20 scale for mental distress and the HFIAS scale for food insecurity used by Mulusew G. Jebena et al. in Ethiopia.

Results: Of the 83 women enrolled in the study, overall, 68.6% (n=57) experienced food insecurity & about 31.3% (n=26) reported to have food security during pregnancy. There were no significant relationships between food insecurity with age, residence, income, no. of family members.

There was a significant relation of food insecurity and mental distress between the study participants. From the 68.6% (n=57) food insecure participants 56.1% (n=32) felt distressed during pregnancy ($p<0.012$).

Conclusions: This study highlights the alarming rise of food insecurity amongst pregnant women & its interconnection with mental distress. The findings emphasize the need for integrated interventions addressing food insecurity and mental health. By tackling food insecurity, we can promote healthier pregnancies and brighter futures.

Keywords | Food insecurity, mental distress, pregnancy

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Introduction

According to the Food and Agriculture Organization of the United Nations (FAO), "food security at the individual or global levels is achieved when all people always have financial and physical access to enough, healthy, and nourishing food to meet their nutritional requirements and dietary priorities for an active and healthy life." At the home level, food security can range from extremely low (one or more family members consuming less food) to high (consistently having access to enough food.[1] The level of food security at the household level can vary from very low (i.e., reduced food intake among one or more household members) to high (i.e., consistent availability of adequate food).[2]

When there is a lack of access to wholesome, safe food or uncertainty about how to obtain it in ways that are acceptable to society, food insecurity is present.[3] The FAO reports that one in eight people on the planet— the majority of those living in developing nations—suffer from persistent starvation and lack access to sufficient food for a productive and healthy life.[1] More than 12% of American households are food insecure, according to the HFSSM. Approximately 8% of households in Canada were food insecure measured by the Canadian Community Health Survey.[4] Food insecurity's global standing has gotten better slightly in the last

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couple of decades. Between 1990–92 and 2010–12, the number of individuals worldwide facing food insecurity declined from 18.6% to 12.5%, and in developing nations, it declined from 23.2% to 14.9%, signaling that the Millennium Development Goal (MDG) target can be achieved.[5] Food security around the world was further challenged by the COVID-19 crisis.[6]

Women are considerably more susceptible to food insecurity during pregnancy.[7] Food insecurity faced by women during pregnancy is associated with socioeconomic factors.[5] Increasing nutritional requirements for the developing fetus, difficulties in finding healthy food, and increased likelihood of quitting work during pregnancy which lowers household income available for food buying, are some of the factors that have been proposed as causes of food insecurity during pregnancy.[8] Several studies have shown that food insecurity affects women who are pregnant because of their restricted access to food, which results in inadequate nutritional intake.[9] Extra energy is needed in pregnant women for the best possible growth and development of the fetus.[10] The nutritional status of women (BMI and MUAC) in the first trimester determines the necessary gestational weight gain (GWG) and ultimately impacts the perinatal period.[11]

During the gestational period, women are susceptible to a wide range of physiological, behavioral, and emotional changes which might be badly impacted by restricted food access.[3] The inability to obtain food often starts a chain of stressful events in the household which deteriorates the mother's mental health leading to anxiety and depression.[5] Furthermore, the results of a cohort study conducted in the UK revealed that food insecurity during gestation enhances the risk of common mental disorders.[12] There has been a link between maternal depression and food inadequacy as shown by studies. Few studies also revealed the connection between mental distress and food insecurity during pregnancy.[13] In the United States, maternal mental health disorders affect 1 in 5 or 800,000 women annually which include depression, anxiety disorders, obsessive-compulsive disorder, post-traumatic stress disorder, bipolar illness, and substance use disorders. These conditions are the prevalent complications of pregnancy and childbirth.[14] There is no direct biological impact on kids when a mother has postpartum depression. Yet, depressive mood symptoms have impacts on mothers' parenthood and their kids' social skill development.[15] In this cross-sectional study, we studied the maternal mental health of pregnant women facing food insecurity. We assessed the percentile of women facing food insecurity during pregnancy and their mental health.

