

Analysis of Socio-demographic variables association with Diabetic Distress Scale (DDS) in diabetic persons - Special reference to Hyderabad and Secunderabad cities

V. Sudha Keerthi

PhD Research Scholar, Department of Social Work, Osmania University, Hyderabad- Telangana State, India.
Email - keerthijames07@gmail.com

Abstract: *Diabetes mellitus is a group of metabolic diseases characterized by hyperglycemia resulting from defects in insulin secretion, insulin action, or both. The chronic hyperglycemia of diabetes is associated with long-term damage, dysfunction, and failure of various organs, especially the eyes, kidneys, nerves, heart, and blood vessels. In India, irrespective of gender, age group, caste, occupation and other demographic statuses people are being affected by diabetes. As the diabetes is a chronic non-communicable disease which cannot be controlled at one time, diabetic persons are undergoing stress causing multiple health problems. In this study, the researcher investigated the effect of socio-demographic variables like age, gender, caste, religion, education, employment on the distress levels using Diabetic Distress Scale (DDS). Also analysed how the regularity of dietary plan influence the distress levels among the diabetic patients. As part of PhD work, the study examined 220 diabetic persons (120 female and 100 male) using purposive sampling method in two government and four private hospitals of Hyderabad city. The mean age of the sample respondents is 53.7 years with minimum age 29 years and maximum age 86 years. Chi-square and Spearman rho correlation test was performed to analyse the significant relationship between the demographic variables and distress levels of diabetic respondents. The study reveals that there is no significant correlation between the distress levels (DDS) and demographic statuses like age, gender, caste, religion, education and occupation of diabetic persons. But it is good to identify that there is significant positive correlation between following regular diet/meal plan and distress levels among diabetic individuals.*

Key Words: *Diabetes, demographic, distress, sampling, correlation.*

1. INTRODUCTION:

Developed countries have made many advance health mechanism and management plans to control infectious diseases thereby resulting in increased life expectancy of individuals, whereas non-infectious chronic diseases have not received the same attention. Diabetes is one of those chronic diseases which have now become a major global health problem. It is both progressive and life-threatening with potentially devastating consequences for health (Suresh, 2006). As per World Health Organisation (WHO) diabetes country profiles, in India due to diabetes 75,900 male deaths and 51,700 female deaths were observed in the age group of 30 to 69 years and 46,800 male deaths, 45,600 female deaths of age group above 70 years (WHO, 2016).

A study on 1600 sample diabetic turkish population reveals that there were statistically significant differences between two groups regarding occupation, income, place of residence and consanguinity marriages. The most significant difference were observed for parameters such as family history of Diabetes Mellitus, physical activities, high blood pressure, stroke and macro vascular complications (Bener, Ozturk & Yildirim, 2017).

In another study of sample consisted of 415 patients from the Palestine Medical Complex (PMC), there was a statistically significant correlation between type of diabetes and difficulty in changing physical habits ($p < 0.05$) and difficulty in using a blood glucose meter ($p < 0.01$). Age was significantly correlated ($p < 0.05$) with difficulty in changing dietary habits and difficulty in changing physical habits. There was a significant relation ($p < 0.05$) between occupation and difficulty in changing dietary habits and difficulty in using a blood glucose meter. The educational level of the participants was significantly associated with difficulty in changing dietary habits ($p < 0.01$) and difficulty in taking medications ($p < 0.05$). (Salameh, B. et al, 2019).

Another study reveals that clinical and sociodemographic variables are relatively weak predictors of diabetes-related distress. The highest scores in the B-DDS were observed in the emotional burden domain, indicating the presence of diabetes distress among the participants of the study (Zanchetta et al, 2016).

2. METHODOLOGY:

2.1 Objectives:

The study aimed to examine the Diabetic Distress Scales (DDS) among the persons with diabetes and to compare the level of distress (DDS) with various socio-demographic variables of persons with diabetes.

2.2 Study Area:

This study was conducted in two government and four private hospitals of Hyderabad district, Telangana State which is one of the southern states in India and previously part of the United Andhra Pradesh.

Study Period: The study collected the data from the respondents during January 2022 and February 2022.

2.3 Research Design:

Descriptive research design was used in this study with a structured questionnaire. A purposive sampling method was used for the study where two (2) government and four (4) private hospitals in Hyderabad city were selected after obtaining their consent.

2.4 Sampling:

For this study a total of 220 diabetic patients have been selected for the study. Of which there are 100 male and 120 female respondents were there with both type-1 and type-2 diabetes mellitus. The study has been carried out in Hyderabad city which is one of the biggest Metropolitan areas in India. A total of two (2) government hospitals namely Basthi daawakana and urban primary health centre and four (4) Private hospitals namely, Yeshodha, Vanaja, Sunflower and Ratu have been selected using purposive sampling method.

