

## Impact of Self-Efficacy Intervention Program on Caregivers Adherence toward Home-based Care Children with Type I Diabetes Mellitus

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### ABSTRACT

**Background and aims:** Diabetes is a metabolic disorder associated with many complications; caregivers' self-efficacy is essential for sustained home management. The study aimed to find out the effects of nursing intervention programs on caregivers' self-efficacy regarding adhering to home-based management of child to type1 diabetes mellitus.

**Methods:** A quasi-experimental study design on home-based nursing intervention was conducted and recruited 60 caregivers who took homecare for their diabetes type 1. The systematic sampling method was used to select the participants Who were divided into two groups (30 in an intervention group and 30 in a control group) and who were registered at the Gulan General Hospital in Akre / Duhok city of Iraqi Kurdistan region. Verbal consent was obtained. starting from 3rd of January to the end of 5th September 2022. The home-based lesions were adopted for 5 months, Mann-Whitney U test, and T-Test were used to identify the comparison between the variables. A p-value of  $\leq 0.05$ , considered statistically significant.

**Results:** There is no significant association between the control and study groups at the pretest before conducting the intervention program, while after conducting a home-based program for the intervention group, the results show that there was a highly significant difference between the pre and post test, the result reflects and successful program to change the self-efficacy of the caregivers from intervention, and it means a provided compared with the control group ( non-intervention group), at a p-value of  $\leq 0.05$ .

**Conclusion:** The results show that the caregivers who participated in the program (Intervention group), were successfully adapted to the self-efficacy program. Applying the program to a wider range of caregivers, to adhere to the caregivers and improve their self -efficacy toward home-based management of type 1 diabetes mellitus.

**Keywords:** Impact; Self-efficacy; Caregiver; Home-based care; Type 1 Diabetes Mellitus.

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## INTRODUCTION

Diabetes mellitus is the general name for a group of chronic metabolic diseases characterized by high blood glucose levels that result from defects in insulin secretion and/or action. The two main forms of diabetes are insulin-dependent diabetes mellitus (IDDM) or type 1 diabetes and noninsulin-dependent or type 2 diabetes. Type 2 diabetes is more commonly diagnosed in adulthood and is characterized by the body's inability to use insulin properly. Although type 1 diabetes can be diagnosed in adulthood, it usually develops and is diagnosed in childhood and adolescence [1]. Currently, type 1 diabetes affects 1 in every 400 to 600 children, and more than 13,000 children are newly diagnosed each year [2]. The total population of Iraq is over 32 million, a diabetes prevalence of 9.1% in 2011 [3]. In updating prevalence in this 2019, rate lowered to 8.8% (ages 20 to 79) [5]. and will be expected to reach 10.4% by 2030; in 2017 the number of diabetic cases in Iraq was 1,411.5. The estimated national prevalence of T1DM increased from 7.8 per 100,000 children (aged under 15) in 1995 to 14.2 in 2000, and 24.7 in 2014 [5]. The average annual incidence rate of T1DM was 7.4 per 100,000, which takes place in the intermediate group [2]. The increase in rates of diabetes across the globe brings with it an increase in diabetes complications. Poor diabetes management, whether through lack of education, limited access to care, or undiagnosed conditions, means diabetes complications are a real problem in most countries [5]. Due to the behaviors, abilities, and knowledge gaps that cause non-adherence to treatment and a considerable rise in long-term consequences, managing the condition effectively in children and adolescents has proven difficult [8]. It can cause major coping issues in children. [9]. The difficulties in educating children with diabetes about nutrition are

frequently tied to their ages and reflect the differing nutritional and developmental needs ; they are shown to be influenced by family functioning and interactions during mealtimes [10]. The aim of the study is to find out the effects of home-based nursing intervention programs on the self-efficacy of caregivers regarding based home care of children with T1DM.

