Original Research

ASSOCIATION BETWEEN SOCIO–DEMOGRAPHIC, HEALTH CHARACTERISTICS AND TYPE 1, TYPE 2 DIABETIC CASES IN GOVERNORATE OF BABYLON, IRAQ

Wael Sulaiman Sabea[1], Suhair Mohammed Hassoun[2], Ahmed Ali Hussein[1]

[1] Community Health technician, Master of Community Health Technology, Ministry of Environment and Health.
[2]Assistant Professor, Community Health Department, College of Health and Medical Technology/Baghdad, Middle Technical University, Iraq

**Corresponding author: wael2791992@gmail.com*

ABSTRACT

Introduction: Health characteristics and socio-demographic of diabetic patients are important in the determination of livening patterns and factors that contributed in development of diabetes. We aim to identify on socio-demographic and health characteristics of diabetics, and find out association between them and with type of diabetes. **Methods:** The study of cross-sectional was carried out in Governorate of Babel /Iraq in Endocrinology and Diabetics Centre for period that starting on 3rd November /2018 and to 10th March /2019.Samples of study were collected through systematic random technique using a questionnaire form had been constructed and developed by a researcher after a comprehensive review of available literature and related books about subject. SPSS had used for data statistical analysis in the current study. **Results:.** (420 diabetics) of both type 1 and type 2 had been participated in the study with response rate (96. 9%). Their ages ranged from (15-75) old years with a mean and standard deviation of (51.8 ± 13.5) years, (46.7%) were male and 53.4% were female. Most of diabetic patients were married and (63.3%) were livening in urban areas. Low percentage (26.9%) of diabetics were with illiterate level and type 2 diabetes was calculated for (81.2%). Hypertension was accounted for (36.4%) while obesity for (35.7%) of them. The study has been showed significant association between type of diabetes and relating their age (type 2 was more in adult group > 44 years while type 1 more in 15- 44 years old), gender (type 2 was more in women compared to type 1), family history (diabetics with type 1 were more with history of family), body mass index (obesity was more in type 2 compared to type1), comorbidity diseases (chronic hypertension and kidney diseases were more in type 2). **Conclusion:** The current study had concluded that prevalence of type 2 diabetes was more compared to type 1 dibetes and with high percentage in women group and more in age group > 44 years. High percentage of diabetics with type 2 were with chronic hypertension and obesity and especially in women compared to type 1 diabetes.

Keywords: *Association, Diabetic patients, Socio-demographic, Health, Babylon.*

Introduction

Diabetes mellitus is a chronic disorder characterized by the presence of hyperglycemia due to insulin secretion, defective insulin work or both. Many of disease-causing processes are involved in the development of diabetes (American Diabetes Association, 2014) . Type 1 diabetes (insulin dependent) accounts for 5%-10% of all cases of diabetes and refers to a condition of autoimmune diseases that represents a very complex metabolic disorder characterized by massive destruction of the pancreas, specifically beta cells which in turn leads to an absolute lack of insulin (Turton *et al*., 2018). While the second type of diabetes (non-dependent insulin) accounts for around 90% of all cases of diabetes and refers to a group of disorders that are characterized by high blood sugar that results from a combination of resistance to insulin work, insufficient secretion of insulin and excessive or inappropriate glucagon secretion (Goyal R., 2019). Diabetes is one of the main causes of morbidity, mortality and high costs to the community (Seuring et al., 2015). International Diabetes Federation has suggested that the number of adults living with diabetes around the world increases from time to another (Alemu, 2015). Prevalence of type 2 diabetes mellitus for 45 countries representing nearly 90% of the world's population; in 2018, there were more than 500 million type 2 diabetes cases around the world, and type 2 diabetes prevalence is compared between high and low-income countries (Kaiser *et al.,* 2018).

