

# Effectiveness of an Educational Program on Diabetic Patient's Knowledge about Early Complications of Diabetes Mellitus: Type I and Type II

By

**Mohammed Jaber hamdi**

MSN, Academic Nurse, Al-Kindy Teaching Hospital, Baghdad, Iraq. Corresponding author:  
Email: [mohammed.jaber1202b@conursing.uobaghdad.edu.iq](mailto:mohammed.jaber1202b@conursing.uobaghdad.edu.iq)

**Aqeel Habeeb Jasim**

PhD, Assistant Professor, Fundamental of Nursing Department, College of Nursing,  
University of Baghdad, Baghdad, Iraq  
Email: [dr.aqeel@conursing.uobaghdad.edu.iq](mailto:dr.aqeel@conursing.uobaghdad.edu.iq)

## Abstract

Background: Diabetes mellitus could be a prevalent illness, particularly among the elderly. Within the final 15 a long time alone, the predominance of analyzed diabetes cases has expanded by 82%. Age-related changes including diminished insulin affectability within the peripheral tissues and decreased insulin control of hepatic glucose yield, coupled with physical inactivity and overweight, contribute to higher frequencies of abnormal glucose resistance inside the older population. Objective(s): The aim of this study is to evaluate the effectiveness of an educational program on diabetic patient's knowledge about early complications of Diabetes Mellitus: Type I and Type II. Methodology: This paper is the published part of a larger study in which a quasi- experimental design used with the application of a pre-test/ post-test approach for the study group and control group after implementation of educational program. Data collection was done at two times: baseline data (before any intervention was provided to the study group) and 21 days after giving the educational program (in the study group). The study started December at 30th 2021. Results: The findings shows that participants in the study group are poor in their knowledge at the pre-test period (87.5%) while they are showing improvement in their knowledge at the post-test (53.13% good) and (46.87% fair) that indicate significant differences in their level of knowledge. Conclusion: The educational program has made a significant deferent for the study group knowledge. The participants who involved in the study group became aware about the general information about diabetes mellitus and early complications about diabetes mellitus. Recommendations: The study findings could promote all those concerned to embrace more diabetes mellitus articles in their curricula; especially secondary school curriculum should include topics concerning diabetic mellitus.

**Keywords:** Effectiveness, Educational Program, Diabetic Patient's, Type I Diabetes Mellitus, Type II Diabetes Mellitus.

## Introduction

Diabetes mellitus (DM) could be a prevalent illness, particularly among the elderly. Within the final 15 a long time alone, the predominance of analyzed diabetes cases has expanded by 82%. Age-related changes including diminished insulin affectability within the peripheral tissues and decreased insulin control of hepatic glucose yield, coupled with physical inactivity and overweight, contribute to higher frequencies of abnormal glucose resistance inside the older population. The study besides outlined that the prevalence of diabetes for all

age bunches around the world was 8.3% in 2011 and will be 9.9% in 2030. The IDF (2013) reports the in general number of people with diabetes in 2013 to be 382 million and has assessed that this number will rise to 582 million to 2035 (Ehrmann, 2014).

Cavan et al. (2015) shown that DM is one of the prominent public health issues of twenty to begin with century. It right presently impacts 415 million people around the world, which is expected to extend to 642 million by the year 2040. In expansion, at appear, 67 billion dollars which is 12 percent of around the world health utilization is went through on diabetes related treatment in a year.

In 2014, 8.5% of adults matured 18 a long time and more seasoned had diabetes. In 2019, diabetes was the coordinate cause of 1.5 million passings and 48% of all passings due to diabetes happened some time recently the age of 70 a long time, between 2000 and 2016, there was a 5% increment in untimely mortality rates (i.e. sometime recently the age of 70) from diabetes. In high-income countries the inopportune mortality rate due to diabetes lessened from 2000 to 2010 but at that point extended in 2010-2016. In lower-middle-income countries, the untimely mortality rate due to diabetes extended over both periods. By separate, the probability of passing on from any one of the four essential non-communicable ailments (checking diabetes mellitus) between the ages of 30 and 70 decreased by 18% all comprehensive between 2000 and 2016 (WHO, 2021; Dunky, 2020, 2021a, 2021b).