## METHODS

A quasi-experimental (pre/post) research design was utilized to accomplish the aim of this study. A home-based intervention program was carried out. Sixty (60) patients were selected based on the simple random sampling methods, from the list of all patients, listed in Gulan General Hospital in Akre Dohuk Governorate, Kurdistan Region, Iraq, until the list of 60 caregivers was completed. The caregivers were split into two groups: one group of 30 caregivers who participated in the nursing intervention program was designated as the intervention group, and the other group of 30 caregivers was designated as a control group. The study's entire time frame spanned eight months, starting on January 3 and ending on September 5, 2022. The researcher collects the data, maintaining the privacy and anonymity of the information. The data collecting form was used without stating the participants' names, sensitive cultural considerations were considered, and approval was acquired; from the Duhok University Ethics Committee at the College of Nursing to perform the study. A non-probabilistic (purposive) sample of 60 (caregivers) was recruited for the study. Patients and their caregivers for outpatient treatment and regular follow-up at the Gulan General Hospital in Akre, the investigator, after obtaining consent to conduct home visits for each study sample, all caregivers.

The researcher wrote down their phone number. The caregivers who have patients with T1DM, aged less than 13 years, who are interested in participating in the study, the patient is registered at Gulan General Hospital in Akre city were included. Then the investigators were obtained oral consent to allow the study group to visit home. Home based visit was obtained for all the participants (intervention and control group), The health promotion model (HPM) was adapted for applying the education Program “notes that each person has unique personal characteristics and experiences that affect subsequent actions” was used as a guide for designing effective home care intervention programs, adhering to interventions, and removing barriers to delivering interventions. The researcher prepared the tools depending on the diabetes rating skills (DBRS) available at: <https://scholarscompass.vcu.edu/etd/185>). Data were analyzed using the statistical program for social sciences (SPSS) version 25. The researcher used frequency and percentage to describe the demographic variables and distribution of the sample in each group. To compare the nursing intervention programs between the control and intervention groups (pre-test and post-tests 1 and 2), Mann-Whitney U, and T-tests were used; a p-value of  $\leq 0.05$  is considered significant difference.

## RESULTS

The present study shows that most (46.6%) of the caregivers were mothers in the control group and 40.0% in the intervention groups respectively. Regarding the caregiver's age in both groups, most (43.4% vs. 33.4%) were between 40 and 45 years old in both groups. Regarding the caregiver's level of education in the caregivers in control and intervention groups in the highest percentage had primary school degrees (56.6% vs. 63.4%). Concerning the

caregiver occupation, the result reveals that, majority (80.0% and 73.2% respectively) of caregivers were out of work in both control and intervention groups respectively. Moreover, it shows that marriage is 90.0% in control groups and 93.4% in intervention groups, respectively. Regarding residential areas, most of them are distributed to sub-urban (40.0%) in control Groups; however, in intervention groups, most of them are in urban (43.4%). Most caregivers have one child with DMT1 in both control and intervention groups (76.6% vs. 73.4%). Concerning the caregiver's socioeconomic status, most of them are middle-class in control and intervention groups (50.0% vs. 33.4%) respectively (Table 1). Regarding the biographical information of the diabetes child patients the study found that the highest percentage (63.4% vs. 70.0% respectively) of the T1DM patients ages were between 9 and 12 years old in both the control and intervention groups and most of them were female (66.6% vs. 53.4%) respectively. Concerning school attendance, the patients in the control group had the highest percentage of not attending school (56.6%) while in the intervention groups, most of them were not regular attendees (53.4%) and the lowest of them in both groups were regular attendees (0.0% and 10.0%) respectively. Regarding the family history of diabetic disease, most (53.4% and 46.6%) respectively of children in both the control and intervention groups have a positive family history, such as (an uncle, grandfather, or one of the parents). regarding BMI the highest percentage (53.4%), in both groups were within acceptable weight (Table 2).

