

# The Effect of Partnership Care Plan on Metabolic Control of Iraqi Diabetic Adolescents

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## Abstract

**Objective:** This study designed and evaluated a long-term care program based on the partnership care plan for the metabolic control of diabetic adolescents in Iraq. The aim of the present study was to determine the effect of using the Partnership Care Plan on diabetic adolescents' metabolic control.

**Methods:** This is a quasi-experimental study, which was performed in Diabetes Center in Erbil, Iraq during 2012-2013. Forty diabetic adolescents were assigned to two groups of 20 members. The partnership care plan was applied in four stages (Motivation, Readying, Involvement, and Evaluation) with an intervention group for a period of three months. The control index for diabetes was the level of HbA1C and insulin, which were measured in both groups before and after the intervention. Data were analyzed by the SPSS software (ver. 16.0) using paired-t and independent-t tests.

**Results:** T-test results revealed that before intervention, both groups had similar levels of HbA1C ( $p=0.77$ ) and insulin ( $p=0.10$ ). However, after intervention, there was a statistically significant difference between the two groups in the level of both HbA1C ( $p<0.000$ ) and insulin ( $p=0.02$ ).

**Conclusion:** The results indicated that using the Partnership Care Plan in adolescents with type 1 diabetes is effective for controlling metabolism.

**Keywords:** Diabetes; Adolescence; Partnership care plan

## Introduction

Diabetes is the most common chronic disease worldwide. The prevalence of diabetes is increasing rapidly and the World Health Organization (2003) has predicted that the number of people with diabetes throughout the world would have almost doubled worldwide, from 177 million in 2000 to 370 million 2030 [1]. This chronic disease necessitates long term behavioral and lifestyle change [2]. The number of people suffering from diabetes has increased continuously with estimates of one million and nine hundred diabetic cases reported in 2010 in the age of 20, and it is estimated that there will be more than 366 million people suffering with diabetes by 2030 [3]. This noticeable increase in the prevalence of diabetes indicates the importance of identifying effective blood sugar control methods.

There are three clinical centers for diabetes in Iraqi Kurdistan. Based on the Iraqi Kurdistan Health Department reports, diabetes is the ninth leading cause of death and the third chronic fatal disease after hypertension and cancer. There were 141,143 diabetic cases in 2008 in this region. 76,984, 43,562 and 20,678 cases in Soleymaniyeh, Erbil and Dehuk, respectively. Iraq's population is 27 million with an estimated diabetes prevalence 7.43%, roughly about 2 million cases. In Iraqi Kurdistan (a region of about 4 million population), the prevalence of type 1 diabetes is 8-10% meaning that there is one diabetic case out of every 10 people [4]. The prevalence in teenagers has been increasing during the last decade [5]. Based on estimations, there is one diabetic case per 400 to 500 teenagers in the world [6]. Type 1 diabetes is considered a chronic and difficult disease for teenagers and their families. As diabetes management relies on self-management [7], patient education is a key intervention in promoting family health when a child is diagnosed with type 1 diabetes. The goal of patient education is to empower children and their parents to

acquire knowledge and skills, and to master and control the treatment process [8]. School-age children can learn diabetes self-management skills but they need their parents to share the responsibility of diabetes management [9]. Teenagers with type 1 diabetes and their families are required to manage several insulin injections, monitor blood glucose control, endure diet limitations and do regular physical activities. The increasing prevalence of diabetes will have a significant impact on national and individual economies as well as on individual health [10].

The cost of diabetes is estimated to be about 99 billion US\$ in direct and indirect medical care related to disability and early deaths [11]. The goals of diabetic patient care are to reduce complications, increase the quality of life scales, health promotion. Using the home care self-care education in diabetic patients is effective in their continuous behaviors and glycemic control [12]. Nurses play an important role in the control and prevention of diabetes. Nurses need to adopt an empowering manner of education, and recognize and assess a child's readiness to learn about diabetes care and take responsibility for it [13]. Nursing care plans assist to solve parts of the patients' problems. The Partnership Care Plan is effectiveness for the primary care of

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both patients and families. The aim of this cooperation is to take the most appropriate service from the most appropriate provider, in the most appropriate place, at the right time and with minimal barriers to be patient. Collaborative care can establish contacts between the people, better relationship with the exchange of clinical information, joint training programs, and improve the out put of this approach [14]. While Kelmo developed an example of an evidence-based patient education program. Other factors supporting changes in work practices require consideration for further development of the model [15]. Therefore, we evaluated the Partnership Care plan for increasing the interaction between patient, nurse, and physician to monitor and control the conditions of diabetic patients. The specific objectives were:

- To monitor and compare insulin levels in adolescents with type 1 diabetes in the intervention and control groups. (pre- and post-intervention).
- To monitor and compare the levels of HbA1C in adolescents with type 1 diabetes in the intervention and control groups (pre- and post-intervention).

## Materials and Methods

This research is based on a quasi-experimental study of diabetic adolescents who were referred to the diabetic centers of Erbil located in northern Iraq (Kurdistan). Subjects attending the diabetic centers of Erbil were selected through the census sampling method. All subjects were placed in either the control group (20 persons) or intervention group (20 persons). All subjects had a pre-test measure of blood sugar (BS) tests over two days; they then were randomly separated into two groups.

