ORIGINAL ARTICLE

Effectiveness of an Education Program on Primary School Teachers Knowledge towards T1DM

AQIL JABER ABD AL-HAMZA[1], SAWSAN ALI MAHMOOD[2], KHAMEES BANDAR OBAID[3]
[1]MSc student, University of Baghdad / College of Nursing, Bab Al Muadham, Baghdad, Iraq
[2]Assistant Professor Dr/ Pediatric Nursing Branch / College of Nursing, University of Baghdad
[3]Professor, PhD Pediatric Nursing Department, College of Nursing, University of Kerbala, Ira
Correspondence to: Aqil Jaber Abd Al-Hamza, Email: Aqil.Jaber1204b@conursing.uobaghdad.edu.iq

ABSTRACT

Background: Schools have an important role to play in ensuring that students with diabetes have the support they need to stay healthy, enjoy the same opportunities for learning and having fun as their peers, and are prepared to do their best in school. Training teachers and education professionals on diabetes is crucial for full-time monitoring of diabetic children in schools. The aims of study is to evaluate the effectiveness of an intervention program on teachers knowledge towards management of students with type I diabetes mellitus.

Methods: A quasi-experimental study conducted on a group of teachers in the Numaniyah district using the pre and post assessment. Using an purposive sample of 60 teachers divided into two groups of 30 samples for each them. The educational program was conducted on 30 teachers and they were compared to the control group. The reliability of the questionnaire was achieved through a pilot study and then presented to experts to prove its validity. The total number of items included in the questionnaire was 30-items. The data was collected by using the self-report method and analyzed by applying a descriptive and inferential statistical data analysis approach.

Results: The results of the study indicated that the (70%) of school teachers expressed deficit knowledge, and after the application of intervention program, (66.7%) of school teachers expressed good knowledge. While in the control group for two tests, the teachers' knowledge was poor (86.7% and 76.7%) respectively. There is a no statistical significant difference between intervention and control groups in the pre-test period of measurement (p=0.230). While, there is a highly statistical significant difference between the intervention and control groups at the post-test period of measurement (p=0.000).

Conclusions: Training the primary school teacher's staff by the implementation such education program which indeed helps to develop their knowledge. Ministry of Health and Education should try to consider teachers benefits. It should adjust training on managing diabetes at school program' aims to increase the awareness of the teachers on diabetes. Increase the awareness of childhood diabetes, it is critical to expand the management strategies to every area, other than healthcare institutions, to which children attend.

Keywords: Knowledge, Primary School Teachers, T1DM.

INTRODUCTION

Diabetes mellitus is one of the most prevailing non-communicable diseases in children [1]. Globally, the annual incidence rate of type 1diabetes (T1DM) is 31.4 new children per 100,000 total population [2]. Type 1 diabetes is a chronic illness characterized by the body's inability to produce insulin due to the autoimmune destruction of the beta cells in the pancreas. Although onset frequently occurs in childhood, the disease can also develop in adults [3]. Diabetes is a disorder of metabolism where the hormone insulin is deficient, ineffective or absent, resulting in abnormally high blood glucose levels and significant damage to the body's vascular system. The prevalence of type 1 diabetes for Unites States residents aged 0-19 years is 1.7 per 1000 [4].

T1DM is a life-long disorder which can be treated by a complex regimen of insulin injections, diet and exercise, and which greatly affects the life of patients and their families [5]. This is particularly the case for children and adolescents with diabetes who may struggle to cope with the management of diabetes within the school environment [6]. Children and adolescents may find it difficult to find medical and social support at school from teachers, staff, and other students [7]. Consequently, this study will add significantly to the limited knowledge about the care and treatment of T1DM among school children. It will also significantly add to the limited knowledge regarding knowledge and attitudes of teachers to children with T1DM. It is envisaged that the findings from this research may provide a rationale for formulation of school health policies that will be targeted towards the effective management of T1DM within the Iraqi school environment..

METHODOLOGY

A quasi-experimental study conducted on a group of teachers in the Numaniyah District/ Wasit Province, using the pre and post assessment. Using an objective sample of 60 teachers divided into two groups of 30 samples for each them. The educational program was conducted on 30 teachers and they were compared to the control group.

