Relationship between Diabetes and Depression Severity in Pregnant Females

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ABSTRACT

BACKGROUND: Depression is a common mental illness found in all regions of the world. In Pakistan, depression is on top of the list among all psychiatric conditions. However, there are inconsistent findings regarding the relationship between diabetes, pregnancy and severity of depression. We aimed to identify the relationship between diabetes and depression severity in pregnant females.

METHODS: In a cross-sectional study, 498 age matched pregnant females were recruited, and categorized as normal glycemic (controls n=300) and diabetic (cases n=198). Aga Khan University Anxiety and Depression Scale was administered to analyze depression score, and blood glucose levels were measured. Data were presented as absolute count/ frequencies. Chi-square test, Spearman rank correlation and simple linear regression analysis were performed. P value of <0.05 was considered significant.

RESULTS: The mean age of the study subjects was 26.6±5 (years). Random blood glucose levels were 148.3±51.9 (mg/dl) for diabetic females and 123.6± 30.5(mg/dl) for non-diabetic females (p<0.001). Majority of the diabetic females answered that they usually had little or no interest in doing daily chores (52%), felt depressed (52%) and tired (39.9%) or bad (35.6%) versus healthy controls (p<0.01). About 23% diabetic females also admitted to having suicidal ideas and even giving half-hearted attempts to end their lives versus 13% healthy controls (p<0.01). When stratified by glucose levels, 64.9% (n=135) females with diabetes and 44% (n=132) without diabetes reported to be depressed (p<0.01). Logistic regression analysis revealed that females with raised blood glucose levels were more prone to be depressed (OR 1.20; CI 1.13-1.27; p=0.01) when compared to females with normal blood glucose levels. An 11.5% positive correlation was found between glycemic status and depression scores.

CONCLUSION: Depression is a common finding in pregnancy, which can be aggravated by poor glycemic control. Among other factors to relieve depression, health care physicians may also focus on a stricter glycemic control to improve maternal mental health status.

Keywords: Depression; Pregnancy; Diabetes; Maternal Health

INTRODUCTION

Depression is a condition characterized by a persistent feeling of sadness, lack of enjoyment, loss of energy and changes in appetite and sleep. It is a common mental illness and is ranked fourth in all regions of the world. Studies have shown that depressive disorders will become the second most common cause of disability by 2020 [1]. Recent studies conducted within Pakistan, report that 57.5% females and 25.5% males from urban Karachi suffer from clinical depression [2-4].

Depression during pregnancy, or antepartum depression, is very similar to clinical depression in non-pregnant population. Between 14-23% of women suffer from some symptoms of depression during pregnancy and 1 in 4 women are said to be affected by depression during their lifetime. However, it may completely go undetected during pregnancy because many people assume it is just another hormonal

imbalance [5]. Most importantly, recent advances in research have also suggested that diabetes during pregnancy is an emerging factor for depression. As many as 9% of pregnancies are complicated by pre-existing or gestational diabetes, and one in 10 new mothers struggles with depression. About 29% women with diabetes are reported to have a higher risk of depression as compared with women without diabetes [6, 7]. According to a study conducted to find the prevalence of depression in pregnant women in Pakistan, around half of the pregnant women living in the rural area of Pakistan reported depression as compared to 36% of women who belonged to the southern villages [8]. However, there are inconsistent findings regarding the relationship between diabetes during pregnancy and severity of depression in local population. Hence, this study aims to identify the relationship of depression severity in diabetic pregnant females.

METHODS

This cross-sectional study was conducted from a period of March 2014 till February 2015. A total of 498 age matched pregnant females were recruited. Women with diabetes were classified as cases (n=198) whereas normoglycemic women were classified as healthy controls (n=300). Women with hypertension, hormonal disturbances and twin pregnancy were excluded from the study. After obtaining a written informed consent, the researcher filled out a detailed and comprehensive questionnaire for depression based on the Aga Khan University Anxiety and Depression Scale (AKUADS) [9]. Serial blood glucose levels were collected from the records file for all study subjects. The study was approved by the institutional ethical review committee (No. 12-01-14-ERC-UMDC).