2.5 Demographic and stress variables:

Demographic data on gender, age, religion, marital status, caste, education level, employment status and dietary plan collected using self-structured questionnaires. The Diabetes Distress Scale (DDS) has been used to assess the distress levels among adult diabetes patients of both type-1 and type-2. The DDS is a 17-item self-report tool. Here, each item is rated on a 3-point scale having 1 – Not a problem; 2 – Moderate problem; 3 – Serious problem. The scale gives an overall distress score based on the total responses on the 1-3 scale for all 17 items.

3. Data Analysis and discussion:

3.1 Association between Gender and DDS levels:

In this study gender is used to refer male and female which plays an important role in particular identities and behaviors as gender is socially constructed. In general there is an opinion among the common public that the stress levels vary between men and woman as they experience different symptoms.

Table 1: DDS level* Gender

S.No	Gender	DDS level			Total
		Low	Moderate	High	
1	Male	31 (51.7)	57 (44.2)	12 (38.7)	100 (45.5)
2	Female	29 (48.3)	72 (55.8)	19 (61.3)	120 (54.5)
Total		60 (100.0) (27.3)	129 (100.0) (58.6)	31 (100.0) (14.1)	220 (100.0)

From the Table 1, it is observed that out of 220 total respondents about more than one-fourth (27.3 percent) are having low stress levels. Further among them male respondents are small majority with 51.7 percent followed by female respondents with 48.3 percent. More than half of the respondents (58.6 percent) are having moderate stress levels. Among them female respondents are high in number (55.8 percent) compared to male respondents (44.2 percent).

The respondents having high stress levels are about one-seventh (14.1), of which majority of them are female respondents (61.3 percent) compared to male respondents (38.7 percent).

A non-parametric chi-square test was performed to identify whether there is any association between gender and stress levels among the sample persons with diabetes. The details are given in below table 2.

Table 2: Chi-square Tests - DDS level* Gender

Test	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.586(a)	2	0.452
N of Valid Cases	220		

(a).0 cells (.0%) have expected count less than 5.

From the table 2, it is found that the chi-square value is 1.586 at degrees of freedom 2 and significance value $p=0.452$, which is more than the level of significance 0.05. Hence, it is concluded that there is no significant association between the gender and DDS levels. The differences observed are merely due to chance.

3.2 Association between age and DDS levels:

Age plays a significant role in the life of human being to perform physical activities, health condition, diet, muscle power, stress levels, coping mechanisms and other areas. As this study related to stress and diabetes, age is more important in controlling the level of stress and diabetes. A study published in the proceedings of National Academy of Sciences found that stress can add years to the age of individual Immune system cell. In this area of study stress play a major role among diabetes which can speed up aging and the different drugs that doctors prescribe depending on the age also may lead to other health ailments which can cause stress and the number of years they live with diabetes and stress play a major role. Hence Age, has been considered as an important variable in this study since Diabetes is a chronic illness and constantly they will be under stress.

From the total respondents the minimum age is 29 years and maximum age is 86 years. The mean age of the sample respondents is 53.7 years. The below table represents the details of DDS levels and age groups:

Table 3: Age of the respondent * DDS levels

S.No	Age of the respondents	DDS levels			Total
		Low	Moderate	High	
1	29 to 46 years	20 (33.3)	30 (23.3)	10 (32.3)	60 (27.3)
2	47 to 61 years	28 (46.7)	65 (50.4)	12 (38.7)	105 (47.7)
3	62 to 87 years	12 (20.0)	34 (26.4)	9 (29.0)	55 (25.0)
Total		60 (27.3)	129 (58.6)	31 (14.1)	220 (100.0)

As seen in the Table 3, out of 220 total respondents about more than one-fourth (27.3 percent) are having low stress levels. Among them respondents of age group 47 to 61 years are in majority (51.7 percent) followed by age group 29 to 46 years (33.3 percent) and age group 62 to 87 years (20.0 percent). In the category of moderate stress levels, respondents of age group 47 to 61 years are in majority (50.4 percent) followed by age group 62 to 87 years (26.4 percent). Lastly, age group with least moderate stress levels are 29 to 46 years (23.3 percent).

The respondents with high stress levels are about one-seventh (14.1), of which majority (38.7 percent) of them belong to age group 47 to 61 years followed by age group 29 to 46 years (32.3 percent). Least percentage of respondents (29.0 percent) with high stress levels are 62 to 87 years age group.