Statistical database obtained from Iraqi Ministry of Health agree with the estimation of WHO about increased prevalence of the diabetes mellitus patients; in Baghdad city patients that attended and visited the specialized centers for endocrinology. Increasing these patients' statistics causes a great health burden due to their suffering from complications that consider as life-long mortality cause.

Imam (2015) mentioned that diabetes mellitus is growing to epidemic extents, driving to destroying complications in case not treated well. There are various challenges inside the viable treatment of diabetes mellitus since of person and money related costs caused in diabetes treatment. In spite of the reality that, comprehensive diabetes care can delay the progression of complications, maximize the quality of life, and minimize healthcare utilize.

Pizzorno, Murray and Joiner-Bey (2016) stated that severe complications of DM may signify a therapeutic crisis in advance to life-or-death condition. Additionally, some indications indeed slightly characteristic of intense complications must be tended to directly. As mentioned in Graham and Abel (2013) complications of diabetes represent the most causes of morbidity and mortality that are related with this chronic metabolic disorder. Furthermore, there's also strong prove that diabetes leads to coordinate unfavorable impacts within the heart that leads to cardiomyopathy.

Sauder et al. (2019) find out that the initial complications happen in teenagers and young adults experiencing type 1 diabetes mellitus more than anticipated. Identification of people with adverse chance components seem allow coordinated behavioral or restorative interventions that diminish the likelihood of prompt improvement of lifetime diabetes-related morbidity. Yen, Lo, Hwu and Hsu (2021) contend that compared to those with late-onset diabetes (infection onset after 60 a long time of age), people with young-onset (illness onset some time recently 40) and early-onset (infection onset between 40 and 60) type 2 diabetes are related with assist excess risk of death, macrovascular, microvascular complications and

amputation.

## **Methodology**

### *Design of the study*

A quasi- experimental design used in the present study with the application of a pre-test/ post-test approach for the study group and control group after implementation of educational program. Data collection was done at two times: baseline data (before any intervention was provided to the study group) and 21 days after giving the educational program (in the study group). The study started December at 30th 2021.

### *Setting of the study*

The study conducted at AL-Russafa Health Directorate/ Specialist Center for Endocrinology Diseases and Diabetes, this center was the designated agency for data collection, because it is a specialized setting that comprise the cases which facilitated the process of data collection.

### *Population of the study*

The population of the current study are diabetic patients who were admitted or taking follow up attainment in Specialist Center for Endocrinology Diseases and Diabetes. Who was totally (90) Participants.

### *Sample of the study*

A non-probability purposive sample of diabetic patients who were admitted or taking follow up appointments in Specialist Center for Endocrinology Diseases and Diabetes. The sample divided into two groups (30) Participants as a study group, and another (30) Participants considered as the control group. The study group was exposed to an educational program, while the control group was not.

### *Data collection*

Data collection performed through the use of the study instrument and the application of the educational program. The Implementation was carried out in Specialist Center for Endocrinology Diseases and Diabetes in Baghdad city, in the period from February 16th 2022 to March 23th 2022.

## **Results of the study**

Table (1) displays the frequency counts for selected variables. As mentioned above, the two groups (control versus study) were equal in size (30) participants for each of them. Most of the participants in both groups according to their gender is female (n= 18; 60.0 %) in the study group, while the number in the control group is (n= 17; 56.7 %). Most of the participants in the study group are in the (above 60 years-old) age groups (n = 15; 50.0%), and it's in the control group (n=14; 46.7%).