In Iraq, the prevalence of diabetes in Basrah city, Southern Iraq, had increased from 5% in 1978 to 19.7% in 2012, with a prevalence of hypoglycemia of 48.8%. This shows the outbreak of diabetes in Iraq, which is facing a diabetic epidemic like the Middle East (Mansour & Al Douri, 2015). In another study about incidence of Type 1 diabetes mellitus in Basra, results of study have showed that the mean annual incidence rate of T1DM was 7.4 per 100,000 among people 0–40-year-old. Incidence rate has been increasing over the past three years (from 2012 to 2016), this is explained by the changes in T1DM epidemiology in Iraq (Almahfoodh *et al.,* 2017). Demographic and health factors like age, family history, genetic factors, bad meals, stress, others had been considered as contributing factors in development of type 1 diabetes mellitus (Antonela *et al*., 2017).The increase in the prevalence of metabolic diseases (such as type 2 diabetes mellitus) in old age may be directly related to age or the process of ageing itself or indirectly through other risk factors associated with age of T2DM (Suastika *et al*,. 2012) . Individuals at the middle socio-economic level that are living in urban areas with low sport activity and do not consume large amounts of fruit are the most susceptible to the incidence of type 2 diabetes (Gudjinu & Sarfo, 2017). Hence , the researcher in this study had aimed to identify the socio-demographic and health characteristics of diabetics and find out association between them and types of diabetes in Governorate of Babylon, Iraq

Methods

A descriptive study design (cross-sectional) had been carried out for a period from 3rd November 2018 to 10th March 2019. This study had taken place in Endocrinology and Diabetics Center in (Medical Marjan City), Babel Governorate/Iraq. It is[i] located 100 Km south of Baghdad city. The researcher collected diabetic responses through direct interviews and informed diabetics about the purposes of research and aims. Period of interview for the patient from 20-30 minutes. The sample size was collected (420) diabetics through systematic random sampling method from both genders and different ages**.** Sample size had calculated according to specific Daniel sample size formula for the continuous (infinite) community; which was explained as the following formula:

n = $\frac{z^2 \ \ p(1-p)}{d^2}$ **,**n = expected sample units number**;**Z: statistic value for a level of confidence (for the level of confidence of 95%;which is conventional, Z .value = 1.96),

P: expected proportion or prevalence; d:is level of the desired of absolute precision. (d is considered as 0.05 to produce precision of good and smaller error of estimate). (Thompson, 2012).This is meaning that z = 1.96 , diabetes prevalence in Iraq according to study in Iraq was 20% (Mansour & Al Douri, 2015) ,d = 0.05. n = [$(1.96)^2$ *(0.20 * 0.80) / $(0.05)^2$ = 3.8416 * 0.16 / .0025] = 245 (minimum sample size). So that the number = 420 diabetics were specific suitable for the study.

The questionnaire form had constructed and revised by a researcher after an adequate review of a previous literature review and articles related to the subject of the study. It consists of 2 parts 15 items. Six items for socio-demographic characteristics which include age, sex, residency, job, marital status, and education level. Nine items for health characteristics of diabetics include diabetes type, period for the onset of diabetes, age of onset of diabetes, history family with diabetes mellitus, medications used for diabetes mellitus, body mass index (BMI), associated diseases or medical history according to a specialized doctor, history of smoking, drinking alcoholic beverages. The validity of the questionnaire was determined through a panel of 13 experts that have experience of more than 3 years in their specialties. The expert's responses were assessed based on their agreement or disagreement on the relevancy of items. Expert's suggestions were taken into consideration; modifications are utilized and the final copy of the constructed instrument is completed to be an appropriate tool for conducting the study. Evaluation results by experts indicated that the questionnaires were clear, adequate, relevant, and valid.

Statistical Analysis of data by using Statistical Package of Social Sciences (SPSS) version 25, examples: frequency, mean, percentage, Pearson chi-square test. Where at least one cell of table had an expected count less than 5 for 2x2 tables; Yate's
corrected Chi-square instead of Pearson chi-square test had used to get adequate results.

Ethical consideration

Administrative approval from College of Health and Medical technology/Middle technical University/Bagdad; furthermore, Endocrinology and Diabetes Diseases Center /Babylon Health Directorate had approved and gave final permission for author to conduct the study and collect data from diabetics after verbal consent.

Results:

The results of this study had been based on the analysis of 420 diabetics; 224 (53.4%) were female but 196 (46.7%) were male (female: male ratio was 1.14:1). Diabetic ages ranged from (15-75) years with a mean of 51.8 years old and a standard deviation of (±) 13.5 years old. More than half (50.5%) were in the age group of 55-75 years and the lowest percentage (11%) were in the age group < 35 years. Regarding the residence; most of the cases (63.6%) were from urban areas. Respecting an occupation; high percentage (39.3%) were housewife. Regarding the marital status and educational level; majority (83.1 %) were married and (26.9%) were illiterate as noted in table no. (1).