Methods

This cross-sectional study was conducted on 83 pregnant women who visited Lady Aitchison and Lady Willingdon Tertiary Health Care Hospitals during their gestation period in 2024. A sample size of 83 was calculated using the formula for sample size estimation based on a prevalence of 22.4%, with a 95% confidence interval and 9% precision.[13]

Participants were included in the study if they were willing to participate and did not have any chronic medical conditions. Women with diagnosed chronic illnesses such as hypertension, diabetes, or a history of psychiatric disorders prior to pregnancy were excluded from the study. Additionally, those who were unable to provide informed consent or complete the necessary questionnaires were also excluded.

The study was carried out over a period of 6 months in 2024, during which data was collected using structured questionnaires. Ethical approval was obtained and all participants provided informed consent after being informed about the study's objectives, procedures, and their rights. Confidentiality of the participants was strictly maintained, and all collected data were anonymized for research purposes.

Informed written consent was obtained from participants during their antenatal visits. Data were collected using a structured interviewer-administered questionnaire from Lady Aitchison and Lady Willingdon Hospitals, Lahore. A pre-tested, close-ended Performa was used for gathering data. As this was a cross-sectional study, no matching or control groups were utilized, and the potential for selection bias was minimized by random selection of participants. The Performa consisted of three parts: the first section included demographic factors such as maternal age, education, number of household residents, and annual income; the second section utilized the Household Food Insecurity Access Scale (HFIAS) with 9 questions assessing food insecurity over the last month, with scores ranging from 0 to 27. Scores from 10-18 indicated moderate insecurity, and 19-27 indicated severe insecurity. The third section used the Self Reporting Questionnaire-20 (SRQ-20) from the WHO to assess mental distress. The SRQ-20 included 20 yes/no questions assessing mental distress, with scores above 11 indicating significant distress.

The information collected was cleansed, revised, and coded via Version 27 of the Statistical Package for Social Sciences (SPSS). Data were entered though Microsoft Excel & then it was analyzed via SPSS thoroughly. The frequency and percentage of variables were computed. Chi square test was applied to compare the qualitative variables. P value less than or equal to 0.05 is considered significant.

Results

A total of 83 pregnant women from two tertiary care hospitals

(Lady Willingdon Hospital & Lady Aitchison) were enrolled in the study. Most of the women involved in our study were above 20 (n=74). Most of the women had studied in high school (n=33) (TABLE 1) while reasonable

Table 1: *Demographic details of participants*

Variable		Frequency	P-value
Age	above 20	74(89%)	
	below 20	9(11%)	0.106
Education	Elementary school	24(28.9%)	0.597
	High school	33(39.8%)	
	Higher education	26(31.3%)	
Residence	Urban area	52(62.7%)	0.29
	Rural area	31(37.3%)	
Monthly Income	Above 25k	71(85%)	0.223
	Below 25k	13(15%)	
No. of residents	1 to 3	18(21.7%)	0.338
	4 to 5	27(32.5%)	
	Above 5	38(45.8%)	

no. of participants studied in elementary school & university. Mostly people were from urban area (n=52). 71 participants told they had family income more than Rs. 25000. Overall, 68.6% (n=57) experienced food insecurity of which 46.9% (n=39) reported moderate food insecurity, while 21.6% (n=18) reported severe food insecurity. About 31.3% (n=26) reported to have food security during

Table 2: *Association between food insecurity and mental distress*

Variable		Distressed	Not distressed	Total
FOOD INSECURITY	Secured	7	19	26
	Moderate insecurity	19	20	39
	Severe insecurity	13	5	18
	Total insecurity	32(56.1%)	25	57(68.6%)

pregnancy. There were no significant relationships between food insecurity and age, residence, income, no. of family members.

Chi-square tests were performed to assess the relationship of food insecurity with different demographic variables & with mental distress. There was a significant relation of food insecurity and mental distress between the study participants. From the 68.6% (n=57) food insecure participants 56.1% (n=32) felt depressed during pregnancy (P <0.012). Interestingly, 26.9% food secured participants felt distressed as well (TABLE 2)

Women with food insecurity and age of the participant were negatively related (p<0.10) Few reported changes in sleep pattern due to food shortages. Food insecurity had no significant relation with the monthly income of the family (p< 0.223).

Neither residence (either urban or rural) of the pregnant women showed significant relationship with food insecurity (p<0.29) nor women with varied family size (p<0.338).