**Table (1):** *Distribution of the study samples (Study and control) according to the demographical Data.*

Variable	Groups	Study group		Control group	
		F	%	F	%
Gender	Male	12	40.0	13	43.3
	Female	18	60.0	17	56.7
	Total	30	100.0	30	100.0
Age Groups	Below 20 years old	0	0.0	0	0.0
	20-29	1	3.3	1	3.3
	30-39	2	6.7	1	3.3
	40-49	5	16.7	6	20.0
	50-59	7	23.3	8	26.7
	Above 60 years old	15	50.0	14	46.7
	Total	30	100.0	30	100.0
Educational Levels	Cannot write or read	0	0.0	1	3.3
	Read and write	9	30.0	10	33.3
	Primary School graduate	8	26.7	6	20.1
	Secondary school graduate	4	13.3	3	10.0
	High school graduate	4	13.3	3	10.0
	Institute graduate	3	10.0	4	13.3
	Bachelor's graduate	2	6.7	3	10
	High education	0	0.0	0	0.0
Total	30	100.0	30	100.0	
Marital Status	Married	16	53.3	16	53.3
	Single	2	6.7	4	13.3
	Widowed	9	30.0	8	26.7
	Divorced	3	10.0	2	6.7
	Total	30	100.0	30	100.0
Occupation	Unemployed	7	23.4	8	26.7
	Governmental employment	1	3.3	0	0.0
	Non-Governmental employment	2	6.7	1	3.3
	Retired	4	13.3	6	20.0
	Housewife	16	53.3	15	50.0
	Other	0	0.0	0	0.0
Total	30	100.0	30	100.0	

Freq. = frequency, % = percentages

Most of the participants in the study group are read and write (n = 9; 30.0 %), followed by those who graduated from primary school (n=8; 26.7), and from secondary and high school that are equal (n = 4; 13.3%) for each. While the same proportion in the control group, the most of them are read and write (n = 10; 33.3 %), followed by those who graduated from primary (n = 6; 20.1 %), and who graduated from secondary and high school (n=3; 10.0%) for each. These findings would suggest that the randomization process provide an acceptable level of equality between the groups.

Most of the participants in the study group are married (n = 16; 53.3 %), and it's the same proportion of the married participants in the control group (n = 16; 53.3 %).

Most of participants in the study group are housewives (n=16; 53.3%), and almost the same in the control group which is (n=15; 50.0%).

**Table (2):** Assessment of participant's knowledge scores pre and post-test for the control group regarding their early complications of diabetes mellitus.

Domain List	Item	Study group													
		Pre-Test							Post-Test						
		Correct answer		False answer		MS	SD	Asses	Correct answer		False answer		MS	SD	Severity
		F	%	F	%				F	%	F	%			
Early complications of DM	1 The normal blood sugar level two hours after	12	40.00	18	60.00	1.30	0.46	P	18	60.00	12	40.00	1.60	0.49	F
	2 Normal blood sugar level in a fasting state	11	36.67	19	63.33	1.27	0.44	P	21	70.00	9	30.00	1.70	0.46	G
	3 Normal cumulative glycated hemoglobin (HbA1C) test is	8	26.67	22	73.33	1.27	0.44	P	21	70.00	9	30.00	1.70	0.46	G
	4 The correct time period for measuring glycated hemoglobin (HbA1C) is each	11	36.67	19	63.33	1.27	0.44	P	19	63.33	11	36.67	1.63	0.49	F
	5 Which one of the following statement is correct	10	33.33	20	66.67	1.33	0.47	P	20	66.67	10	33.33	1.67	0.47	G
	6 Recurrent infections are early complication of diabetes mellitus caused by:	12	40.00	18	60.00	1.30	0.46	P	19	63.33	11	36.67	1.63	0.49	F
	7 The following factors cause dizziness in diabetic patients except	13	43.33	17	56.67	1.43	0.5	F	18	60.00	12	40.00	1.60	0.49	F
	8 Persistent, uncontrolled high blood sugar leads to high levels of sorbitol (a sugar made up of glucose), which can lead to	3	10.00	27	90.00	1.10	0.3	P	12	40.00	18	60.00	1.40	0.49	F
	9 What is considered an early complication of diabetes	9	30.00	21	70.00	1.30	0.46	P	19	63.33	11	36.67	1.63	0.49	F
	10 Diabetic ketoacidosis is caused by all of the following factors except	7	23.33	23	76.67	1.23	0.43	P	15	50.00	15	50.00	1.50	0.5	F
	11 Signs of diabetic ketoacidosis except	11	36.67	19	63.33	1.27	0.44	P	18	60.00	12	40.00	1.60	0.49	F
	12 Diabetic ketoacidosis may occur with	2	6.67	28	93.33	1.07	0.25	P	17	56.67	13	43.33	1.57	0.5	F
	13 Diaphoresis, tachycardia, anxious, hungry, and disorientation occurs with	6	20.00	24	80.00	1.20	0.4	P	13	43.33	17	56.67	1.43	0.5	F
	14 Hypoglycemia occurs is when the blood the glucose falls to less than 50 to 60 mg/dL due to all the following except	6	20.00	24	80.00	1.20	0.4	P	16	53.33	14	46.67	1.53	0.5	F
	15 Complications of low blood sugar in the body	9	30.00	21	70.00	1.30	0.46	P	20	66.67	10	33.33	1.67	0.47	G
	16 To control the low blood sugar level, you can	10	33.33	20	66.67	1.33	0.47	P	21	70.00	9	30.00	1.70	0.46	G
	17 Diabetic coma is one of	5	16.67	25	83.33	1.17	0.37	P	20	66.67	10	33.33	1.67	0.47	G
	18 Diabetic coma can occur as a result of	11	36.67	19	63.33	1.27	0.44	P	23	76.67	7	23.33	1.77	0.43	G
	19 All of the following are considered diabetic coma except	4	13.33	26	86.67	1.13	0.34	P	18	60.00	12	40.00	1.60	0.49	F
	20 Factors to avoid diabetic coma except	12	40.00	18	60.00	1.40	0.49	F	19	63.33	11	36.67	1.63	0.49	F
<b>Overall items</b>		8.6	28.67	21.4	71.33	1.26	0.42	P	18.35	61.17	11.65	38.83	1.61	0.46	F

