

Effectiveness of Telehealth Education Programme Regarding Diabetes Self - Management on Knowledge among Adolescents with Type 1 Diabetes Mellitus

Bintu Raju¹, Dr. Soja S L²

¹M. Sc Nursing Govt College of Nursing, Kottayam, India

²Assistant professor, Government College of Nursing, Kottayam, India

Abstract: *The present study investigated effectiveness of telehealth education programme regarding diabetes self - management on knowledge among adolescents with type1 diabetes mellitus attending Institute of Child Health, Kottayam. The main objective of the study was to evaluate the effectiveness of telehealth education programme on knowledge regarding diabetes self - management. A quasi experimental pre - test post - test control group design was adopted for this study. The study was theoretically supported by Nola J Penders Health promotion model. The study was conducted among 60 (30 control and 30 experimental) adolescents with type 1 diabetes mellitus, selected by purposive sampling technique. Socio personal data sheet, clinical data sheet, structured knowledge questionnaire regarding self - management of type1 diabetes mellitus were used for data collection. The data were collected over a period of six weeks and were analysed using descriptive and inferential statistics. Results of the study revealed that telehealth education had significant effect on improving knowledge ($p < 0.05$ regarding diabetes self - management among adolescents with type 1 diabetes mellitus.*

Keywords: Effectiveness; Telehealth education; Knowledge; Adolescents; Self - management

1. Introduction

Type 1 diabetes mellitus (T1DM) is an autoimmune disease that leads to the destruction of insulin - producing pancreatic beta cells. Insulin is an essential anabolic hormone that exerts multiple effects on glucose, lipid, protein, and mineral metabolism, as well as growth. Importantly, insulin allows glucose to enter muscle and adipose cells, stimulates the liver to store glucose as glycogen and synthesize fatty acids, stimulates the uptake of amino acids, inhibits the breakdown of fat in adipose tissue, and stimulates the uptake of potassium into cells. Individuals with type1 diabetes mellitus require life - long insulin replacement therapy.¹

Fluctuations in glycaemia due to hormonal changes, growth periods, physical activity and emotions make diabetes management difficult during adolescence.²

Diabetes is an ideal medical condition for telehealth utilization because it relies heavily on patient self - management and use of home medical devices that both generate and capture data. Although diabetes patient have better outcomes with more frequent provider contact.³

2. Objectives

- 1) To assess the knowledge regarding diabetes self - management among adolescents with type1 diabetes mellitus
- 2) To evaluate the effectiveness of telehealth education programme on knowledge regarding diabetes self - management among adolescents with type1 diabetes mellitus

3. Materials and methods

Quantitative approach was adopted for the study. Research design selected for the study was quasi experimental pretest posttest control group design. Nonprobability purposive sampling technique was used to select the study subjects. Adolescents in the age group of 10 - 19 years with type1 diabetes mellitus, attended in Mittayi clinic of ICH Kottayam were included in this study. Inclusion criteria of the present study was, adolescents who were; willing to participate in the study, registered under the state government project named Mittayi project at ICH Kottayam, male and female adolescents diagnosed with type 1 diabetes mellitus. Those excluded from the study, adolescents with type 1 diabetes mellitus who were; diagnosed to have other chronic diseases like heart disorder, lung disorder, renal disorder etc. Physically and mentally challenged adolescents. 30 subjects in control group and 30 subjects in experimental group with type 1 diabetes mellitus attending in this study. Google forms were used for the consent and data collection. On the first day of study pretest was conducted by using google forms. Basic information and clinical data of adolescents with type1 diabetes mellitus were collected using tool 1, Sociopersonal and Clinical datasheet. Knowledge regarding diabetes self - management were assessed by tool 2, Structured knowledge questionnaire regarding diabetes self - management Telehealth education programme regarding self - management of type 1 diabetes mellitus was administered to the experimental group on the second day whereas, the control group received only routine home care. Posttest was conducted after the 15th day of pretest in control and experimental group. The obtained data was tabulated and analysed in term of objectives of the study using descriptive and inferential statistics.

4. Results

4.1 Socio personal data of adolescents with type 1 diabetes mellitus

Among the study participants 73.3% of adolescents with type 1 diabetes mellitus in control group and half of the subjects (50%) in experimental group belong to 10 - 15 and 16 - 19 years respectively. Considering the gender among the experimental and control group 60% of subjects were females. Regarding the birth order 53.3% of subjects in control group and 46.7% of subjects in experimental group were second born. Present study revealed that 80% of adolescents in control and experimental group belong to nuclear family. Among the study participants 66.7% of subjects in control and 60% of subjects in experimental group had BPL economic status. The data revealed that most of the subjects in control (86.7%) and experimental group (93.3%) were non vegetarians. Considering the family history of diabetes mellitus 56.7% of subjects in the control group had family history of diabetes mellitus and in the experimental group 56.7% of subjects had no family history of diabetes mellitus.