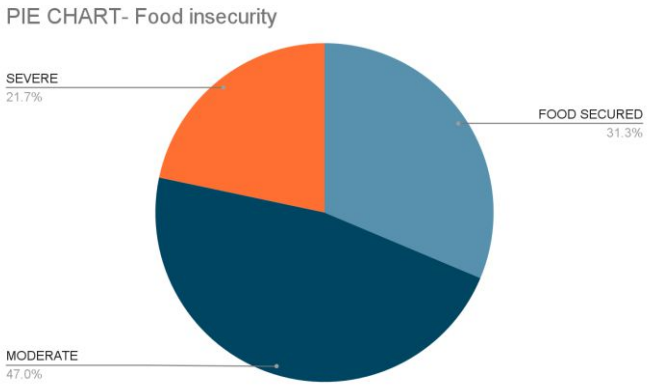

Figure 1: *Percentage of food insecurity*

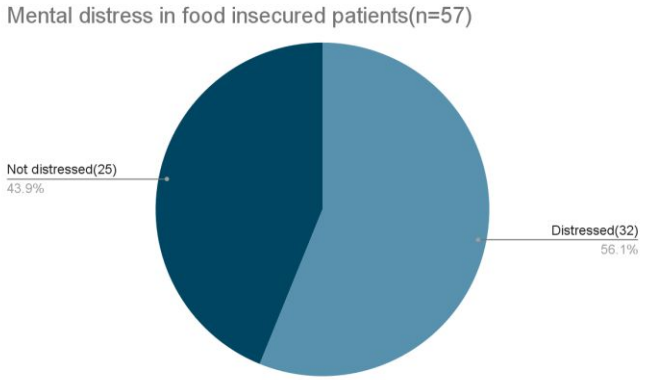

Figure 2: *Percentage of mental distress*

Discussion

This cross-sectional study was aimed at assessing household food insecurity and its association with mental distress among pregnant women. Of the 83 women enrolled in the study, overall, 68.6% (n=57) experienced food insecurity of which, 46.9% (n=39) reported moderate food insecurity, while 21.6% (n=18) reported severe food insecurity. About 31.3% (n=26) reported to have food security during pregnancy. There were no significant relationships between food insecurity and age, residence, income, no. of family members.

There was considerable relation between food insecurity and mental distress among the participants. From the 68.6% (n=57) food insecure participants 56.1% (n=32) felt distressed during pregnancy. Interestingly, 26.9% food secured participants felt distressed as well. Women with food insecurity and age of the participant were negatively related. Few reported changes in sleep pattern due to food shortages. Food

insecurity had no significant relation with the monthly income of the family. Neither residence (either urban or rural) of the pregnant women nor women with varied family size showed significant relationship with food insecurity.

Our study findings indicate widespread presence (68.6%) of food insecure pregnant women. It not only affects maternal health but also influences the development process of fetus. In our study, we also found strong correlation between food insecurity and mental distress during pregnancy. This highlights the urgent need to cope with this problem at government level by making different polices and strategies, and public health interventions. The results of this study closely align the findings of previous studies conducted in different part of the world. A study conducted in Colombo stated the percentage of mental distress 50.1%. 38.2% were somewhat food insecure whereas 6.4% were highly food insecure. The high percentage of mental distress was reported among the pregnant women who were facing either mild or severe FI.[18] The results of this study supported the findings of our study that there is a relation between food insecurity and mental distress during pregnancy. A Southwestern Ethiopian article reported 9% of food insecurity. Twenty two percent (22%) of women who were pregnant had mental distress, with high prevalence among those who were insecure of food (48.3%). The percentage of mental distress was (19.9%) among those who had FI.[13] Although mental distress also reported among food secure pregnant women but had much more prevalence among the pregnant women who were facing food insecurity. This previously conducted study gives strong agreement to our results.