Table (1):Socio-demographic characteristics of diabetics

Socio- demographic & health characteristics		**No.**	**%**
Total No. of diabetics		420	100.0
Age (years)	**< 35 years**	46	11
	35--44	64	15.2
	45--54	98	23.3
	55--75	212	50.5
	Mean±SD (Range)	51.8±13.5 (15-75)	
Gender	**Female**	224	53.3
	Male	196	46.7
Residence	**Urban**	267	63.6
	Rural	153	36.4
Occupation	**Employee**	46	11.0
	Student	20	4.8
	Earner	52	12.4
	Housewife	165	39.3
	Retired	76	18.1
	Free work	61	14.5
Marital status	**Single**	25	6.0
	Married	349	83.1
	Separated	1	0.2
	Divorced	23	5.5
	Widow	22	5.2
Educational level	**Illiterate**	113	26.9
	Read & Write	47	11.2
	Primary	79	18.8
	Intermediate	66	15.7
	Secondary	49	11.7
	Institute	37	8.8
	College and Higher	29	6.9

Table (2) had showed that high percentage (81.2%) were in type 2 diabetics group. Regarding the age of onset of diabetes mellitus was ranged from (8-65) years with mean of (39.6) years and a standard deviation of (±) 13.4 years. High percentage (53.3%) were with history of family for DM and (46.7 %) without family history, most of them (80.5%) with using oral hypoglycemic drugs. Regarding the comorbidity diseases were ordered as following percentages; chronic hypertension (36.4%), rheumatoid arthritis (19.5%), respiratory diseases (9.5%), kidney diseases (5.7%), thyroid gland diseases (4.3%) respectively. Regarding the body mass index; the higher percentage (35.7%) was with obesity. While regarding the smoking; the higher percentage (74.8%) were non-smokers and duration of smoking was ranged from (2-50) years old with mean of (17.0) years and standard deviation (±) 10.8 years. The high percentage (96.4%) of patients were not drinking alcoholic beverages and duration of alcoholic was ranged from (1-15) years old with mean of (6.3) years and standard deviation (±) 10.8 years. While the higher percentage (63.3%) of patients were not drinking soft drinks.

Table (2):. Health -characteristics of diabetics :

Health characteristics		**No.**	**%**
Total No. of diabetics		420	100
Type of diabetes	**Type 1 diabetes mellitus (DMT1)**	341	81.2
	Type 2 diabetes mellitus (DMT2)	79	18.8
Age for onset of DMT1	**Mean±SD (Range)**	20.5±8.4 (8-55)	
Age for onset of DMT2	**Mean±SD (Range)**	44±8.2 (15-65)	
Family member with DM	**Yes**	224	53.3
	No	196	46.7
Medications used for DM	**Oral hypoglycemic drugs**	338	80.5
	Insulin	82	19.5
Suffered from any of the diseases according to specialized doctor or medical history		**No.**	**%**
Chronic hypertension		153	36.4
Rheumatoid arthritis		82	19.5
Respiratory diseases		40	9.5
Kidney diseases		24	5.7
Thyroid gland diseases		18	4.3
BMI (Kg/m2)	**Thin (<18.5)**	29	6.9
	Normal (18.5-24.9)	123	29.3
	Overweight (25-29.9)	118	28.1
	Obese (=>30)	150	35.7
Smoking (years period)	**Yes**	107	25.5
	No	313	74.5
Duration of smoking (years)	**Mean±SD (Range)**	17.0±10.8 (2-50)	
Drinking alcoholic beverages	**Yes**	15	3.6
	No	405	96.4

Table (3) showed that there was a significant association (p.value ≤ 0.05) between types of diabetes and their age {type 2 was more in adult group > 44 years while type 1 more in (15- 44 years) }, gender {type 2 was more in women compared to type 1}, family history {diabetics with type 1 were more with history of family },BMI {obesity was more in type 2 compared to type1}, comorbidity diseases {chronic hypertension and kidney diseases were more in type 2} . And in another side, although thyroid gland diseases were more in type 1, and arthritis, respiratory diseases were more in type 2 but there wasn't significant.