Statistical Analysis: Data were analyzed by SPSS version 19 (IBM, Chicago, USA). Data are presented as mean ± standard deviation and frequencies wherever applicable. Chi-square test was used to test differences in categorical variables. Spearman rank correlation was used to identify the relationship of age and glycemic status with depression scores. Logistic regression analysis was performed to evaluate depression severity with glycemic status. P value of <0.05 was considered significant.

RESULTS

The results are summarized in Table 1-2. The mean age of the study subjects was 26.6±5 (years). Random blood glucose levels were 148.3 ±51.9 (mg/dl) for diabetic females and 123.6 ± 30.5(mg/dl) for non-diabetic females (p<0.001). Of the 498 women, 65% (n=323) were nulliparous, while 35% (n=175) were with their second pregnancy. Majority of the patients (86.8%; n= 172) had developed diabetes during pregnancy while 13.1% (n=26) had preexisting diabetes. 52% (n= 267) study subjects were found to be suffering from minimal to moderate depression. Majority of the diabetic females answered that they usually had little or no interest in doing daily chores (52%), felt depressed (52%) and tired (39.9%) or bad (35.6%) which was higher than healthy controls (p<0.01). About 23% diabetic females also admitted to having suicidal ideas and even giving half-hearted attempts to end their lives versus 13% healthy controls (p<0.01). When stratified by glucose imbalance; 68.1% (n=135) females with diabetes reported to be suffering from mild to moderate depression versus 44% (n=132) without diabetes (p<0.01) (Table 2). Logistic regression analysis revealed that females with raised blood glucose levels during pregnancy were more prone to be depressed (OR 1.20; CI 1.13-1.27) when compared to females with normal blood glucose levels.

DISCUSSION

The findings of this study reveal that depression is common among pregnant females. About 52% (n= 267) of the overall study subjects were found to be suffering from minimal to moderate depression. This percentage was augmented when we stratified the study subjects by glucose imbalance; 68.1% (n=135) females with diabetes reported to be suffering from mild to moderate depression versus 44% (n=132) without diabetes (p<0.01) (Table 2). Moreover, females with raised blood glucose levels during pregnancy were more prone to be depressed compared to females with normal blood glucose levels. Similar findings were reported in an earlier study where women with pre-existing diabetes had 54% higher odds of any antenatal depression compared to those without diabetes [10]. Similarly, a study conducted in Bangladesh reported that depression was more common in pregnant females with diabetes (25.9 %) versus females without (10.4 %) [11]. Women with diabetes not only have to cope with hormonal