### Inclusion criteria

- Diagnosed with type 1 diabetes for at least one year ago;
- Having the age between 12 and 20 years.

### Exclusion criteria

- Having no other acute or chronic disease or illnesses.

We measured HbA1C and insulin levels as two para clinic tests. The independent and dependent variables were the Partnership Care Plan and diabetes metabolic control respectively in which the effect of Partnership Care Plan on the dependent variable was determined. The effect of the Partnership Care Plan on diabetic control for teenagers was determined by comparing the HbA1C levels and insulin consumption before and after the intervention in the control and intervention groups. No intervention was applied to the control group.

The Partnership Care Plan was done in the intervention group in four stages: Motivation, Readying, Involvement, and Evaluation.

## Motivation

Diabetes is a chronic disease and many patients are unaware of the side-effects of their disease; they need to be motivated to become actively involved in controlling the disease. Children desire to be independent in their choices and decisions concerning diabetes management [16-18]. In this stage, the health assessment questionnaire designed based on the patients' diabetic management problems was completed patients. Thus the patients' educational needs and care management were determined. The nurse and physician discussed with the diabetic adolescents about their problems and needs as well as the necessity for long-term management of the disease.

## Readying

After the motivation process, the patients were prepared to participate in the reading stage. Readying can be organized by partnership care team. The members of the team were twenty adolescents, one specialist nurse, and one physician. These meetings took place in three-four sessions lasting approximately 45-60 minutes. These meetings gave information about the complications of diabetes, empowerment, and autonomy in self-care. The specialist nurse and physician directed the meetings together.

## Involvement

Involvement was defined as the continuous cooperation and active participation of all the persons at the meetings as well as patient compliance with the principles of self-care, accomplished during the follow-up partnership meetings. The partnership follow-up meetings were conducted monthly and were organized by the partnership care team. The members of the team included: five patients with mutual problems, one specialist nurse, and one physician. The educational meetings were discussion-based, and the physician and nurse answered the patients' questions. At the start of each class, the specialist nurse, as the leader of the partnership care team, assessed the patients progress by asking questions about previous meetings and offering further explanation, if necessary. The physician guided and supported the discussion.

## Evaluation

Before implementation, the participants were examined with an insulin scale and HbA1C test (as a pre-test measurement in the two study groups), and the obtained results were compared using pre- and post- tests. Data were analyzed with the SPSS software (ver.16) using the independent sample t-test, paired t-test, and Chi-square test.

## Ethical considerations

All participants signed written informed consent prior to their participation. For the control group that did not get any intervention, education sessions were offered by author 1 upon completion of the intervention.

## Results

The Chi-square and Fischer tests showed no significant difference between the demographic properties of the participants in two study groups and their parents ( $p > 0.05$ ) (Tables 1 and 2).

The HbA1C level was decreased from 12.2 to 10.1 in the intervention group after the intervention ( $p = 0.000$ ); however it was increased in the control group from 12.35 (pre-intervention) to 13.7 (post-intervention), and the T-square test indicated a significant difference ( $p = 0.001$ ). Also before the intervention, there was no significant difference in the glycosylated hemoglobin level, based on the independent t-test, between the intervention and control group ( $p = 0.77$ ). After the intervention, a significant difference was observed in the glycosylated hemoglobin level, between the groups ( $p = 0.000$ ) (Table 3).

Insulin consumption was decreased from 60.1 to 47.15 in the intervention group, showing a significant difference before and after the intervention ( $p = 0.000$ ). Also it was increased from 51.6 (pre-intervention) to 59.05 (post-intervention) in the control group as validated by a coupled t-test ( $p = 0.000$ ). Based on the results of independent t-test, insulin consumption showed no significant difference before the intervention between the intervention and

X square	Control		Intervention		Group demographic data	
	Percent	Number	Percent	Number		
0.49	65	13	75	15	Student	Teenagers, job
	35	7	25	5	Non Student	
	100	20	100	20	Total	
0.32	45	9	30	6	<guidance	Teenagers, literacy
	55	11	70	14	>guidance	
	100	20	100	20	Total	
0.23 (Fisher)	100	20	85	17	>10 years	Diabetes duration
	0	0	15	3	10 years>	
	100	20	100	20	Total	
0.74	40	8	45	9	3	Times of insulin injection/day
	60	12	55	11	4	
	100	20	100	20	Total	
0.34 (Fisher)	20	4	5	1	Yes	Diabetes record in family
	80	16	95	19	No	
	100	20	100	20	Total	
1(Fisher)	85	17	90	18	Mixed	Type of insulin
	15	3	10	2	Non Mixed	
	100	20	100	20	Total	
0.05	35	7	65	13	Governmental	Fathers, job
	65	13	35	7	Non-Governmental	
	100	20	100	20	Total	
1(Fisher)	10	2	10	2	Illiterate	Fathers, literacy
	90	18	90	18	Literate	
	100	20	100	20	Total	
1 (Fisher)	85	17	18	90	Housewife	Mothers, job
	15	3	2	10	Employer	
	100	20	100	20	Total	
0.008	55	11	15	3	Illiterate	Mothers literacy
	85	9	85	17	Literate	
	100	20	100	20	Total	
1(Fisher)	90	18	85	17	Intermediate and lower	Family income
	10	2	15	3	Intermediate and upper	
	100	20	100	20	Total	