Validity was given to a panel of 11 arbitrators were asked to offer their opinions and suggestions on each of the study questionnaire's components in terms of language appropriateness, association with the dimension of study variables to which it was assigned, and suitability for the study population. To assess the questionnaire's reliability, data were collected from nurses, and the test was administered to 10 subjects from the study population who were not part of the original sample. Cronbach's alpha was discovered to be 0.82.

The SPSS version 20.0 software application was used to conduct statistical analysis. The information was evenly distributed. One-way analysis of variance and independent sample t test were used to examine variations in variables based on socio-demographic characteristics. For continuous variables, descriptive data is reported as mean standard deviation, and for categorical variables, it is shown as number (percent). Statistical significance was defined as a p 0.05.

RESULTS

Findings show participants age, the mean age for school teacher's in intervention group is 41 and the mean age in control group is 42, the age 30-39 years old were recorded the highest percentage in both groups (40% and 33.3%) respectively. In regard with the gender, the male were constituted more than half of school teacher's in intervention group (53.3%), as compared with those who are female school teacher's in control group (60%). Residents related findings, the urban residents were the majority among school teacher's in both groups intervention and control (83.3% and 66.7%) respectively. Concerning education level, the diploma degree were predominated among school teacher's in both groups intervention and control (83.3% and 73.3%) respectively. Respect to the years of experience, most of school teacher's in both groups intervention and control were had more than 10 years of

experience (73.3% and 76.7%) respectively. In terms of training, it is obvious among study findings that the teacher's in both groups intervention and control no attend training sessions (96.7% and 90%) respectively. There were no significant differences in both groups (p> 0.05).

Table 1: Sample Characteristics

Age /years	Classification	Intervention		Control		p-value
		Freq.	%	Freq.	%	
	20-29 years old	2	6.7	3	10.0	0.130
	30-39 years old	12	40.0	10	33.3	
	40-49 years old	7	23.3	8	26.7	
	50 and older	9	30.0	9	30.0	
	M± SD	41 ± 9.702		42 ± 8.861		
Gender	Male	16	53.3	12	40.0	0.039
	Female	14	46.7	18	60.0	
Residents	Urban	25	83.3	20	66.7	0.039
	Rural	5	16.7	10	33.3	
Education Level	Diploma	25	83.3	22	73.3	0.120
	Bachelor's	5	16.7	8	26.7	
Years of experience	<5yaers	3	10.0	2	6.7	0.078
	5-10years	5	16.7	5	16.7	
	>10years	22	73.3	23	76.7	
Training	Yes	1	3.3	3	10.0	0.239
	No	29	96.7	27	90.0	

Findings in table (2) illustrated that the (70%) of school teacher's expressed a poor level of knowledge at the pre-test period of measurement (M ± SD=37.76 ± 7.846) with regard type I diabetes mellitus. While, after application of intervention program, findings demonstrated that the (66.7%) of school teacher's expressed a good level of knowledge at the post-test period of measurement (M ± SD=51.73± 7.143).

Table 2: School Teacher's Knowledge about Type I DM in Intervention Group

Weighted	Pre-test			Post-test		
	Freq.	%	M ± SD	Freq.	%	M ± SD
Poor (M=30-40)	21	70.0	37.76 ± 7.846	3	10.0	51.73± 7.143
Fair (M=41-50)	7	23.3		7	23.3	
Good (M=51-60)	2	6.7		20	66.7	
Total	30	100.0		30	100.0	

"M: Mean of total Scores, SD: Standard Deviation for total scores

Findings in table (3) illustrated that the (86.7%) of school teacher's expressed a poor level of knowledge at the pre-test period of measurement (M ± SD=35.6 ± 5.863) with regard type I diabetes mellitus. While, after period of time has passed, findings demonstrated that the (76.7%) of school teacher's expressed a poor level of knowledge at the post-test period of measurement (M ± SD=37.96± 8.930).

