

Perceived Social Support and Glycemic Control among Type 2 Diabetes Patients in a Tertiary Care Centre in Chennai, Tamil Nadu, India

Deepanchakravarthi V¹, S. Arun Murugan², Shruthee SG³

¹Assistant Professor, Department of Community Medicine, Government Medical College, Thiruvallur, Tamil Nadu, India

²Professor and Head, Department of Community Medicine, Government Omandurar Medical College, Chennai, Tamil Nadu, India

³Former District NCD Programme Officer, Directorate of Public Health and Preventive Medicine, Chennai, Tamil Nadu, India

Correspondence: Dr. Deepanchakravarthi.V, Email:chakravarthiii1391@gmail.com

Abstract:


Introduction: Support from the external environment for enabling behavioral change, is often instrumental in mediating glycemic control in patients coping with diabetes. While evidence is scant in the Indian setting, there is a lack of consistency in findings among studies done elsewhere. **Objective:** To assess the perceived availability of social support and its association with glycemic control among type 2 diabetics. **Method:** Between October and December 2019, a cross sectional study was conducted among 150 adult patients at the Diabetology clinic in a tertiary care centre in Chennai. Outpatients with a confirmed diagnosis of type 2 diabetes for at least one year, were recruited by convenient sampling. Perceived social support was assessed using the RAND-MOS social support survey instrument, while average of last three fasting blood glucose (FBG) readings determined glycemic status. Non-parametric Kruskal Wallis and Mann-Whitney U tests were used to analyze association of social support with glycemic control and socio-demographic determinants. Spearman's correlation coefficients with 95% CIs are reported for association of individual domain scores with average FBG. All analyses were performed with SPSS Version 23. **Results:** Study participants were aged 35 to 85 years, and living with type 2 diabetes for a mean duration of 10 ± 7.7 years. The average FBG in the past year ranged from 79 to 398 mg/dl in these patients, with 41 (27%) and 109 (73%) being classified as having good and poor glycemic control, respectively. The median (IQR) social support summary score was 62 (40-81) on a scale of 0 – 100; perceived social support was reportedly low, intermediate, and high in 36 (24%), 74 (49%) and 40 (27%) participants, respectively. The level of social support was not found to be significantly associated with glycemic control ($P=0.628$); average FBG and summary social support score showed no correlation [$\rho=.081$ (95% CI: $-.097, .253$), $P =.322$]. **Conclusion:** While a three-fourths majority reported availability of social support for coping with diabetes, this was not found to be significantly associated with glycemic status. The potential role of support networks, beyond the immediate family, in improving health outcomes needs to be examined.

Keywords: Diabetes, Family, Glycemic Control, Perceived Support, Social Support

Introduction:

According to the latest report (2021) of the International Diabetes Federation, one in 10 adults globally are estimated to have type 2 diabetes mellitus, with low and middle income countries accounting for three-fourth of the burden.^[1,2] India

has an estimated 77 million adults living with type 2 diabetes and more than 50% are not aware of their diabetic status.^[3] Rapid urbanization and an aging population combined with dramatic changes in lifestyle are the major factors contributing to this surge in its prevalence.^[1] The most conspicuous

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attribute of the illness is its chronicity, which demands life-long adherence to medication and lifestyle modifications; severe end organ damage and premature death are well documented consequences of long standing uncontrolled diabetes.^[4]

Several studies point to the association of perceived social support with improved outcomes in patients coping with diabetes, through intermediate pathways of effective self-care practices and sustained adherence to treatment recommendations.^[5-7] Social support may be defined as 'a personal perception of known and unknown needs that are gratified by significant help from others through individual or community interaction and contacts'.^[8] It is a qualitative construct that informs us about the functional and behavioral aspects of a person's social network; it may not necessarily be a positive influence.^[9] In recent times, social support is being increasingly recognized as a mediator or moderator of health outcomes. Available evidence suggests that social support may play various roles in the management of diabetes: 1) informational support regarding treatment, complications and follow up, 2) emotional or affectionate support that fosters comfort and helps deal with perceived stress and 3) tangible support, which is practical assistance with daily living such as with household chores, preparation of diabetic-friendly meals, and satisfying financial and other needs for accessing health care.^[10]

Attaining Glycemic control often requires psychosocial interventions, for effective behavioral change and self-care; mere physician initiated medical treatment may at best, play a cursory role.^[11] However, results from available studies,^[12-16] exploring the role of social support in mediating Glycemic control among diabetic patients, are inconsistent. Due to this, and a paucity of published studies in the Indian context, the present study aims to estimate the perceived availability of social support and to determine its association with Glycemic control in patients with type 2 diabetes mellitus.