Table (3): The association between type of diabetes and some selected demographic & health characteristics.

Socio-demographic and health Variables		Type of diabetes mellitus					
		Type 1	%	Type 2	%	Total	%
Total No.		79	100	341	100	420	100
Age	< 35 y.	43	54.4	3	0.9	46	11
	35---- 44	27	34.2	37	10.9	64	15.2
	45--- 54	4	5.1	94	27.6	98	23.3
	55--- 75 y.	5	6.3	207	60.7	212	50.5
Chi-square test	χ^2 = 242.333	df=3 *				p. value = 0.0001	
Gender	Male	51	64.6	154	42.5	196	42.5
	Female	28	35.4	196	57.5	224	53.3
Chi-square test	χ^2 = 12.513	df=1 0.0001 *				p. value =	
Family history	Yes	54	68.4	170	49.9	224	53.3
	No	25	31.6	171	50.1	196	46.7
Chi-square test	χ^2 = 8.821	df=1 0.003 *				p. value =	
BMI	< 18.5 (Thin)	25	31.6	4	1.2	29	6.9
	18.5 – 24.9	31	39.2	93	27.3	124	29.5
	25-29.5	13	16.5	104	30.5	117	27.9
	>=30	10	12.7	140	41.1	150	35.7
Chi-square test	χ^2 = 108.393	df=3 0.0001*				p. value =	
Chronic hypertension	Yes	6	7.6	147	43.1	153	36.4
	No	73	92.4	194	56.9	267	63.6
Chi-square test	χ^2 = 34.931	df=1 0.0001 *				p. value =	
Kidney diseases	Yes	0	0	24	7	24	5.7
	No	79	100	317	93	396	94.3
Yate's corrected Chi-square	Y = 4.663	df=1 0.031 *				p. value =	
Thyroid gland diseases	Yes	4	5.1	14	4.1	18	4.3
	No	75	94.9	327	95.9	402	95.7
Yate's corrected Chi-square	Y= 0.005	df=1 0.944				p. value =	
Arthritis	Yes	12	15.2	70	20.5	82	19.5
	No	67	84.8	271	79.5	338	80.5

Chi-square test	**χ^2 = 1.163**	**df=1**				**p. value =**	
		0.281					
Respiratory system diseases	**Yes**	6	7.6	34	10	40	9.5
	No	73	92.4	306	90	379	90.5
Chi-square test	**χ^2 = 0.517**	df=1				p. value =	
		0.420					
*Significant association between proportions using Pearson Yates correction and Chi-square tests ≤ 0.05 level.							

Discussion

The current study had illustrated that 50.5% of diabetics were in the age group of 55-75 years with a mean age of 52 years. This finding was agreement by the study in Lebanon that showed the role of ageing in the development of diabetes type 2 (Karaoui *et al.,* 2018), and also similar according to report of American Diabetes Association, which had found that diabetes is an increasing burden on public health and the ageing of the world's population is a major contributor to the epidemic of diabetes (Kalyani *et al.,* 2017). More than half of diabetics were female, this showed that the prevalence of DM among females more than males, may because nature of life style for women this study is similar to studies in Iraqi that had been explained that the majority of diabetes were female (Al-Tukmagi & Moussa, 2014; Ebrahim *et al.,* 2014), but compared to another study in Lebanon by had been illustrated that ratio the male*/* female was 1.38, (Karaoui *et al*., 2018).This disagreement may be because of the nature of the study place or different lifestyles between the two countries. Regarding the residence; most of the cases are from the urban area; the findings are similar to the study in Baghdad, Iraq (Abbas *et al,.* 2016) and also another study in Palestine that showed that most of the diabetics were from the urban population (Ishtaya *et al.,* 2018). Regarding an occupation; a high percentage of diabetics were housewives, the possible reason may be related to educational level or may the opportunity to get a job for a woman is few in Iraqi society. This outcome was also supported by other studies in Iraqi (Al-Rubaye, 2011; Mansour *et al.,* 2018). Regarding marital status; most the diabetics were married, this was interpreted as the effect of the early marriage; similarly reported by other studies (Ebrahim *et al.,* 2014; Al-Tukmagi & Moussa, 2014). Relating the educational level; the high percentage of diabetics were illiterate, this might reflect the educational background of Iraqi population especially with poor economic level and impact of many wars that happened in the past periods; where many students left school in first stage of the study to work. This result is similar to what had been reported by study in Basra, Iraqi that had noted that high percentage of diabetics were with poor level of education (Mansour *et al.,* 2018), but this the result was disagreement by the study of in Basra , Iraqi ; where had found that the high percentage of diabetics were in secondary & high education (Ebrahim *et al.,* 2014). This difference might be because of nature of the study place and method of sample selection. In relation to smoking, most of diabetics (74.5%) were non-smokers and duration of smoking ranged from 2-50 years. The possible explanation of the result is that the majority of diabetics were female and more compliance to social habits in Iraq about avoiding the smoking; the finding was the nearest to the