**Table 1:** Socio-demographical characteristics of the caregiver

Socio-demographical characteristics		Control	Intervention
		No.( %)	No.( %)
The main caregiver	Mother	14(46.6)	12(40)
	Father	13(43.4)	16(53.4)
	Brother	3(10)	2(6.6)
Age of the caregiver/year	Above 45	8(26.6)	9(30)
	40 to 45	13(43.4)	10(33.4)
	35 to 39	8(26.6)	10(33.4)
	Less than 35	1(3.4)	1(3.4)
Level of education	Illiterate	2(6.6)	0
	Can read and write	7(23.4)	7(23.4)
	Primary school	17(56.6)	19(63.4)
	Secondary school	2(13.2)	1(3.4)
	Higher education	2(13.2)	3(20)
Caregiver occupation	Public Employed	4(26.6)	6(40)
	Unemployed	4(26.6)	2(13.2)
	Out of work	12(80)	11(73.2)
	Housewife	9(60)	8(26.6)
	Retired	1(3.4)	3(10)
Marital status	Married	27(90)	28(93.4)
	Single	3(10)	2(6.6)
Residential area	Urban	10(33.4)	13
	Rural	8(26.6)	10(33.4)
	sub-urban	12(40)	7(23.4)
No. of children with Diabetic Mellitus Type1 in the family	One patient	23(76.6)	22(73.47)
	More than one patient	7(23.4)	8(26.6)
Socio-economic status	High	4(13.4)	3(10)
	Middle	15(50)	10(33.4)
	Low	11(36.6)	17(52.6)

**Table 2:** Assessment of biographical information of the Diabetes child patients (n= 60)

Demographical characteristics	Diabetes Patients	Control group	Intervention group
		No.(%)	No.(%)
Age/year	Less than 4 years	3(10)	0
	4 to 8 years	8(26.6)	9(30)
	9 to 12 years	19(63.4)	21(70)
Gender of patient	Male	10(33.4)	14(46.6)
	Female	20(66.6)	16(53.4)
School attendance	Regular	0	3(10)
	Irregular	13(43.4)	16(53.4)
	No attendance	17(56.6)	11(36.6)
Family history for Diabetic disease	Father	3(20)	3(20)
	Mother	2(13.2)	2(13.2)
	Others	16(53.4)	14(46.6)
	No history of diabetes in the family	6(20)	9(30)
	Parents	3(10)	2(6.6)
BMI	Underweight	5(16.6)	2(6.6)
	Acceptable weight	16(53.4)	16(53.4)
	Overweight	9(30)	12(40)

Concerning the assessment of self-efficacy for diabetes scale of caregivers of intervention and control group pre-test the, majority (76.6%) vs (53.4%) of control groups the caregivers not applicable for their child about eating meals every 4 to 5 hours every day, including breakfast every day while of intervention strongly the caregivers disagree regarding his child eat meals every 4 to 5 hours every day, including breakfast every day about (53.4% vs 86.6%) of participate don't obligated to prepare the diet for his child when must prepare or share food with other people who do not have diabetes in both groups (46.6% vs 76.6%) Caregivers in both groups do not choose the appropriate food for a child to eat when are hungry (for example, snacks), Regarding exercise 15 to 30 minutes 4 to

5 times per week most caregivers do not Apply it their child (66.6%) in both groups, (52.6% vs 66.6%) of participate do not use anything for his child to prevent blood sugar level from dropping when exercising in the control and intervention groups. About (70% vs 40%) of participants do not know what to do when their child's blood sugar levels goes higher or lower than it should be, most (36.6% vs 70%) of caregivers in both groups have not judged when the changes in his child's illness mean should visit the doctor and about (66.6% vs 76.6%) of participants in the control and intervention groups. Most caregivers do not control their child's diabetes so that it does not interfere with the things they want to do (Table 3).

**Table 3.** Assessment of self-efficacy for diabetes scale of caregivers of intervention and control group (pre and post-test) (n= 30).