Methods:

A single-center facility level cross sectional study was conducted at the Diabetology outpatient clinic in a Government Medical College Hospital, Chennai during the period from October 2019 to December 2019. Outpatients aged 18 years and above, with a confirmed diagnosis of type 2 diabetes mellitus, who have known their disease status for at least one year prior to the study were eligible to participate in the survey. Based on the mean (SD) social support score of 68.1 (16.97) reported in the study done by Chew BH et al^[8], the minimum sample size required for estimation of mean social support was found to be 123 using the formula $(z_{\alpha/2})^2 SD^2 / d^{2[17]}$ with an absolute precision (d) of 3 at 95% confidence level ($z_{\alpha/2} = 1.96$); hence a final sample size of 150 was decided. Patients reporting to the facility, satisfying the inclusion criteria were sampled conveniently, until the required sample size was reached.

The data was collected by personal interview using a semi-structured questionnaire in the local language, after obtaining written informed consent. Information regarding the socio-demographic characteristics and relevant clinical history was collected, followed by assessment of availability of social support using the RAND Corporation – Medical Outcomes Study (RAND-MOS) social support survey instrument.^[18] The survey instrument is available free of charge; translation of the tool to the local language was performed by the investigators, followed by back-translation by a third party to check for appropriateness. Median (Interquartile range) score in each domain of social support, overall summary index score and its association with Glycemic control and relevant socio-demographic determinants were the primary and secondary outcomes studied.

Social support, in this study, refers to perceived availability of support from any person who is a friend or family member in imagined social conditions in the past 1 year, as measured using the survey instrument by RAND - MOS. It is a 19 item multi-dimensional instrument developed as part of

the Medical Outcomes Study (MOS)^[19] conducted at RAND Corporation for studying healthcare outcomes in patients with chronic conditions. It comprises 4 sub-scales that measure various dimensions of social support: emotional support/informational support (items 2, 3, 7, 8, 12, 15, 16, and 18), tangible support (items 1, 4, 11, and 14), positive social interaction (items 6, 10, 17), and affectionate support (items 5, 9, and 19), and one overall summary index. These 19 items are given a score of one (none of the time) to five (all the time) each. The respondent-specific mean score of the items in each sub-scale is calculated, ignoring items with missing values; the overall summary index score is calculated by averaging scores of all 19 non-missing items, resulting in scores in the scale of one to five for each domain and the summary index. These scores are then transformed to have a possible range of 0 – 100, with a higher score indicating better social support. Perceived social support is classified into 3 groups: low, intermediate and high using 40% and 80% of the total score as the cut-offs.

Glycemic control was assessed based on the average of three most recent fasting blood glucose (FBG) levels within the past one year. As per American Diabetic Association 2019 guidelines, FBG in the range of 80 - 130 mg/dl was defined as good Glycemic control^[20] while any reading outside this range was categorized as poor Glycemic control for the purpose of this study. The association of social support summary index scores with Glycemic control and socio-demographic determinants was analyzed using Kruskal Wallis or Mann Whitney U tests as appropriate. Spearman's correlation coefficient (ρ) was estimated to determine correlation of individual domain scores with average FBG; 95% confidence intervals are reported. A *P* value < .05 is statistically significant. All statistical analyses were performed with SPSS (version 23; SPSS, Inc., Chicago, IL, USA). The study protocol was approved by the Institutional Ethics Committee.

Results:

The mean age of the 150 participants recruited for the study was 59 ± 9 years, with the minimum and maximum age being 35 and 85 years, respectively. The male to female ratio was 1: 1.6, with a two-thirds majority currently married. Household size ranged from one to ten, with a median (IQR) household size of 4 (2-5). Table 1 and Table 2 show the socio-demographic and clinical profile of the study participants.