study in Babylon, Iraq (Alsaadawi, 2016) and in Southeastern Nigeria (Nwaokoro *et al.,* 2014). The present study showed that the majority of diabetics (96.4%) were not drinking alcoholic beverages; this might be related to religious attitude and reject these alcoholic beverages by Iraqi society. To the best of our knowledge; there is no previous similar study, but in comparison to survey results in Iraq, it had been illustrated that 96.8% of people do not drink alcoholic beverages (Al-Hemiery *et al.,* 2017), unlike the study done in America that had indicated that the majority of diabetics in America were drinking different alcoholic beverages (Vaeth *et al.,* 2014) . Most of diabetics were not drinking soft drinks on daily basis; this explains the good behavior and awareness towards avoiding the soft drinks; similarly the finding was supported by the study in Al-Khobar, Saudi Arabia Kingdom (Mokabel *et al.,* 2017). Regarding the type of DM, study had been illustrated that most of diabetics were female with type 2 DM and the mean age of onset of DM was equal or more than 44 years; this had shown that bad lifestyles like lack of physical activity and obesity play a main role in the development of diabetes type 2. This outcome was similar with another study in Basra, Iraqi (Mansour *et al.,* 2018) and the study in Palestine which had been shown that diabetes type 2 was accounted for a high ratio compared to diabetes type 1 that was calculated for low percentage (El Sharif, 2017).Concerning with family history of diabetes; a high percentage of diabetics (53.3%) had shown that they have a family history and higher in type 1 diabetes, this illustrates family role in the development of diabetes; similarly this the finding was similar by the study in Basra ,Iraqi (Ebrahim *et al.,* 2014) and in Lebanon (Karaoui *et al.,* 2018). Regarding the type of therapy; majority of diabetics (80.5%) took oral hypoglycemic drugs, the reason that most of diabetics were with type 2 diabetes and most of diabetics had taken oral tablets to keep on normal glucose in the blood; this result of the study is similar to other studies in Lebanon (Karaoui *et al.,* 2018), and also with acceptable level by the study in Tehran, Iran (Darvishpoor & Abed, 2013).The present study explained that most of adult female diabetics with type 2 have {chronic hypertension (36.4%), obesity (35.7%)}; this had interpreted that diabetes with bad life styles like unhealthy diet, bad sleeping, stress, lack of physical activity have significant main impact with long period of time in development of chronic hypertension and obesity among diabetics; this result had agreed by the study in Baghdad, Iraq (Al-Rubaye, 2011), (Colosia *et al,.* 2013).

Conclusion: The present study had concluded that the prevalence of type 2 diabetes was more compared to type 1 and with a high percentage in the women group and more in age group morr than 44 years. A high percentage of diabetics with type 2 were with chronic hypertension and obesity and especially in women. The study has been suggested the establishment of modern well-organized educational programs supported with modern developed educational technologies for diabetics in diabetic centers and other institutions show role of socio-demographic and health factors in development of diabetes. Continuing many studies on large samples of diabetics in other countries to identify more on socio-demographic and health characteristics of diabetics, and show effect of them on diabetes in other countries.

Abbreviations

ADA: American Diabetes Association; BMI: Body mass index; DM: Diabetes mellitus; F: Frequency SD: Standard deviation; SPSS: Statistical Package of Social Sciences; TS: Total scoring; X^2: Chi-square.

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Conflicts of Interest

The author declares no conflicts of interest.

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