A Non-parametric chi-square test was applied to identify the association between age and stress levels among the sample persons with diabetes. The details are given in below table 4

Table 4: Chi-square Tests - DDS level* Age

Test	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.484(a)	4	0.480
N of Valid Cases	220		

(a).0 cells (.0%) have expected count less than 5.

From the table 4, it is found that the chi-square value is 3.484 at degrees of freedom 4 and significance value $p=0.480$, which is more than the level of significance 0.05. Hence, it shows that there is no significant association between the respondent's age and their DDS levels. The differences observed are merely due to chance.

3.3 Association between Caste and DDS levels:

One's caste affects their options regarding marriage, employment, education, economic mobility housing etc. It solves economic problem in each and every individual as it is attached with an occupation and as it is hereditary in nature one can follow his traditional occupation .through his specialised occupation one can solve his economic problem. The patterns of taking food, wearing dress, keeping relations with other castes gives the individual identity.

Table 5: Caste of the respondents * DDS levels

S.No	Caste of the respondents	DDS levels			Total
		Low	Moderate	High	
1	SC	14 (23.3)	32 (24.8)	12 (38.7)	58 (26.4)
2	ST	6 (10.0)	1 (0.8)	1 (3.2)	8 (3.6)
3	OBC	30 (50.0)	75 (58.1)	13 (41.9)	118 (53.6)
4	OC	10 (16.7)	21 (16.3)	5 (16.1)	36 (16.4)
Total		60 (27.3)	129 (58.6)	31 (14.1)	220 (100.0)

From the Table 5, it can be seen that out of one-fourth (27.3 percent) respondents with low stress levels majority (50.0 percent) of them are Other Backward Castes (OBCs). This was followed by Scheduled Castes (SCs) with one-fourth (23.3 percent) and Other Castes (OC) are one-sixth (16.7 percent) respondents. Least low stress levels were found in STs (10.0 percent).

Similar results were found in the category of moderate stress levels, respondents of OBC's are in majority (58.1 percent) followed by one-fourth SCs (24.8 percent) and one-sixth OCs (16.3 percent) respondents. Lastly, least moderate stress levels are found in STs (0.8 percent). The respondents with high stress levels are about one-seventh (14.1), of which OBCs are in majority (41.9 percent) followed by SCs (38.7 percent), OCs (16.1 percent) and STs (3.2 percent) respectively.

In order to see the significant association between caste and DDS levels, chi-square test was applied. Below table represents the details of chi-square tests:

Table 6: Chi-square Tests - DDS level* Castes

Test	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	13.152(a)	4	0.041
N of Valid Cases	220		

(a).3 cells (25.0%) have expected count less than 5.

The table 6, shows that chi-square value is 13.152 at degrees of freedom 4 and significance value $p=0.041$, which is less than the level of significance 0.05. Hence, there is significant association between the caste and DDS levels. But the respondents of four caste groups are not in proportion, indicates that the significant association observed are might be merely due to chance.

3.4 Association between Religion and DDS levels:

Religion helps in creating an ethical frame work and also a regulator for values in day today life. Religion acts an agency of socialization it helps in building values like love, empathy, self-respect and harmony. It plays a crucial role in giving a cultural identity. Religious community gives people a sense of belonging and provides an important source of social support and encourages people to lead healthier life styles.

Table 7: Religion of the respondents * DDS levels

S.No	Religion of the respondents	DDS levels			Total
		Low	Moderate	High	
1	Hindu	32 (53.3)	90 (69.8)	25 (80.6)	147 (66.8)
2	Muslim	14 (23.3)	21 (16.3)	2 (6.5)	37 (16.8)
3	Christian	13 (21.7)	17 (13.2)	4 (12.9)	34 (15.5)
4	Others	1 (1.7)	1 (0.8)	0 (0.0)	2 (0.9)
Total		60 (27.3)	129 (58.6)	31 (14.1)	220 (100.0)

The Table 7 illustrates that out of one-fourth (27.3 percent) respondents with low stress levels majority (53.3 percent) of them belongs to Hindu religion. This was followed by Muslim (23.3 percent) and Christian (21.7 percent) having small difference in percentage. Other religious respondents constitute least in number with 1.7 percent.

Among 58.6 percent respondents with moderate stress levels, more than two-third (69.8 percent) respondents are Hindus followed by Muslim (16.3 percent) and Christian (13.2 percent) respondents. Only 0.8 percent respondents belong to other religious group. The respondents with high stress levels are about one-seventh (14.1), of which Hindus are in majority (80.6 percent) followed by Christian (12.9 percent) and Muslim (6.5 percent).