(Severity; or Ass.) Assessment: (G) Good (1.67 - 2); (F) Fair (1.34 – 1.66); (P) Poor (1.00 – 1.33), (F) Frequency, (%) Percentage, (MS) Mean score, (SD) Standard deviation.

Table (2) demonstrates that there are significant differences of mean between pre and post-test in the study group related to the participant's knowledge which showing that they are poor in their knowledge at the pre-test period and fair in their knowledge at the post-test period regarding their subdomain and sub item of the general information about diabetes mellitus.

**Table (3):** Overall Assessment of participant's knowledge regarding their general information about diabetes mellitus and early complications of diabetes mellitus

Levels of knowledge	Study Group								Control group							
	Pre-test				Post-test				Pre-test				Post-test			
	F	%	MS	SD	F	%	MS	SD	F	%	MS	SD	F	%	MS	SD
Poor	28	87.5			0	0			29	90.6			28	87.5		
Fair	4	12.5	1.20	0.40	15	46.87	1.66	0.47	3	9.4	1.17	0.37	4	12.5	1.20	0.40
Good	0	0			17	53.13			0	0			0	0		
<b>Total</b>	<b>32</b>	<b>100</b>			<b>32</b>	<b>100</b>			<b>32</b>	<b>100</b>			<b>32</b>	<b>100</b>		

Frequency, (%) Percentage, (MS) Mean score, (SD) Standard deviation.

Table (3) present the overall assessment of the participant's knowledge; the findings shows that participants in the study group are poor in their knowledge at the pre-test period (87.5%) while they are showing improvement in their knowledge at the post-test (53.13% good) and (46.87% fair) that indicate significant differences in their level of knowledge.



While the participants in the control group are showing poor level of knowledge over both periods of the pre and post-test (90.6%) that doesn't reveal changes in their level of knowledge.

## **Discussion**

Most of the participants in both groups according to their gender is female (n= 18; 60.0 %) in the study group, while the number in the control group is (n= 17; 56.7 %).

The result supported by the study that done by Abbas et al (2014) which stated that The majority of participants, 51.7% were females, this study totally agree with a study done by Hassen and Ahmed (2015) which mentioned that The majority of the population was female (n=48; 96.0%), also agree with Al-khafaf (2017) which declared that the most of the participants were female presenting (66 %),and there are no significant association regarding participants scores and their socio-demographic characteristics.

Most of the participants in the study group are in the (above 60 years-old) age groups (n = 15; 50.0%), and it's in the control group (n=14; 46.7%).

The results totally agree with a study that done by Al-Ameri and Hatab (2015) which pointed out that (n=122; 78.1%) of the study participants are over 60 years old. Furthermore, agree with a study that done by Nishida et al. (2020) which pointed out that Fifty-one elderly patients with type II diabetes mellitus (aged 61–79 years) participated in the study. Saied and Atiyah (2022) results agree with these findings; the majority of the study participants were (n=28; 40.0%) of the age group were 60 years old and above.