Table 1: Frequency Depression Scale in study subjects

		Control (n=300) n(%)	Cases(n=198) n(%)	p-value
Little interest in doing things	Not at all	196 (65.3)	95 (48)	<0.01*
	Several Days	100 (33.3)	99 (50)	
	More than half days	3 (1)	4(2)	
	Nearly every day	1(0.3)	0(0)	
Feeling down or depressed	Not at all	212 (70.7)	97 (49)	<0.01*
	Several Days	86 (28.7)	93 (47)	
	More than half days	2 (0.7)	8 (4)	
	Nearly every day	0 (0)	0 (0)	
Trouble Sleeping	Not at all	218(72.7)	106(53.5)	<0.01*
	Several Days	73(24.3)	86(43.4)	
	More than half days	6(2)	4(2)	
	Nearly every day	3(1)	2(1)	
Feeling Tired	Not at all	238(79.3)	119(60.1)	<0.01*
	Several Days	58(19.3)	72(36.4)	
	More than half days	4(1.3)	7(3.5)	
	Nearly every day	0(0)	0(0)	
Poor Appetite	Not at all	251(83.7)	124(62.6)	<0.01*
	Several Days	44(14.7)	68(34.3)	
	More than half days	3(1.0)	6(3)	
	Nearly every day	2(0.7)	0(0)	
Feeling Bad	Not at all	261(87)	127(64.1)	<0.01*
	Several Days	34(11.3)	68(34.3)	
	More than half days	5(1.7)	3(1.5)	
	Nearly every day	0(0)	0(0)	
Trouble Concentrating	Not at all	261(87)	140(70.7)	<0.01*
	Several Days	37(12.3)	54(27.3)	
	More than half days	1(0.3)	4(2)	
	Nearly every day	1(0.3)	0(0)	
Moving or speaking slow	Not at all	270(90)	142(71.7)	<0.01*
	Several Days	24(8)	51(25.8)	
	More than half days	6(2)	5(2.5)	
	Nearly every day	0(0)	0(0)	
Suicidal Ideas	Not at all	281(93.7)	152(76.8)	<0.01*
	Several Days	18(6)	42(21.2)	
	More than half days	1(0.3)	3(1.5)	
	Nearly every day	0(0)	1(.5)	
How difficult to handle situations	Not at all	236(78.7)	108(54.5)	<0.01*
	Somewhat Difficult	57(19.0)	57(28.8)	
	Very Difficult	5(1.7)	30(15.2)	
	Extremely Difficult	2 (0.006)	3(0.01)	
Data presented as Number (Frequency) *P<0.05 when compared to controls				

changes due to pregnancy but also have to monitor their glucose and modify their daily routine. These changes may act as additional burdens and can increase the risk for depression. It has also been suggested that hormonal changes that occur with diabetes could exacerbate the hormonal changes that accompany pregnancy. Recent advances in understanding the neurobiology of depression have implicated that there is a progressive relation between diabetes and depression. Both conditions are associated with raised inflammatory markers and that may

Table 2: Depression severity in diabetic and normoglycemic subjects

	Control(n=300) n (%)	Cases(n=198) n (%)
Not Depressed	168 (56.0) **	63 (31.8)
Minimal depression	88 (29.3)	60 (30.3) *
Mild depression	37 (12.3)	70 (35.4) **
Moderate depression	7 (2.3)	5 (2.5)
Severe depression	0 (0)	0 (0)

Where ** p<0.01, * p<0.05

prove to be the key biological link in the comorbidity [12]. Other factors such as lack of support from family and friends, anxiety or negative feelings about the pregnancy, problems with a previous pregnancy or birth, marriage or money problems or stressful life events may increase the risk of depression amongst pregnant women [8]. Moreover, verbal and physical abuse which a woman may face during pregnancy also contributes to depression and if not taken care of, may develop into chronic depression [13]. All these conditions can harm both the mother and the baby.

A significant number of women admitted to having suicidal ideation. Major depression is among the strongest predictors of suicidal ideation [14]. Research on suicidal ideation during pregnancy is limited however previous studies have shown that suicidal ideation has been present in 35% of women seeking antenatal neuropsychiatric treatment [15] and in about 4–40% of women in high-risk socioeconomic groups [16-19] Further research into this potentially devastating consequence of antenatal depression is needed.

Depression complicated with diabetes is a serious health concern and needs to be addressed efficiently. Long-standing depression, especially during pregnancy, may develop into a chronic form which may be more dangerous [19]. Adequate support should be provided to women during pregnancy. For instance, during antenatal visits, women should be counseled regarding the causes and consequences of depression as well as uncontrolled glucose levels. This way, they will be well aware that the symptoms they are having are serious and not just mood swings. They should be told that depression is not something to be ashamed of and that they can always consult a doctor about it. Moreover, further studies should be conducted over a large scale to establish a concrete link between diabetes during pregnancy and depression.

CONCLUSION

Depression is common during pregnancy, which can be aggravated by poor glycemic control. Among other factors to relieve depression, health care physicians may also focus on a stricter glycemic control to improve maternal mental health status.