To test the significant association between religion and DDS levels, a non-parametric of chi-square test was performed. The below table represents the results of chi-square test:

Table 8: Chi-square Tests - DDS level* Religion

Test	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	8.953(a)	6	0.176
N of Valid Cases	220		

(a).0 cells (.0%) have expected count less than 5.

The table 8, shows that chi-square value is 8.953 at degrees of freedom 6 and significance value $p=0.176$, which is more than the level of significance 0.05. Hence, there is no significant association between the respondent's religion and their DDS levels. The differences observed are merely due to chance.

3.5 Association between education level and DDS level:

Education helps us to lead a good and healthy life, helps us to know the uses of various types of food and its nutritional values in dealing with health issues in protecting from diseases and leading a healthy life style which avoids many health problems and helps to manage stress. One should be aware of the things that affects our daily life especially need to have the knowledge about the particular diseases to deal with it manage efficiently and coping with the problem to lead a stressful life.

Table 9: Education levels of the respondents * DDS levels

S.No	Education levels of respondents	DDS levels			Total
		Low	Moderate	High	
1	Illiterate	23 (38.3)	32 (24.8)	9 (29.0)	64 (29.1)
2	1 to 5 th class	7 (11.7)	18 (14.0)	3 (9.7)	28 (12.7)
3	6 th to 12 th class	11 (18.3)	54 (41.9)	12 (38.7)	77 (35.0)
4	Graduation and above	19 (31.7)	25 (19.4)	7 (22.6)	51 (23.2)
Total		60 (27.3)	129 (58.6)	31 (14.1)	220 (100.0)

The table 9 represents the data pertaining to the education levels of the respondents and their DDS levels. It is observed that more than one-fourth (27.3 percent) are having low distress levels. Among them majority (38.3 percent) respondents with low distress levels are illiterates followed by graduation & above (31.7 percent) and 6th to 12th class (18.3 percent) respondents respectively. Least distress levels (11.7 percent) were found in respondents belongs to education level of 1 to 5th class.

More than half of the respondents (58.6 percent) are having moderate stress levels. Among them majority (41.9 percent) respondents belongs to educational level of 6th to 12th class followed by illiterates (24.8 percent) and graduation & above (19.4 percent). Least moderate distress levels were found in the educational group of 1 to 5th class (14.0 percent). The respondents with high distress levels are about one-seventh (14.1), of which more than one-third (38.6 percent) are 6th to 12th class educational group followed by illiterates with less than one-third (29.0 percent) and graduation & above with one fourth (22.6 percent) respondents.

In order to identify the significant association between educational levels and DDS levels, a non-parametric of chi-square test was performed. The below table represents the results of chi-square test:

Table 10: Chi-square Tests - DDS level* Religion

Test	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	12.29(a)	6	0.056
N of Valid Cases	220		

(a).1 cells (8.3%) have expected count less than 5.

The table 9, shows that chi-square value is 12.29 at degrees of freedom 6 and significance value $p = 0.056$, which is slightly more than the level of significance 0.05. Hence, there is no significant association between the respondent's educational level and their DDS levels. The differences observed are merely due to chance.

3.6 Association between Employment status and DDS levels:

Occupation helps an individual to maintain his or her living standards; it enhances the qualification skills and capacities of professionals. It helps for personality development and people who are involved in occupation earn social respect. It has a set of behaviours connected to social norms that allows someone to organise and allocate time for self-care activities and enjoys work and payment. The quality of life may also depend upon the kind of occupation the individual have.

Table 11: Occupational levels of the respondents * DDS levels

S.No	Education levels of respondents	DDS levels			Total
		Low	Moderate	High	
1	Unskilled	25 (41.7)	50 (38.8)	14 (45.2)	89 (40.5)
2	Skilled	14 (23.3)	31 (24.0)	8 (25.8)	53 (24.1)
3	Business	4 (6.7)	14 (10.9)	3 (9.7)	21 (9.5)
4	Professionals	17 (28.3)	34 (26.4)	6 (19.4)	57 (25.9)
Total		60 (27.3)	129 (58.6)	31 (14.1)	220 (100.0)

The table 10 represents the data pertaining to the occupational status of respondents and their DDS levels. It is observed that more than one-fourth (27.3 percent) are having low distress levels. Among them majority (41.7 percent) are unskilled followed by professionals (28.3 percent) and skilled (23.3 percent) respondents respectively. Least distress levels (6.7 percent) were found in respondents belongs to occupational status of business.

