



# **The Assessment of Relations between Socioeconomic Status and Number of Complications among Type 2 Diabetic Patients**

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## **Abstract**

**Background:** The prevalence of diabetes mellitus among Iranian aged 25–64 estimated to be about 7.7%. The aim of current study was the assessment of socioeconomic status of diabetic patients and their complications.

**Methods:** A cross sectional study was conducted on type 2 diabetic patients with complications in four major teaching hospitals affiliated to Tehran University of Medical Sciences (TUMS) during July 2009 to March 2010. All patients (530) were interviewed through a questionnaire with 85% response rate (450 patients). Skilled nurses were assigned as responsible for data collection. Collected data analyzed by Exact Fisher and  $\chi^2$  tests using SPSS version 11.5.

**Results:** The majority of patients had experienced one or more complications. Findings revealed that 50%, 33.6% and 16.4% of the patients suffered from one, two, and three complications of type 2 diabetes, respectively. Patients with cardiovascular complications included 22.2%, with both cardiovascular and eye complications (12.7%), and with cardiovascular, eye and foot ulcer together 14% of the respondents. Frequency of complications demonstrated significant relation with sex, age, educational level, type of occupation, duration of diabetes ( $P<0.001$ ) and social class ( $P=0.002$ ). The majority of patients (54.2%) belonged to low income group.

**Conclusion:** It seems patients with low socioeconomic status face more challenges in their social environment together with less psychological support. Health care systems are responsible to empower them to control their illness and feel a better life to live.

**Keywords:** Type 2 diabetes, Complications, Socioeconomic status

## **Introduction**

Diabetes mellitus is a chronic metabolic condition with rapidly increasing characteristics worldwide. Diabetes as a determinant illness in epidemiologic transition is one of major health concerns in both developed and developing countries (1). It is associated with a significant increased risk for

morbidity and mortality (2, 3). Diabetes demonstrated correlation with micro and macro vascular complications, with variety of side effects. Increased rate of mortality due to organ dysfunctions resulted from macrovascular and microvascular complications has been reported (4).

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Growing rate of diabetic patients requires more resources for their treatment (5). The prevalence rate of diabetes mellitus among adult (25–64 years) Iranian citizens was estimated as about 7.7% in 2005 (2 million individuals) by The "National Survey of Risk Factors for Non-Communicable Diseases of Iran" (6).

Despite the fact that prevalence of macrovascular and microvascular complications of diabetes has been studied by several studies, the relationship between consequences of diabetes and socioeconomic status of patients has not widely been analyzed. In this study not only the prevalence of diabetes (type 2) complications was reviewed, but also the relationship between the complications and socioeconomic status of the patient analyzed (7). Though the relation between socioeconomic status and general wellbeing of population has widely been approved (8), it is not clear that how socioeconomic status affects the outcome of treatment for diabetic patients. It seems that access to/ and utilization of health care services, together with quality of care plan, and patients' cooperation and adherence to the whole process of treatment during daily activities, may result to quality or unpleasant consequences of the illness (9).

The number of complications among patients contracted with type 2 diabetes and its relation with socioeconomic status of the patients is followed as the main objectives of the present study.

The goal of the present study was determining socioeconomic factors influence on the number and types of complications resulted from type 2 diabetes.

## Materials and Methods

A cross sectional study was conducted on type 2 diabetic patients with complications in four major teaching hospitals affiliated with Tehran University of Medical Sciences (TUMS). These centers selected due to their great capacities for collaboration in data collection process, direct

monitoring of activities for diabetic patients, and their super-specialty levels.

A questionnaire with 42 questions was employed as an instrument for data collection. The questionnaire consisted of three main categories as followings:

1. General demographic information such as age, sex, marital status, family size, Living environment climate, type of job, level of educational attainment, and family income.
2. Health related background: disease duration, type of complications, type of treatment, physical activity, and general health status.
3. Social related factors: social relations and interactions between patients and their family members, perceptions and feeling of patients about security atmosphere of their living spaces, family support for the patient and leisure time.

Skilled nurses assigned as responsible for data collection. Analysis of data conducted through SPSS version 11.5.

Reliability measured by test –retest method ( $\alpha$ -chronbach = 0.76). Content validity also achieved through the experts opinions. From ethics point of view no patient forced or obliged to participate in the study. All patients (530, response rate was 85%) recognized as type 2 diabetes were interviewed during the course of study (9 months), therefore there was no need to sampling.