A study conducted in Cape Town, South Africa during the COVID-19 pandemic, which assessed the association between common mental disorders (CMDs). According to this study, the prevalence of women with common mental disorders significantly increased with increasing food insecurity when they conceived and increasing number of pregnancies.[19] During COVID-19 pandemic the whole world suffered through food insecurity situations due to lockdown which causes increased prevalence of mental disorders. Women during pregnancy also suffered through these mental disorders obviously one of them is mental distress. Thus, we found close alignment between these finding and result of our study. A study conducted in North Carolina, which reported prevalence of food insecurity 5.2% and marginal food security 7.8% among pregnant women. Pregnant women who are exposed to such levels of food insecurity had higher prevalence of stress.[20] The lower levels of food insecurity as reported by this study may be due to better socioeconomic status and low rate of inflation as these factors varies in different countries. But there is an association of food insecurity and mental distress according to this study. A systematic review registered in PROSPERO performed following the PRISMA guidelines reported that in eleven studies, women from families with food insecurity had higher chances of depression and stressful events. The lack of social support in pregnant women facing food insecurity led to mental distress and depression in them.[9] These results showed close association between food insecurity and mental distress. Along with mental distress, several other mental disorders like depression and anxiety also developed among the pregnant women who were food insecure.

A study conducted in Hamadan, Iran, according to which 67.5% pregnant women were facing certain degree of food insecurity. This food insecurity in pregnant women was associated with several types of complications during pregnancy. Gestational weight gain and neonatal birth weight also being affected by food insecurity during pregnancy.[1] This study measured the food insecurity among pregnant women which were found with healthy prevalence. The prevalence of food insecurity among pregnant women according to this study was almost close to prevalence of food insecurity calculated in our study. But discrepancy is that we found the association between food insecurity and mental distress while this study reported the association of food insecurity with gestational weight gain, neonatal birth weight complications of pregnancy in pregnant women. Similarly, a study conducted in Chicago, reported that in urban population, that the occurrence of food insecurity among women who were pregnant was more than 1 in 10. This food insecurity was associated with lower pregnancy related weight gain.[3] This study assessed food insecurity in women during pregnancy but was different from our study as it was supposed to measure the association of the food insecurity with gestational weight gain.

A study was conducted in United States; among WIC eligible women reported that women with high food security had the prevalence of food insecurity 19.1% and women with low food security had the prevalence of mental distress 36.8%. While women who were facing food insecurity had the 58.0% of those being studied.[21] This study clearly showed that there is a relation between FI and mental distress, but unlike our study, this one was not conducted among pregnant women. A study conducted in Toronto, Canada at two tertiary care hospitals marked as site 1 and site 2 showed the prevalence of food insecurity 12.8%. Site 2 which was a hospital that provided care to large vulnerable and isolated population had more than five times prevalence (21.3%) of food insecurity among pregnant women as compared to site 1 which was a hospital that received the patient from well-established community with prevalence (4.4%) of food

insecurity.[22] This study showed food insecurity predominance is lower socioeconomic strata. Limitation of this study is that it only measured the prevalence of FI among women who were pregnant and didn't take into account its association with mental distress and other problems which can develop during pregnancy due to insecurity of food. On the other hand, our study assessed the food insecurity among pregnant women as well as its association with mental distress which was found to be significantly positive. However, there are also some study limitations. Our study population was small and included only two tertiary care hospitals and relied on self-reported data which may be subject to personal biases and inaccuracies. Moreover, this was a cross sectional study and it might not analyze the relation over a period of time. In the future, research can be conducted over large population including multiple hospitals. Moreover association of household food insecurity can be studied with other factors like weight gain during pregnancy and weight of the newborn, congenital diseases or complications during delivery of the baby.

This study has strengths, such as addressing a gap in research on food insecurity and mental distress among pregnant women in Pakistan and using validated tools like HFIAS and SRQ-20. The findings reveal a strong correlation between food insecurity and mental distress, emphasizing the need for integrated public health interventions. However, limitations include a small sample size of 83 participants from two hospitals, a cross-sectional design, and reliance on self-reported data, which could introduce bias. Policy implications include the development of integrated interventions targeting both food insecurity and mental health, routine screening during prenatal care, and community-level efforts to improve food access.

Conclusion

This study highlighted the alarming prevalence of food insecurity amongst pregnant women and its signifi-cant correlation with mental distress. The findings emphasize the need for integrated interventions addressing food insecu-rity and mental health. Healthcare providers should prioritize food security assessments and referrals to support services. Policymakers must address the root causes of food insecurity to ensure maternal and fetal well-being. By tackling food insecurity, we can promote healthier pregnancies and brighter futures.

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Ethical approval: Obtained from IRB of King Edward Medical University.

Authors Contribution:

MK, UH: Involved in conceptualization of study

AR, SU, SKR: Involved in data collection

IS, BA: Involved in manuscript writing

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