Table 3: School Teacher's Knowledge about Type I DM in Control Group

Weighted	Pre-test			Post-test		
	Freq.	%	M ± SD	Freq.	%	M ± SD
Poor (M=30-40)	26	86.7	35.6 ± 5.863	23	76.7	37.96± 8.930
Fair (M=41-50)	3	10.0		3	10.0	
Good (M=51-60)	1	3.3		4	13.3	
Total	30	100.0		30	100.0	

"M: Mean of total Scores, SD: Standard Deviation for total scores

This table (4) shows that there is a no statistical significant difference between intervention and control groups in the pre-test period of measurement (p=0.230). While, there is a highly statistical significant difference between the intervention and control groups at the post-test period of measurement (p=0.000).

Table 4: Independent Sample t-test between the Intervention and Control Groups responses at pre-post-test Knowledge related to Type I DM

Pre-test	Weighted	Mean	S.D	t-value	d.f	p≤ 0.05	Sig
	Intervention	1.25	0.261	1.213	58	0.230	NS
	Control	1.18	0.195				
Post-test	Intervention	1.72	0.238	6.571	58	0.000	HS
	Control	1.26	0.297				

DISCUSSION

It is well-known that micro- and macro vascular complications of DM can be prevented through a well-managed metabolic control [8]. Good metabolic control can be only achieved with a comprehensive training. Schools are the major application areas of training in childhood diabetes and school professionals can play a critical role in the management of the disease. The 'Managing Diabetes at School Program' aims to increase the awareness of the teachers on diabetes. To increase the awareness of childhood diabetes, it is critical to expand the management strategies to every area, other than healthcare institutions, to which children attend.

Teacher's Knowledge towards Type I Diabetes Mellitus at Pre-test for both Groups (Intervention and Control)

A total of 30 multiple choice questions were used to measure the knowledge of respondents regarding students with type I DM and the mean score was 51-60 as a greater level, 41-50 as moderate level and 30-40 as a lower level. In current study findings, teachers expressed a poor level of knowledge with regard type I DM at the pre-test period of measurement for both intervention group (M ± SD=37.76 ± 7.846) and control group (M ±

SD=35.6 ± 5.863). This is a worrying finding given the importance of management of students with type I DM and its essentiality in school environment. There were no statistical significant difference between intervention (M ± SD= 1.25±0.261) and control (M ± SD= 1.18±0.195) groups in the pre-test period of measurement (t=1.213; p=0.230) with regards knowledge towards students with type I DM. With respect to the statistical mean, the study results indicate that the teachers in the intervention group have poor knowledge to the same degree as the teachers in the control group, which means an evaluation of 60 teachers who had unsatisfactory of knowledge.

In agreement with current findings, Greco (2018), investigated the school teachers knowledge with type I diabetes mellitus and depicted that the level of knowledge about different aspects of diabetes among school teachers was extremely poor. Teachers who had previous experiences with children with diabetes showed a much higher level of knowledge than those who did not [9].

The level of knowledge regarding pediatric diabetes among Greek teachers were extremely unsatisfactory and the school environment is threatened by health aspects. It is It is evident that there is an urgent need for providing further information, as well as practical training to schoolteachers with emphasis being placed on the initial symptoms of diabetes and also in the detection and management of diabetic emergencies [10]. Within the scope of the managing diabetes at school program. Aycan et al. (2012), confirmed that the school teachers have limited knowledge on diabetes. We believe that their knowledge levels can be improved by widespread training programs [11].

Teachers in female elementary schools in Northern Saudi Arabia need to improve their knowledge about diabetes in children, especially recognizing and management of diabetic emergencies. Training programs are crucially needed to empower teachers with knowledge and self-confidence in helping students with diabetes [12].

An overview of parents' perceptions of identifying the special needs of children with Type 1 diabetes in the school setting. The training sessions on Type 1 diabetes, an increase in the number of nurses, better availability of resources from diabetic associations to schools and improved communication between school personnel and parents were identified as key factors that may improve the full integration of the diabetic child in this setting [13].

The poor level of knowledge in school environment as being the school teachers of educational institutions believe they have not been particularly trained in the care of students living with T1DM and point out that their educational institutions in the city of Melilla are not prepared to help in diabetic emergencies [14]. In order to improve a healthy school environment, training sessions are a very important factor in terms of training teachers or students.