Most of the participants in the study group are read and write (n = 9; 30.0 %), followed by those who graduated from primary school (n=8; 26.7), and from secondary and high school that are equal (n = 4; 13.3%) for each. While the same proportion in the control group, the most of them are read and write (n = 10; 33.3 %), followed by those who graduated from primary (n = 6; 20.0 %), and who graduated from secondary and high school (n =3; 10.0%) for each. These findings would suggest that the randomization process provide an acceptable level of equality between the groups.

A study done by Atiyah (2013) agree with the results, which mentioned that most of the study sample were read and write in educational level (n = 23; 46.0%).

Most of the participants in the study group are married (n = 16; 53.3 %), and it's the same proportion of the married participants in the control group (n = 16; 53.3 %).

The results agree with the findings that obtained in Zhang et al. (2017) which concluded that the most of participants were married (58.44%). Furthermore, agree with a study done by Aljuaid et al. (2018) which mentioned that the majority if participants were married (93.9%).

Most of participants in the study group are housewives (n=16; 53.3%), and almost the same in the control group which is (n=15; 50.0%).

The result supported by result obtained in Majeed (2015) which stated that the most of the participants were housewives (n = 46; 46.0%), furthermore, another study done by Al-Shammary and Al-Gersha (2014) declared that most of the participants were housewives (n =25; 41.7%) which agree with the current result.

The participant's knowledge showing that they have poor knowledge at the pre-test period and good level in their knowledge at the post-test period regarding their subdomain and sub item of the general information about diabetes mellitus and additionally towards items of early complications of diabetes mellitus.

Those results are supported in a study done by Ryan, Jennings, Vittoria, & Fedders (2013) which revealed that there is significant improvements observed for participants' knowledge level after application of a multisession diabetes education program. Also, agree with McEwen et al. (2015) which confirmed the effectiveness of implementation of an educational program on an individualized type 2 diabetes by investigation of better disease outcomes. Moreover, in agree with AL-Shahrani (2018).

It is well known that prolonged length of disease results in different disease-associated complications basically as a result of low knowledge and poor disease control, in this way contributing to the disease-related morbidity. The objectives of the study targeted towards improving knowledge level for those participated in the study by implementation of an educational program based on deficits found (the researcher).

## **Conclusion**

The study findings show that most of the study participants for both control and study groups were females, over sixty years old, read and write, married, and housewives according to their socio-demographic data. The educational program has made a significant deferent for the study group knowledge. The participants who involved in the study group became aware about the general information about diabetes mellitus and early complications about diabetes mellitus. The educational program faced several challenges but can be applied to the clients regardless their differences.

## **Recommendations**

The study findings could promote all those concerned to embrace more diabetes mellitus articles in their curricula; especially secondary school curriculum should include topics concerning diabetic mellitus. Future research studies must being focus on this topic and applying educational program on a larger sample of other population to generalize.

## **References**

- Abbas, I. M., Ali, R. A. M., Mohammed, W. K., & Jaber, I. A. R. (2018). Effectiveness of Nursing Intervention for Early Detection of Breast Cancer among Working Women at Baghdad City. *Indian Journal of Public Health Research & Development*, 9(12).
- Al-Ameri, M. H., & Hatab, W. A. A. (2015). Assessing the Levels of Quality of Life for elderly People inflicted by Parkinson's Disease in the City of Baghdad. *Iraqi National Journal of Nursing Specialties*, 28(1).
- AL-Khafaf, E. S. (2017). Knowledge and Coping Strategies among Diabetic Patients in AL-Wafa'a Centre in Mosul City. *Mosul Journal of Nursing*. 5(2) (83-85).
- AL-Shahrani, A. M. (2018). Impact of health education program on diabetic control among diabetic patient managed at diabetic and endocrine center in Bisha, Saudi Arabia. *Biomed. Res*, 29(11), 2391-2394.