Case-control Items	Control					Intervention				
	Strongly Agree	Agree	Disagree	Strongly Disagree	N/A	Strongly Agree	Agree	Disagree	Strongly Disagree	N/A
1 Eat meals every 4 to 5 hours every day, including breakfast every day?	0	0	1 (3.4)	11 (36.6)	23 (76.6)	0	0	7 (23.4)	16 (53.4)	4 (13.4)
2 Follow diet when you must prepare or share food with other people who do not have diabetes?	0	0	3 (10)	7 (23.4)	16 (53.4)	0	0	26 (86.6)	4 (13.4)	0
3 Choose the appropriate food for your child to eat when you are hungry (for example, snacks)?	0	0	1 (3.4)	6 (20)	14 (46.6)	0	0	23 (76.6)	5 (16.6)	2 (6.6)
4 Exercise 15 to 30 minutes, 4 to 5 times per week?	0	0	4 (13.4)	6 (20)	20 (66.6)	0	0	20 (66.6)	8 (26.6)	2 (6.6)
5 Do something to prevent your blood sugar level from dropping when you exercise?	0	0	4 (13.4)	2 (6.6)	17 (52.6)	0	0	20 (66.6)	9 (30)	1 (3.4)
6 Know what to do when your child's blood sugar level goes higher or lower than it should be?	0	0	0	3 (10)	21 (70)	0	0	0 (0)	12 (40)	7 (23.4)
7 Judge when the changes in your child's illness mean you should visit the doctor?	3 (10)	0	2 (6.6)	5 (16.6)	11 (36.6)	0	0	21 (70)	6 (20)	3 (10)
8 Control your child diabetes so that it does not interfere with the things you want to do?	0	0	2 (6.6)	1 (3.4)	20 (66.6)	0	0	23 (76.6)	6 (20)	1 (3.4)

Concerning comparing domains between the intervention and control groups before conducting the program ( pre-test), the study found non-significant differences

between the self-efficacy for diabetes scale of caregivers before conducting the program ( pre-test) at p-value 0.953 (Table 4).

**Table 4.** Compare of domains between intervention and control group before conduct the program (pre-test) ( n= 60 )

Self-efficacy		N	Mean	SD	P-Value
(Mann-Whitney U)					
Assessment of self-efficacy for diabetes scale of caregivers	Control	30	2.088	0.986	0.953 (NS)
	Intervention	30	2.033	0.512	

In terms of comparison between self-efficacy for the diabetes scale of the caregiver’s domain, pre- and post-tests 1 and 2 show that there was a highly significant difference between the intervention group at P value < 0.001 and 0.008. However, there is a non-significant difference after

two months of applying the intervention programs between pre and post2. but in control groups there are no-significant differences between pre and post-test 1&2 in the assessment of self-efficacy for the diabetes scale of caregivers (Table 5).

**Table 5.** Compare between self-efficacy for diabetes scale of caregiver’s domain pre and post -test 1 and 2 ( n= 30)

Interventional groups										
Pre-test and post-test 1						Pre-test and post-test 2				
	Mean	SD	t-test	d.f.	P-Value	Mean	Std. Deviation	t-test	d.f.	P-Value
Self-Efficacy for Diabetes Scale of caregivers	2.033	0.512				2.033	0.512	-0.249	29	0.008
	3.533	0.325	-32.311	29	< 0.001	2.046	0.937			
Control groups										
Self-Efficacy for Diabetes Scale of caregivers	Pre-test and post-test 1					Pre-test and post-test2				
	Mean	SD	t-test	d.f.	P-Value	Mean	Std. Deviation	t-test	d.f.	P-Value
	1.183	0.249				1.183	0.249	< 0.001	29	1.000
	1.183	0.249	< 0.001	29	1.000	1.1833	0.249			

## DISCUSSION

The findings of the present study show that most of the caregivers in the control groups were patients' mothers, but in the intervention Groups, they were fathers. A study confirmed that the 18 caregivers who represented the study of children with T1DM, there were 12 of the participants were mothers' children [11]. This may be attributed to the males' desire to participate in the program more than females. As they have sufficient and appropriate time to participate compared to females, on the other hand, the social, culture, customs, and traditions of our society, do not allow strangers to visit him in her home and communicate with females. Concerning the caregivers' age group, the study reveals that the majority of participants were between 40 and 45 years old in the control and intervention groups, respectively. When compared with the results of [2], they found that most of the mothers' age was over 41 years old in both the control and intervention group. While this result is in contrast with a study which found that the age of the caregivers was between 36 to 40 years old, they added with respect to their level of education, the present study found that the highest percentage of caregivers were primary school graduates. In contrast with the current result a study reveals that forty-two percent of caregivers had a secondary school education, 21.9% had some form of higher education [13 & 14]. A cross-sectional study conducted in Addis Ababa, Ethiopia, entitled Health-related quality-of-life and associated factors among children and adolescents with type 1 diabetes mellitus: a cross-sectional study, found that the most of caregivers were private employees. This result is in contrast with our result which reflects that majority of the caregivers were out of work in both