Table 1: Socio-demographic profile of the study participants (N=150)

Variables	n (%)
Age (years)	
<40	4 (2.7)
40-60	80 (53.3)
>60	66 (44)
Sex	
Male	57 (38)
Female	93 (62)
Marital status	
Single	1 (0.7)
Married	104 (69.3)
Widowed/separated	45 (30)
Educational status	
Illiterate	47 (31.3)
≤10 years of schooling	69 (46)
>10 years of schooling	32 (21.3)
Graduate	2 (1.3)
Employment Status	
Unemployed	103 (69)
Employed	47 (31)
Socioeconomic status*	
Upper	12 (8)
Upper middle	54 (36)
Middle	56 (37.3)
Lower middle	26 (17.3)
Lower	2 (1.3)

**Modified BG Prasad scale with CPI(IW) updated as of August 2019.*

Table 2: Diabetic profile of the study participants (N=150)

Variables	n (%)
Age at diagnosis (years)	
< 40	36 (24)
≥ 40	114 (76)
Duration of diabetes (years)	
<10	87 (58)
10-20	50 (33)
>20	13 (9)
Treatment	
Oral hypoglycemics	119 (79)
Insulin with oral hypoglycemics	31 (21)
Glycemic Control*	
Good	41 (27)
Poor	109 (73)
Complications	
Present	61 (41)
Absent	89 (59)

*Based on average of last three fasting blood glucose (FBG) readings; FBG in the range 80 – 130 mg/dl was classified as good control.

While 4% and 13% reported being current and former smokers, 6% and 13% were current and former drinkers respectively. The proportion of patients with early-onset diabetes (age at onset less than 40 years)^[21] was 24%. Patients were aware of their diabetic status for a mean duration of 10 ± 7.7 years, with the minimum and maximum duration being 1 year and 45 years, respectively. The average of last three FBG readings in the past 1 year in these patients ranged from 79 to 398 mg/dl, with a median (IQR) of 175 (127 - 232) mg/dl. Based on ADA 2019 guidelines, nearly three-fourth of the patients were categorized as having poor Glycemic control; one-fifth of the participants were currently using insulin at the time of the study. Among the 61 patients identified with diabetes-related morbidity, peripheral neuropathy (22,36.1%), chronic kidney disease (14,23%), diabetic ulcer (13, 21.3%) and ischemic heart disease (12,19.7%) were observed respectively, in decreasing frequency.

Table 3: Median (IQR) scores and levels of perceived social support among Diabetic patients (N=150)

Social support domain	Median (IQR) Score	Levels of social support, n (%)		
		Low (0 - 39*)	Intermediate (40 - 79*)	High (80 - 100*)
Emotional Support	50 (27-75)	46 (31)	70 (46)	34 (23)
Tangible Support	75 (50-100)	29 (19)	48 (32)	73 (49)
Affectionate Support	75 (41-100)	35 (23)	61 (41)	54 (36)
Positive Social Interaction	25 (0-50)	86 (58)	59 (39)	5 (3)
Overall Summary index	62 (40-81)	36 (24)	74 (49)	40 (27)