The inclusion criteria were type 2 diabetes patients with complications including Nephropathy, retinopathy, ischemic heart disease, foot ulcer, limb amputation, and stroke. The complications were defined as following:

- § Nephropathy: Impaired renal function as reflected by chronic estimated GFR of  $\leq 60$  ml/min per 1.73 m<sup>2</sup>. GFR was estimated by Cockcroft-Gault equation:

$$CCr \text{ (mL/min)} = \frac{(140 - \text{Age}) * \text{Lean body weight (kg)}}{72 * Cr \text{ (mg/dL)}}$$

For women, the formula requires multiplication by 0.85 to account for smaller muscle mass compare to men (10).

- § Retinopathy: Based on ophthalmologic consultation
- § Ischemic heart disease: According to history, ECG and coronary angiography.
- § Foot ulcer: According to Wagner criteria for diabetic foot ulcer(11)
- § limb amputation: According to history of limb amputation at any level
- § Stroke: According to neurological consultation based on loss of focal brain function.

Other diabetic patients such as type 1 diabetes and secondary diabetes were excluded from the study.

Exact Fisher and  $\chi^2$  tests were conducted for assessment of associations between dependent and independent variables.

## Results

Overall, 450 type 2 complicated diabetic patients participated in the study. Table 1 demonstrates demographic characteristics of the patients. About 89.9% (n=373) of the respondents belonged to low social class, while 9.8 % ( n=44) and 7.3% (n=33) of them were placed on middle and high social classes respectively. Table 2 reveals dominant type and frequency of complications among the population study.

**Table 1:** Demographic and Health- related Characteristics of the Sample

Variables	Frequency n (%)	Variables	Frequency n (%)
Sex		Family Annual Income Group(R)	
Male	243(54)	< 36* 10 <sup>6</sup>	129(28.7)
Female	207(46)	36* 10 <sup>6</sup> -72* 10 <sup>6</sup>	244(54.2)
		72* 10 <sup>6</sup> -108* 10 <sup>6</sup>	44(9.8)
		>108 * 10 <sup>6</sup>	33(7.3)
Age Group(yr)		Duration of Diabetes(yrs)	
<60	247(54.9)	<5	165(36.7)
60-70	94(20.9)	5-9	72(16)
>70	109(24.2)	10-15	100(22.2)
		16-19	52(11.6)
		>20	61(13.6)
Marital Status		Physical Activity(minutes per week)	
Married	311(91.3)	<150	420(93.3)
Unmarried	39(8.7)	≥150	30(6.7)
Levels of Education		General Health Status	
Illiterate & primary	114(25.3)	Very Favorable	39(8.7)
Secondary level	237(52.7)	Favorable	218(48.4)
Tertiary	100(22)	Unfavorable	193(42.9)
Occupation		Type of Treatment	
Homemaker	210(46.7)	Diet alone	32(7.1)
Retired	128(28.4)	Oral agents	273(60.7)
Self- employed	73(16.2)	Using Insulin	66(14.7)
Civil servant	32(8.7)	Oral agents & Insulin	79(17.6)
Unemployed	7(1.6)		

**Table 2:** Types and frequency of complications among participants

Diabetes Complications	Frequency n (%)
One (Cardiovascular)	*225(50) **100(22.2)
Two ( Cardiovascular & Eye)	151(3.6) 57(12.7)
Three and more ( Cardiovascular , Eye & Foot Ulcer)	74(16.4) 63(14)

\* The most frequent complication in number

\*\* The most frequent complication in type

In terms of diagnosis of the illness, (36.7%, n=165) of the patients reported that they become aware of contracting with type 2 diabetes at least

five years ago. Findings also revealed that oral medication was dominant type of treatment in population study (60.7%, n=273). Although home was describe as a place for spending leisure time by almost half of the respondents (48.4%, n=218), less than 50% ( n=214) of them were satisfied with their living environment security and communication with their family members. Variables such as family size, type of treatment, duration of diabetes, educational level, types of job, and the way spending leisure time, all developed significant relations with number/frequency of type 2 diabetes among study population ( $P<0.001$ ). Female sex also developed a significant relation with dependent variable, with 95% confidence ( $P=0.05$ ). Table 3 summarizes these findings.