groups. According to marital status, the current result shows that most caregivers were married in control groups and intervention groups respectively. Correspondingly a study was conducted in Baghdad, found that almost all caregivers were out of work [14]. Regarding the residential area, the study reveals that most of the samples were distributed into sub-urban control groups and urban intervention groups. These results are the opposite of a study by [15], who found that most of parents were lived in urban. Concerning the number of children affected by DMT1 in the family, the result shows that most of the caregivers have one affected child with DMT1 in both the control and intervention groups. This result is in disagreement with a study conducted by Keklik et al., (2020), who reported that 51.8% of the families had more than two affected children with T1DM. Concerning the caregiver's socioeconomic status, the results show that most families lived in the middle of socioeconomic status (SES). Our results were in agreement with the results of a study conducted in Baghdad – Iraq and who found that most participants lived in middle SES in this study conducted in Baghdad [15]. Concerning the biographical information of the patient's current study it indicates that the highest percentage of the age of patients were 9 to 12 years old in both the control and intervention groups and most of them are female. The results of the current study were in agreement with a study conducted in Addis Ababa, Ethiopia in 2021 in which it was found that 54.9% of age patient were about 5 to 12 years old and found 56.6% female [15]. Concerning school attendance in the control group, the highest percentage is not attendance while, in the intervention groups, most of them are not regular attendance and the lowest of them in both groups regular attendance. The opposite result was also



documented by Alabedi, 2020, whose study found that most participation in regular school attendance is about (9.4% vs. 15%) in both groups. researcher's opinion that the family fears the complications, especially hypoglycaemia. Regarding family history for diabetic disease, most of the children in both control and intervention groups have a family history. these findings agree with Qadir & Zangana, 2020, who concluded that most of the participants have a family history entitled the effect of swimming program on glycaemic control in male adolescents with type 1 diabetes mellitus).with regard to BMI the highest percentage in both groups is acceptable weight. Some of them are overweight; this result is the same with [19]. He found that in children with diabetes type, about 29% were obese or overweight. Regarding the assessment of the self-efficacy of the intervention and control group pre-test. In this study, the researcher found that most of the caregivers' answers were not applicable in both groups. These results are in agreement with a study conducted in Egypt [20], which conducted a health educational program for DM caregivers and found before the intervention programs, the patients had poor self-efficacy. The same result was found in a result of a study which showed that patients with diabetes had poor self-efficacy [21]. Concerning the comparison of overall domains between the intervention and control groups before conducting the program (pre-test) the study indicates that there are no significant differences between all domains in intervention and control groups before intervention programs. The present results agree with the study by Gürkan et al., 2019, who stated that no there was no significant differences in the diabetes behavior rating scale and self-efficacy domain in the control and intervention groups. After the nursing

intervention program, the present study found that there is a highly significant difference between pre and post-tests 1&2 in the intervention group compared to the control group regarding self-efficacy for the diabetes scale of caregivers). This result is supported by a study that was conducted an intervention program on children with T1DM, found that there were highly significant differences between pre and post-tests (1 and 2) regarding the self-efficacy for diabetes scale of caregivers in the intervention group, and they found there were non-significant differences between pre and post-tests (1 and 2) in control groups [21],

## CONCLUSION

The majority of caregivers of children with type 1 diabetes mellitus improved their self-efficacy about the disease, and disease management performed by these caregivers is satisfactory in general after being exposed to nursing intervention programs. However, there is a need to intervene in some ways, changing attitudes to cope more adequately with the disease as well as improving the effectiveness of diabetes education.

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## ETHICAL CONSIDERATION

This study has been approved by the ethical committee at Duhok University, College of Nursing.

## CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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