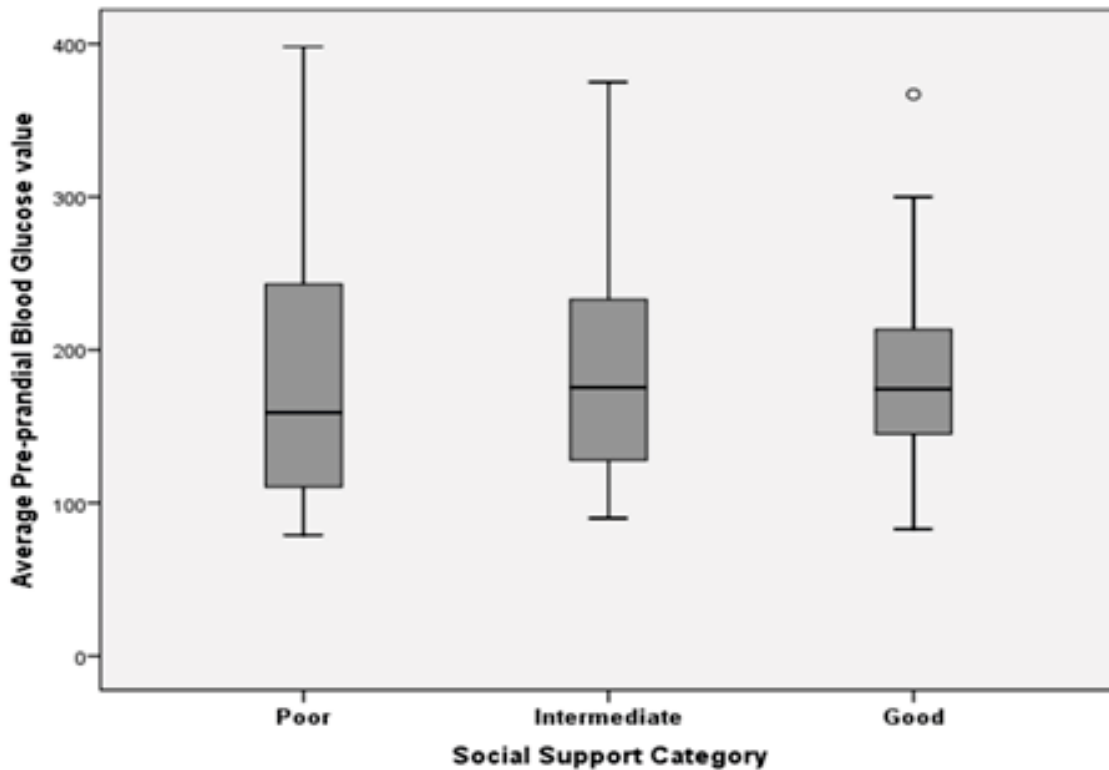
Note. *40% and 80% of total score are used as cut-offs for classifying three levels of social support

Median (IQR) social support summary index score for study participants was found to be 62 (40-81); with 49% and 27% having intermediate and high levels of perceived social support. The median (IQR) score in each domain of social support along with categorization of study participants based on perceived availability of social support is given in Table 3. Poor correlation was observed between

overall summary index score and household size [$\rho = .185$ (95% CI: .028, .338), $P = .023$]. Figure 1 shows the distribution of average fasting blood glucose in the past 1 year in individuals reporting various levels of perceived social support.

It is seen that, there is no statistically significant difference with respect to the average Fasting Blood Glucose value (FBG) between these groups and the

Figure 1: Distribution of average fasting blood glucose in participants reporting various levels of social support (N=150)



range of the distribution becomes increasingly narrower with higher levels of support. It is notable that only one (2.5%) participant had an average FBG above 300 mg/dl in the high social support category, while 6 (8.1%) and 4 (11%) had average fasting values above 300mg/dl in the intermediate and low categories respectively.

Table 4 reports the correlation of scores in each domain of social support with average fasting blood glucose levels among study participants.

Regarding the association of perceived social support with socio-demographic determinants of the participants, it was found that apart from marital status ($P = .028$), all other variables are seen to have no significant association with availability of social support among. Relevant clinical features such as age at diagnosis ($P = .311$), duration of diabetes ($P = .346$), or presence of secondary complications ($P = .868$) also seem to have no significant association with perceived social support in these patients.

Table 4: Correlation of social support domain scores with average fasting blood glucose levels (N=150)

Domains of Social support	ρ^*	95% Confidence Interval for ρ		p value
		Lower limit	Upper limit	
Emotional support	0.088	-0.085	0.246	0.283
Tangible support	0.061	-0.107	0.227	0.460
Affectionate support	0.145	-0.025	0.302	0.076
Positive Interaction	-0.088	-0.248	0.080	0.285
Overall summary index	0.081	-0.097	0.253	0.322

Note. *Spearman's correlation co-efficient

Discussion:

It was observed that approximately one-fourth and one-half of the patients with type 2 diabetes in this study reported high and intermediate levels of perceived social support, respectively. A similar proportion (29.7%) of participants reported high levels of social support in a study conducted at an institution attached urban primary health center in Malaysia in 2015,^[8] which also used the RAND-MOS tool for measuring social support. A facility based study in Ethiopia^[22] using the Diabetic social support tool^[23,24] classified 55% of its diabetic patients as perceiving good social support; informational (55%), emotional (53%), companionship (53%) and tangible (49%) support were the most common forms of social support reported by participants. Whereas, in the present study, majority of participants reported tangible and affectionate support as the most commonly available forms of support, followed by emotional and informational support, while positive social interaction took a backseat.