The training and management of DM should target behavioral changes in the patients, in the parents and other caring individuals [15]. A well-established relationship should be built among the patient, his/her parents and teachers. In a study, it was reported that teachers were incapable of making connections between a specific problem and the reasons underlying the problem, unless they were aware of the medical condition of the student [16].

Sentenac et al. (2011) reported that a higher number of children with chronic diseases were exposed to unfriendly behaviors at school with diminished communication with their peers [17]. Also, it was shown that children with an impaired blood glucose regulation and non-compliance to the dietary recommendations were neglected by their teachers [18].

Children with diabetes spend a considerable amount of their time at school and it is not unreasonable to expect their teachers to have a basic working knowledge of diabetes for a safe management of their schooling. This study shows a poor sensitivity of the school institution about diabetes and a very superficial level of knowledge of the different aspects of diabetes among school teachers. Specific training sessions for school personnel can represent a key factors in bringing children with diabetes to a full integration, so improving control of their glycaemic status as well as their quality of life. Teacher's Knowledge towards Type I Diabetes Mellitus at Post-test for both Groups (Intervention and Control)

We aimed in this study to evaluate the effectiveness of an intervention program on teachers knowledge about students with type I DM. In current study findings, school teacher's expressed a good level of knowledge with regard students with type I DM at the post-test period of measurement (M ± SD=51.73± 7.143) after application of intervention program. While, teacher's in control group expressed a poor level of knowledge (M ± SD=37.96± 8.930) with regard type I DM at the post-test period of measurement. This findings means effective of an education program, teacher's in intervention group expressed a benefit. There is a highly statistical significant difference between the intervention (M ± SD= 1.72±0.238) and control (M ± SD= 1.26±0.297) groups at the post-test period of measurement (t-test= 6.571; p=0.000) with regards knowledge towards students with type I DM. With respect to the statistical mean, the study results indicate that there is an improvement in the knowledge scores among intervention group after the application of the education program compared with the control group.

In our work, specifically, teachers in our study who received training in caring for diabetic students, were three and half times more likely to have a good level of knowledge about the disease, compared to those who did not receive such training. Inappropriately, less than one-third of our schools which carried out specific training programs for T1D for teachers. The inadequacy specific training among teachers and other school staff was also observed in other studies worldwide [19, 20]. Evidence from previous research established that teachers who received training, not only acquired factual knowledge, but also felt more confident when helping students with diabetes and promoted positive impact on teacher-student relationship [21].

There is accepted hypothesis that states (There were significant differences in teacher's knowledge between intervention group and control group), teacher's in the study group achieved considerable benefit from intervention program concerning type I diabetes mellitus. Based on this regard, the rate of teachers who were willing to give support to diabetic children was 76.5%. Therefore, it demonstrated that an important ratio of the teachers will attend and benefit from training programs designed for them. However, studies are required to establish the success rate of these programs and their effects on the knowledge at school environment [11].

Until today, several school programs worldwide, targeting management of DM, prevention of DM type 1, and lifestyle interventions were performed successfully [22, 23]. As the 'Managing Diabetes at School Program' is the first attempt at AL-Numaniyah District in Wasit province/ Iraq, the outcomes of this program should be analyzed carefully to develop new strategies based on different perspectives.

In this study, responses to a questionnaire indicate that teachers in Numaniyah district schools have limited information about diabetes and some concerns about disease management. By reaching large communities through teacher training programmes, early diagnosis of childhood diabetes as well as prevention/delay of its complications can be achieved.

CONCLUSION

Training the primary school teacher's staff by the implementation such education program which indeed helps to develop their knowledge. Ministry of Health and Education should try to consider teachers benefits. It should adjust training on managing diabetes at school program' aims to increase the awareness of the teachers on diabetes. Increase the awareness of childhood diabetes, it is critical to expand the management strategies to every area, other

than healthcare institutions, to which children attend **Ethical Clearance**

"All experimental protocols were approved under the Wasit Education Directorate, Iraq and all experiments were carried out in accordance with approved guidelines"

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