More than half of the respondents (58.6 percent) are having moderate stress levels. Among them majority (38.8 percent) respondents are unskilled followed by professionals (26.4 percent) and skilled (24.0 percent). Least moderate distress levels were found in respondents engaged in business (10.9 percent). The respondents with high distress levels are about one-seventh (14.1), of which majority (45.2 percent) are unskilled followed by skilled with one-fourth (25.8 percent) and professionals with less than one-fourth (19.4 percent) respondents.

In order to identify the significant association between occupational status and DDS levels, a non-parametric of chi-square test was performed. The below table represents the results of chi-square test:

Table 12: Chi-square Tests - DDS level* Religion

Test	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	12.29(a)	6	0.941
N of Valid Cases	220		

(a).1 cells (8.3%) have expected count less than 5.

The table 11, shows that chi-square value is 1.748 at degrees of freedom 6 and significance value $p = 0.941$, which is more than the level of significance 0.05. Hence, there is no significant association between the respondent's occupational status and their DDS levels. The differences observed are merely due to chance.

3.7 Association between diet/meal plan and DDS levels:

Healthy diet plan is important to every person for good health. It is more essential for the diabetic patients to control their level of diabetes and it protects against various non-communicable diseases such as heart issues, cancer and others.

Table 13: Respondents diet/meal plan * DDS levels

S.No	Diet/meal plan	DDS levels			Total
		Low	Moderate	High	
1	Always	51 (85.0)	84 (65.1)	15 (48.4)	150 (68.2)
2	Rarely	9 (15.0)	37 (28.7)	14 (45.2)	60 (27.3)
3	Never	0 (0.0)	8 (6.2)	2 (6.5)	10 (4.5)
Total		60 (27.3)	129 (58.6)	31 (14.1)	220 (100.0)

The Table 12 illustrates that out of one-fourth (27.3 percent) respondents with low stress levels majority (85.0 percent) of them asserted that they are regularly following the diet/meal plan. This was followed by respondents who are following diet/meal plan rarely (15.0 percent). Among 58.6 percent respondents with moderate stress levels, more than two-third (65.1 percent) respondents are following diet/meal regularly. This was followed by respondents following diet plan rarely (28.7 percent) and never (6.2 percent).

The respondents with high stress levels are about one-seventh (14.1), of which respondents following diet plan regularly are in majority (48.4 percent) followed by rarely (45.2 percent). Least percentage (6.5 percent) respondents with high distress levels are not following any diet/meal plan.

To test the significant association between diet/meal plan and DDS levels, a non-parametric of chi-square test was performed. The below table represents the results of chi-square test:

Table 14: Chi-square Tests - DDS level* diet/meal plan

Test	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	15.720(a)	4	0.03
N of Valid Cases	220		

(a).0 cells (0.0%) have expected count less than 5.

The table 12, shows that chi-square value is 15.720 at degrees of freedom 4 and significance value $p = 0.03$, which is less than the level of significance 0.05. Hence, there is a significant association between the respondent's diet/meal plan and their DDS levels.

3.8 Correlation between DDS levels and socio-demographic status of respondents:

In order to identify the relationship between the DDS levels and various socio-demographic variables of respondents, a non-parametric of spearman's rho correlation test was performed. The results were shown below:

Table: Spearman's rho correlation between DDS levels and various socio-demographic variables

Particular	Age	Gender	Marital Status	Religion	Caste	Education	Occupation	Meal
Correlation Coefficient	0.04	0.085	-0.034	-.065	-0.03	0.028	-0.027	.255**
Sig. (2-tailed)	0.50	0.21	0.619	0.076	0.613	0.681	0.69	0

** Correlation is significant at the 0.01 level (2-tailed)

The above table results illustrates that there is significant positive correlation (0.255) between the diet/meal plan followed by the diabetic persons and their distress levels (DDS levels). It shows that with the regularity of diet/meal plan there is gradual decrease in the distress levels among diabetic individuals. And there is no significant correlation between distress levels (DDS) and variables like age, gender, marital status, religion, caste, education and occupation.

4. CONCLUSION:

There is an upsurge in prevalence of diabetes in developing countries particularly in India which is affecting many individuals and families leading to distress. Especially in urban areas there was a steady increase in number of diabetic patients due to urban life style and environmental changes. In this regard, this study explores the socio-demographic determinants influencing the distress levels among diabetic persons in urban life style (Hyderabad and Secunderad cities). It is interesting to observe that there are no significant differences in distress levels among the diabetic patients' socio-demographic factors like age, gender, caste, religion, education and occupation statuses. But maintaining regular diet/meal plan is having a significant impact on the distress levels, where respondents with good dietary plan are low distress compared to diabetic patients who are not following any diet/meal plan.

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