- Al-Shammary, Y. K. A., AL-Gersha, K. A. M. (2014). Satisfaction of Patients, Coronary Arteries in Related to Nursing and Medical Care. *Iraqi National Journal of Nursing Specialties*, 27(2) (74-83).
- Atiyah, H. H. (2013). Determination of Physical Problems for Adult Patients with Asthma. *Mosul Journal of Nursing*, 1(2), 48-53.
- Cavan D, Fernandes JDR, Makaroff L, et al. IDF diabetes atlas. 7th edn. International Diabetes Federation 2015.
- Dunky, M. (2020). Wood Adhesives Based on Natural Resources: A Critical Review: Part III. Tannin- and Lignin-Based Adhesives. *Reviews of Adhesion and Adhesives*, 8(4), 379-525. <https://doi.org/10.7569/RAA-2020-097313>
- Dunky, M. (2021a). Wood Adhesives Based on Natural Resources: A Critical Review: Part IV. Special Topics. *Reviews of Adhesion and Adhesives*, 9(2), 189-268. <https://doi.org/10.7569/RAA.2021.097307>
- Dunky, M. (2021b). Wood Adhesives Based on Natural Resources: A Critical Review: Part V. Wood Welding and Binderless Boards. *Reviews of Adhesion and Adhesives*, 9(3), 308-367. <https://doi.org/10.47750/RAA/9.3.01>
- Ehrmann, B. J. (2014). chapter contents. *A Comprehensive Guide to Geriatric Rehabilitation: [previously entitled Geriatric Rehabilitation Manual]*. Sciencedirect. 329.
- Graham, T. E., & Abel, E. D. (2013). Autophagy in diabetes and the metabolic syndrome. *Autophagy in Health and Disease*, 117-139.
- Hassen, A. F., & Ahmed, S. A. (2015). Assessment Contributing Factors related to hypothyroidism/hyperthyroidism for adult patient at Bagdad Teaching Hospitals. *Kufa Journal for Nursing Sciences*, 5(3).
- Imam, S. K. (2015). Diabetes: a new horizon and approach to management. In *Glucose Intake and Utilization in Pre-Diabetes and Diabetes* (pp. 29-44). Academic Press.
- Majed O. Aljuaid, Abdulmajeed M. Almutairi, Mohammed A. Assiri, Dhifallah M. Almalki, Khaled Alswat, "Diabetes-Related Distress Assessment among Type 2 Diabetes Patients", *Journal of Diabetes Research*, vol. 2018, Article ID 7328128, 10 pages, 2018. <https://doi.org/10.1155/2018/7328128>
- McEwen, L. N., Ibrahim, M., Ali, N. M., Assaad-Khalil, S. H., Tantawi, H. R., Nasr, G., ... & Herman, W. H. (2015). Impact of an individualized type 2 diabetes education program on clinical outcomes during Ramadan. *BMJ Open Diabetes Research and Care*, 3(1), e000111.
- Pizzorno, J. E., Murray, M. T., & Joiner-Bey, H. (2016). *The Clinician's Handbook of Natural Medicine E-Book*. Elsevier Health Sciences.
- Ryan, J. G., Jennings, T., Vittoria, I., & Fedders, M. (2013). Short and long-term outcomes from a multisession diabetes education program targeting low-income minority patients: a six-month follow up. *Clinical therapeutics*, 35(1), A43-A53.
- Saied, A. ., & Atiyah, H. (2022). Contributing Factors for Adult with osteoarthritis in Al Diwaniya Governorate Hospitals. *Kufa Journal for Nursing Sciences*, 5(1), 116–125. Retrieved from <https://journal.uokufa.edu.iq/index.php/kjns/article/view/3157>
- Sauder, K. A., Stafford, J. M., Mayer-Davis, E. J., Jensen, E. T., Saydah, S., Mottl, A., ... & Yi-Frazier, J. (2019). Co-occurrence of early diabetes-related complications in adolescents and young adults with type 1 diabetes: an observational cohort study. *The Lancet Child & Adolescent Health*, 3(1), 35-43.
- WHO [World Health Organization]. 2021. Diabetes Overview. Retrieved from <https://www.who.int/health-topics/diabetes>
- Yen, F. S., Lo, Y. R., Hwu, C. M., & Hsu, C. C. (2021). Early-onset type 2 diabetes < 60 years and risk of vascular complications. *Diabetes Research and Clinical Practice*, 109129.