**Table 3:** Comparison between number of complications and study variables

Variables	One Complication	Two Complications	Three Complications
Sex			
Male	NS	NS	NS
Female	NS	$P<0.001$	NS
Age Group(yr)	$P<0.001$	$P<0.001$	$P<0.001$
Marital Status	NS	NS	NS
Level of Education	NS	$P<0.001$	$P<0.001$
Family Size	$P<0.001$	$P<0.001$	$P<0.001$
Occupation	NS	$P<0.001$	$P<0.001$
Security in Living Environment	$P<0.001$	NS	$P<0.001$
Communication in Living Environment	$P<0.005$	$P<0.005$	$P<0.005$
Leisure time Spending	$P<0.001$	$P<0.001$	$P<0.001$
General Health Status	$P<0.001$	$P<0.001$	$P<0.001$
Duration of Diabetes	$P<0.001$	$P<0.001$	$P<0.001$
Physical Activity	NS	NS	NS
Type of Treatment	$P<0.001$	$P<0.001$	$P<0.001$
Family Annual Income Group	$P<0.001$	$P<0.001$	$P<0.001$

NS=Not Significant

## Discussion

According to WHO report (2006), diabetes as an epidemiologic transition disease not merely affects the rich / developed countries and well to do social classes. In fact, population in working age and poorer countries also is highly affected by this illness (1).

Type 2 diabetes does not demonstrate definite symptoms in early stages, so patients contracted type 2 diabetes may become aware of their illness in very advanced stages. Even in this stage some patients with low socioeconomic status do not seeking appropriate care due to either lack of access (physically or financially) to health care, or lack of enough knowledge and sensitivity about their illness and its consequences (12). This study revealed findings similar to studies conducted in other countries (8-10).

Similarities have been found between findings of the present study and that of Lagrange as follows:

1. A lion share (83%, n= 373) of the study population was from low socioeconomic status.
2. More complications resulted from type 2 diabetes were found among women than men.
3. A greater part of the study population demonstrated that patients living with type 2 diabetes had become aware of their illness too lately (6, 13). As it has been indicated in Table 1, patients become aware of their illness (type 2 diabetes) at least five years later than initial syndromes of illness and complications developed in their bodies (14).

Findings revealed "low socioeconomic status", "bigger family size", "low level of educational attainment and income", "no outdoor leisure time activities " were main socioeconomic and demographic characteristics of the study population .These characteristics apparently lead to a cumulative effects on poor people's developing of illness as it has been indicated in Everson et al, study (15). Another study also revealed an inverse association between

socioeconomic status and prevalence of type 2 diabetes in the middles of life (16). The increased rates of prevalence of diabetes type 2 most likely develop more complications among patients. These patients are in a greater need of health care since they are poor in one hand and suffer from more complications of the disease in the other .Undoubtedly, providing appropriate and necessary care for this group of patients requires more financial resources (17), which are not sufficiently exists or allocated for this type of illness in developing countries or among the poor (1). While confronting with these problems, several studies demonstrated that majority of cases of type 2 diabetes could be prevented by the adoption of a healthier life style (18). This approach will more likely saves financial resources and helps to allocate them efficiently.

Schootman 's study revealed that inappropriate living environment can develop a direct relation with onset of diabetes and its complication (19).This is similar to findings of the present study which have indicated significant direct relation between low level of security and communication in living environment and the number of complications related to type 2 diabetic patients. Health status and life expectancy of lower social class is affected by social disparity on one hand and inappropriate lifestyle on the other. Therefore, higher rates of cardiovascular disease because of type 2 diabetes, among people with lower socioeconomic characteristics are expected and demonstrated in several studies (8, 20).

Obviously, patients with a chronic illness need more care and resources to be allocated for their treatment and amelioration. Poor patients in the lack of access to a comprehensive and universal insurance may develop insufficient and inadequate care for their illness. Such a condition may highly be resulted from socioeconomic inequality and disparity, as it has been demonstrated by findings of this study. In fact the early development of complications resulted from type 2 diabetes,



among these patients may approve the relation described above (8).

It seems that individuals with low socioeconomic status experience more challenges in social environment but less challenges in psychosocial supports on their lives. Health professionals seem to be responsible for empowerment of type 2 diabetic patients. This is an effective way of dealing with a chronic disease management, which require more investing in developing and improvement of patients' ability for self-care (9). Empowerment of patients with chronic diseases is a process, which should continuously be conducted until the patients achieve adequate self-efficacy, self-esteem, and self-confidence (21). Moreover, empowerment of patients by appropriate methods may reduce and even control the number and severity of complications resulted from type 2 diabetes (22). By these methods, patients should develop self-managed behaviors such as self-regulation, self-integration, continuous interaction with professionals, self-monitoring, and adherence to plan of treatment in controlling their illness (23). For the purpose of on, time diagnosis of patients contracted with type 2 diabetes screening of population in community level is suggested (24). In line with this, building supportive groups of patients may increase the effectiveness of methods of dealing with type 2 diabetic patients.

### Ethical Consideration

All ethical issue ( such as informed consent, conflict of interest, plagiarism, misconduct, co-authorship, double submission , etc) have been consider carefully.

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