**Table 1:** Absolute and relative frequencies distribution of the research cases based on the demographic data in the intervention and control groups.

control groups (p=0.1) while a significant difference was seen after intervention between the two groups (p=0.02). As shown in Table 3, there is an ascending trend in HbA1C level in 95% of the control group cases while a descending trend is observed in 100% of the intervention group. The Fisher test showed a significant difference between the intervention and control groups in this regard. Additionally, 85% and 95% of the participants have ascending and descending trends of insulin consumption in the intervention and control groups, respectively.

## Discussions

The results indicated that the indexes of diabetic adolescents after intervention decreased significantly. Therefore, the Partnership Nursing Care Plan has a positive effect. Salehin et al. [16] utilized the Iranian Diabetes Association to pursue the relation between HbA1C and menstruation irregularity in teenage girls with type 1 diabetes and, demonstrated that diabetes duration is not significantly dependent upon HbA1C reduction [19]. With the ongoing duration of diabetes, teenagers may be more prepared to accept the responsibility of metabolic control of their diabetes. In addition, teenagers are expected to

become less dependent on their parents and manage their illness more independently. Parents needed to adjust to the diabetes management regimen in order to support their child [20]. The role of the healthcare team is to give cognitive, emotional and concrete support to the family [21]. Parents need professional support to become more independent in the management of diabetes [20]. Children acquire diabetes-related knowledge and skills from the doctors, nurses and dieticians [22,23].

Bel et al. [24] noted that the economic and social conditions of diabetic patients are related to the appropriate management of diabetes. The diabetes history of the intervention and control groups is the same in the first order relatives (father, mother, sister, and brother) [24]. In India, 47.5% of diabetic teenagers have had at least one diabetic case in their family, and in 9.1 of them, the mentioned family member has been the first order relative [25]. Najimi et al. [26] evaluated the nutritional effect on metabolic indexes, Body Mass Index (BMI) and blood pressure in 100 adolescents with type 1 diabetes. They found that nutrition based education decreased the HbA1C significantly during three months in an intervention group [26]. A review of studies on the consideration of medical evidence of self-surveying blood sugar levels in managing type 1 and 2 diabetes reveals that the self-survey of blood sugar in type 1 diabetes is effective in HbA1C reduction [27,28]. The findings of this present research indicated that both hypotheses of the study (insulin intake and HbA1C) are important variables of metabolic control in diabetic teenagers, and can significantly differ with intervention (p=0.00). Our sample size was small, which is one of the limitations of this study.

## Conclusion

The model presented in the present work can be applied to improve metabolic control of diabetes in teenagers in diabetic management centers. It uses the caring protocol in the metabolic control of diabetic teenagers. Therefore, it is recommended that this research be continued for three to five years to monitor the life style change over time. Nurses

Step / HbA1C	Before intervention		After intervention		Coupled t
Intervention group	Mean	Standard deviation	Mean	Standard deviation	
	12.2	1.73	10.1	1.37	p=0.000
Control group	12.35	1.49	13.7	1.08	p=0.001
Independent t	p=0.77		p=0.000		
Step/insulin consumption	Before intervention		After intervention		Coupled t
Intervention group	Mean	Standard deviation	Mean	Standard deviation	
	60.1	17.75	47.15	14.65	p=0.000
Control group	51.6	14.21	59.05	17.72	p=0.000
Independent t	p=0.1		p=0.02		

**Table 2:** Comparison of the mean and standard deviation of HbA1C & insulin consumption before and after the intervention in the intervention and control group.

Group/dependent variable	Control		Intervention		Fisher
	Percent	Number	Percent	Number	
HbA1C increase	95%	19	0%	0	p=0.000
HbA1C decrease	5%	1	100%	20	
Total	100%	20	100%	20	
Insulin increase	85%	17	5%	1	p=0.000
Insulin decrease	15%	3	95%	19	
Total	100%	20	100%	20	

**Table 3:** Absolute and relative frequencies distribution of the research cases in respect to HbA1C level and insulin consumption in the intervention and control groups.

can affect changes in health behaviors by adopting an empowering manner of education that recognizes and assesses a children's readiness to learn about diabetes care and manage their illness. Nurses must also help parents and other adults to gradually shift the responsibility to children as they become adolescents.

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G.H. designed and applied the Partnership Care Plan, and managed educational classes for adolescent as a nurse.

DAK. designed and applied the Partnership Care Plan as a physician. He prescribed insulin based on adolescents needs and provided requirements in the clinic for applying Partnership Care Plan

EM. edited the manuscript and added additional comments for consideration.

No potential conflicts of interest relevant to this article were reported.

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