REFERENCES

1. Bennett HA, Einarson A, Taddio A, Koren G, Einarson TR. Prevalence of depression during pregnancy: systematic review. *Obstet Gynecol.* 2004;103(4):698-709

2. Muhammad Gadit AA, Mugford G. Prevalence of Depression among Households in Three Capital Cities of Pakistan: Need to Revise the Mental Health Policy. Heo M, ed. *PLoS ONE*. 2007;2(2):e209

3. Husain N, Creed F, Tomenson B. Depression and social stress in Pakistan. *Psychological medicine*. 2000; 30(2): 395-402

4. Ali BS, Rahbar MH, Tareen AL, Gui A, Samad L, Naeem S. Prevalence of and Factors associated with Anxiety and Depression among Women in a lower middle class semi-urban community of Karachi, Pakistan. J Pak Med Assoc 2002

5. Stewart DE. Depression during pregnancy. *N Engl J Med*. 2011; 365 (17):1605-1611

6. Knol MJ, Twisk JW, Beekman AT, Heine RJ, Snoek FJ, Pouwer F. Depression as a risk factor for the onset of type 2 diabetes mellitus. A meta-analysis. *Diabetologia*. 2006;49(5):837-45

7. Gavard JA, Lustman PJ, Clouse RE. Prevalence of depression in adults with diabetes. An epidemiological evaluation. *Diabetes Care.* 1993; 16(8):1167-78.

8. Shah SM, Bowen A, Afridi I, Nowshad G, Muhajarine N. Prevalence of antenatal depression: comparison between Pakistani and Canadian women. *J Pak Med Assoc*. 2011; 61(3):242-6

9. 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(9):261-5

10. Katon JG, Russo J, Gavin AR, Melville JL, Katon WJ. Diabetes and Depression in Pregnancy: Is There an Association? *Journal of Women's Health*. 2011;20(7):983-989

11. Natasha K, Hussain A, Khan AA. Prevalence of depression among subjects with and without gestational diabetes mellitus in Bangladesh: a hospital based study. *Journal of Diabetes & Metabolic Disorders*. 2015; 14(1):1-9

12. Stuart MJ, Baune BT. Depression and type 2 diabetes: inflammatory mechanisms of apsychoneuroendocrine co-morbidity. *Neurosci Biobehav Rev.* 2012; 36(1):658-76

13. Rich-Edwards JW, Kleinman K, Abrams A, et al. Sociodemographic predictors of antenatal and postpartum depressive symptoms among women in a medical group practice. *Journal of Epidemiology and Community Health*. 2006;60(3):221-227

14. Nock MK, Borges G, Bromet EJ, Cha CB, Kessler RC, Lee S. Suicide and Suicidal Behavior. *Epidemiologic reviews*. 2008;30(1):133-154.

15. Newport DJ, Levey LC, Pennell PB, Ragan K, Stowe ZN. Suicidal ideation in pregnancy: assessment and

clinical implications. *Archives of women's mental health.* 2007; 10(5):181-187.

16. Melville JL, Gavin A, Guo Y, Fan M-Y, Katon WJ. Depressive Disorders During Pregnancy: Prevalence and Risk Factors in a Large Urban Sample. *Obstetrics and gynecology*. 2010;116(5):1064-1070.

17. Lindahl V, Pearson JL, Colpe L. Prevalence of suicidality during pregnancy and the postpartum. *Archives of Women's Mental Health.* 2005; 8(2):77-87.

18. Stallones L, Leff M, Canetto SS, Garrett CJ, Mendelson B. Suicidal ideation among low-income women on family assistance programs. *Women & health*. 2007; 45(4): 65-83.

19. Bonari L, Pinto N, Ahn E, Einarson A, Steiner M, Koren G. Perinatal risks of untreated depression during pregnancy. *Can J Psychiatry*. 2004; 49(11):726–735.