While the difference in reported social support levels may be explained partially by varying socio-cultural perceptions and practices in different country settings, the absence of uniformity in measurement tools and cut-offs employed for classification of perceived social support must also be considered. While we have employed a cut-off of more than 80% of the total score to define high social support in this study, above mentioned studies^{[8],[20]} have used 75% of total score and mean score as cut off points respectively for characterizing the same parameter. The justification for using 40% and 80% of total scores as cut-offs for classifying social support into three categories in this study, is that upon transformation back to the original response item scale of 1-5, these limits correspond to classification of participants based on their average responses; responses ranging between 'none' or 'little of the time' as low social support, between 'little', 'some' and 'most' of the time as intermediate, and 'most' or 'all of the time' as high social support.

No statistically significant association was found between perceived social support and Glycemic control in our study. Studies conducted in Asians^[12-13] have shown a significant positive association between social support and Glycemic control; other studies done in Asia and elsewhere^[7-8,15-16,23] negate this finding. A study conducted in a Chinese healthcare facility^[12] indicates that social support helps in improving Glycemic control as it has a direct effect on patients' self-motivation and confidence; structural equation modelling describes this relationship to be completely and sequentially mediated by self-care and adherence. Similarly, an Indian study^[14] in 2016 has shown that social support positively influences self-management behaviors in diabetes such as diet control, physical activity and Glycemic monitoring. A systematic review by Kadirvelu et al in 2012 substantiates this finding, and further recommends for inclusion of psycho-social interventions in the management of diabetes.^[10]

As the participants in this study sought care from a tertiary level facility, with a considerable proportion falling on the severe end of the disease spectrum, as indicated by insulin usage and presence of end organ damage in 21% and 41% of these patients, whether this could have potentially modified the effect of available social support on Glycemic control needs to be examined. Furthermore, the mean duration of diabetes among study participants was 10.4 years and the possibility that the chronicity of disease and the resulting heightened β -cell dysfunction may dampen the effect of social support on Glycemic control as described in a similar study by Chew et al,^[8] must also be entertained. Available evidence^[26,27] suggests that duration of diabetes is an important determinant of Glycemic control. Studies done by Karimy et al^[28] and Mohebi et al^[15] describe a significant association between duration of diabetes and social support, with availability of social support diminishing with increase in disease duration. In our study, we did not find any significant association between disease duration and social support.

The social support summary index score was significantly associated with the marital status of the study participants. Spousal support constitutes a major aspect of the support received by an individual, and married individuals usually have a wider social network and interactions compared to those living alone.^[29,30] Gender, education and employment status of the study participants were not seen to be associated with social support; however, men on average scored higher on the social support scale. A study conducted by Mohebi et al^[15] in Iran shows male diabetics reporting higher levels of social support; and this is consistent with the socio-cultural norms generally prevalent among Asians, where women often exclusively fulfil the care and support roles within a family.

The poor correlation observed between household size and availability of social support is contrary to expectations of availability of better support in a larger household, as documented in a study conducted by Chew et al.^[8] The role of recent technological developments in fulfilling social support needs without requiring direct personal contact, may need to be considered in this context. A systematic review of six controlled intervention studies by Van Dam et al to determine the role of social support in diabetes in 2005 found that new forms of social support such as group consultations, internet or telephone based peer support, and support groups were promising avenues, while classic forms of support from family and friends did not improve control of diabetes.^[31]

Conclusion:

Nearly three-fourth of the participants in this study reported intermediate or high levels of classic forms of social support, especially in marital relationships, for managing their diabetes. However, a positive association of perceived social support with Glycemic control could not be established in this study. Further research exploring newer avenues for creating and establishing support networks, beyond the context of family, is imperative for improving health outcomes in patients coping with chronic illnesses.

Limitations:

This study has several limitations. Being a tertiary facility-based study, this may introduce selection bias with regard to representativeness across the disease spectrum; this precludes generalizability of results to the average diabetic individual in the community. Due to resource constraints typical of a public facility, fasting blood glucose rather than glycosylated hemoglobin (HbA1c) was used for classifying Glycemic control in these patients, despite the latter being the more specific test. Furthermore, possibility of construct bias in the assessment of perceived social support cannot be excluded as the survey instrument has not been validated in the study setting, despite being validated and adapted to other Asian countries such as neighboring China and Taiwan.

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Declaration:

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Conflict of Interest: Nil

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