4.2 Clinical data of adolescents with type 1 diabetes mellitus

Among the study participants, 60% of subjects in control and experimental group had onset of disease at the age of 1 - 9 years. Study revealed that 60% of subjects in control group and 66.7% of subjects in experimental group had $\geq 7.1\%$, HbA1c value. Regarding the use of CGM device, half of the subject 50% in control group use CGM device and majority of subjects (70%) in experimental group were not using CGM device. Study showed that half of the subjects (50%) in control group had no hospitalization; in the experimental group 43.3% of adolescents had less than five hospital admissions in a year. Among the study participants 100 % of subjects in control group and 93.4% of subjects in experimental group had no complications. Study revealed that all subjects (100%) in control group and 96.7% in experimental group had regular follow up visits

4.3 Findings related to knowledge of adolescents with type 1 diabetes mellitus

Table 1: Frequency distribution and percentage of adolescents with type 1 diabetes mellitus based on knowledge regarding diabetes self – management, (n=60)

Knowledge	Control group (n=30)		Experimental group (n=30)		df	χ^2	P
	f	%	f	%			
Excellent (20 - 25)	7	23.3	3	10	2	4.8	0.1
Good (15 - 19)	16	53.4	24	80			
Average (10 - 14)	7	23.3	3	10			
Poor (<10)	0	0	0	0			

Table 1 depicts that 53.4% of subjects in control group and 80% of subjects in experimental group had good knowledge regarding diabetes self - management. Chi square was computed to check the homogeneity of variables. It was found that both the groups were homogenous in terms of knowledge.

4.4 Effectiveness of telehealth education programme on knowledge regarding diabetes self - management among adolescents with type1 diabetes mellitus.

Table 2: Median and inter quartile range (IQR) of knowledge regarding diabetes self - management among adolescents with type1 diabetes mellitus in control and experimental group (n=60)

Group	Knowledge			
	Pretest		Post test	
	Median	IQR	Median	IQR
Control (n=30)	18	4	19	3
Experimental (n=30)	16.50	3	20.5	4

The data presented in table 2 shows that median posttest scores of knowledge regarding experimental and control group were 20.5 and 19 and IOR of experimental and control group were 4 and 3 respectively.

Table 3 Mean rank, sum of ranks and U value of post test scores of knowledge regarding diabetes self - management among adolescents with type 1 diabetes mellitus in control and experimental group, (n=60)

Knowledge				
Group	Mean rank	Sum of ranks	U	p
Control (n=30)	24.92	747.50	282.5	0.012
Experimental (n=30)	36.08	1082.50		

Table 3 shows that the mean rank of post test scores of knowledge regarding diabetes self - management among adolescents with type 1 diabetes mellitus in control and experimental group were 24.92 and 36.08 respectively. The obtained U value (282.5) was significant at 0.05 levels. Hence the null hypothesis was rejected. It was interpreted that there was statistically significant difference in the post test scores of knowledge between control and experimental group. This indicated that telehealth education programme was effective in improving knowledge among adolescents with type 1 diabetes mellitus.

5. Discussion

The present study assessed the knowledge of adolescents with type 1 diabetes mellitus, the study findings showed that majority of adolescents in control group (53.4%) and experimental group (80%) had good knowledge regarding self - management of type 1 diabetes mellitus. The findings were also consistent with the descriptive - analytical and cross - sectional study to evaluate the knowledge of adolescents with T1DM about the disease and respective care. The sample was composed of a total of 51 adolescents aged between 12 and 18 years being followed - up in diabetes consultations in the center region of Portugal. The results revealed that most (50.9%) adolescents had a good level of overall knowledge about diabetes and in 3 of the 5 dimensions, the study revealed some misconceptions, as well as adolescents with a low level of knowledge.4

The present study assessed the effectiveness of telehealth education programme on knowledge among adolescents with type 1 diabetes mellitus. The study findings showed

that telehealth education programme was effective in improving knowledge in diabetes self - management among adolescents with type 1 diabetes mellitus ($p=0.012$). The study findings were supported to a study conducted to assess the Knowledge Improvement with Web - Based Diabetes Education Program Brain food. The study result showed that, a web - based diabetes education programme is educationally sound and effective at delivering Type 1 diabetes mellitus education to both professionals and non - professionals. Web access from non - clinic settings can improve access to high - quality education for learners in remote or underserved locations.⁵

6. Conclusions

Based on the findings of the study the following conclusions were drawn. There was a significant increase in knowledge among adolescents with type 1 diabetes mellitus regarding diabetes self - management after the intervention. The present study highlighted the need for improving knowledge among adolescents with type 1 diabetes mellitus.

References

- [1] Lucier, J., Weinstock, R. S., & Doerr, C. (2021). Diabetes Mellitus Type 1 (Nursing).
- [2] Kassai, B., Rabilloud, M., Bernoux, D., Michal, C., Riche, B., Ginhoux, T., & Nicolino, M. (2015). Management of adolescents with very poorly controlled type 1 diabetes by nurses: a parallel group randomized controlled trial. *Trials*, *16* (1), 1 - 7.
- [3] Crossen, S., Raymond, J., & Neinstein, A. (2020). Top 10 tips for successfully implementing a diabetes telehealth program. *Diabetes technology & therapeutics*, *22* (12), 920 - 928.
- [4] Costa Flora, M., & GonçalvesHenriquesGameiro, M. (2016). Self - Care of Adolescents with Type 1 Diabetes Mellitus: Knowledge about the Disease. *Revista de Enfermagem Referencia*, *4* (8).
- [5] Bell, J. A., Patel, B., & Malasanos, T. (2006). Knowledge improvement with web - based diabetes education program: brain food. *Diabetes technology & therapeutics*, *8* (4), 444 - 448.