

Instructional Program Toward Adolescents Attitudes of Insulin Self-Administration

Adolescents
Attitudes of Insulin
Self-Administration

Nawfel Fadhil Hamza¹ and Muna Abdulwahab Khaleel²

ABSTRACT

Objective: To identify the level of attitudes adolescents have about self-administering insulin and to determine how that attitudes relates to sociodemographic characteristics

Study Design: A quasi-experimental study

Place and Duration of Study: This study was conducted at the diabetic and endocrine center of Al-Hilla city from 23rd May 2025 to 7th October 2025.

Methods: 120 adolescents were enrolled. The researcher uses an evaluation instrument, which consists of two sub-parts, where the first sub-part includes 7 questions related to demographic characteristics of adolescents with type I diabetes mellitus disease, the second sub-part includes 16 questions related to the attitudes of adolescents about self-injection of insulin. Each question has three options (agree, disagree and not sure). Where 3 = agree, 2 = not sure and 1 = disagree, and 3 represent the high value scale. The reliability coefficient of Cronbach Alpha, which determines the questionnaire's accuracy, is 0.86. Data collection is assessed and analyzed using SPSS-25.

Results: The adolescents attitudes in experimental group in posttest1 &2 is improving, while attitudes of control group is stayed in same level this indicated the instructional program was effective interventional approach to improve adolescents attitudes. Additionally, the findings point to a scientific association between the attitudes of teenagers and demographic information such as age, education level, and prior training. Repeated-measures analysis confirmed significant Time, Group, and Time × Group interaction effects with large effect sizes.

Conclusion: Most of the teenagers in the study samples were between the ages of 15 and 18 and resided in urban areas. Adolescent attitudes in the study group had a significant change; the mean was 23.58±13.65 in the pre-test, before to instructional program sessions; 33.41±14.96 in the post-test one, following educational program sessions; and 32.31±14.26 in the post-test two.

Key Words: Instructional program, Adolescents attitudes, Self-administration insulin

Citation of article: Hamza NF, Khaleel MA. Instructional Program Toward Adolescents Attitudes of Insulin Self-Administration. Med Forum 2026;37(4):5-9. doi:10.60110/medforum.370401.

INTRODUCTION

There are three types of diabetes; type I diabetes, also referred to as insulin-dependent diabetes, is more common in children but can afflict both adults and children. The demise of pancreatic beta cells, which results in little or no insulin production, is the etiology of type I diabetes. Non-insulin-dependent diabetes mellitus (NIDDM), another name for type II diabetes, is brought on by cellular resistance to insulin production and a lack of responsiveness to insulin, which is

prevalent in adults and frequently linked to sedentary lifestyles and obesity; type III is known as gestational diabetes, which results from physiological changes in pregnant women and weight gain, which causes stress on the pancreas to produce insulin to cover that increase where this type usually disappears at birth.¹

Health care officers should provide insulin to people who are taking it. A pen choice device with different length needles may be used to administer insulin; the size of the needles or syringe is decided by the healthcare officers. Alcohol swaps, continuous glucose monitors, and strips are additional supplies that are anticipated along with insulin.²

Children with DM type one need to basal insulin shots to maintain a safe range of blood glucose levels order to survive people with diabetes. To lead a healthy life and prevent numerous complications, they also need support, education, and routine blood glucose monitoring by adhering to a structured plan for clinical care for children, which includes early childhood physical activity and a healthy diet and adolescence where organized education can provide children with a lifestyle and a continuous healthy attitudes for children

¹. PhD Student Pediatric Health Nursing / Professor, Community Health Nursing², College of Nursing, University of Babylon.

Correspondence: Nawfel Fadhil Hamza, PhD student Pediatric Health Nursing, College of Nursing, University of Babylon.

Contact No: +9647803405686

Email: nur378.nawfal.fadel@student.uobabylon.edu.iq

Received: December, 2025

Reviewed: January-February, 2026

Accepted: March, 2026

with help of their families to follow it throughout their lives.³

Insulin is one of the oldest and most significant anti-diabetic medications available, and it is the most effective way to control hyperglycemia when used at the authorized levels. The preferred treatment for individuals with type 1 diabetes mellitus is insulin given subcutaneously either continuously or in several doses. To manage the burden, patients must take insulin therapy as directed by their doctors. Patients must have a positive attitude and a firm grasp of self-insulin administration in order to significantly contribute to their care.⁴

Insulin injection technique is better method to control of glucose management, so there is a need to familiarize the patient with the best and latest techniques suitable for use in insulin injections. The use of short and thin needles is necessary to reduce severity of pain which the patient feels during the injection, as well as improve absorption of insulin and the response of body tissues to it. This is done through educating and training patients and their parents on the technique of insulin injection, as educate diabetic patients on safe handling and use correct injection techniques, the effectiveness contributes to improving the patient's health condition, increases patients' acceptance of injections, and reduces the risks and complications that may occur as a result of incorrect and un-modern injection methods.⁵

METHODS

A quasi-experimental study is conducted at diabetic and endocrine center of Al-Hilla city from 23rd May 2025 to 7th October 2025 vide letter No. 84 dated 4th May 2025 and 120 adolescents were enrolled. The researcher uses an evaluation instrument, which consists of two sub-parts, where the first sub-part includes 7 questions related to demographic characteristics of adolescents with type I diabetes mellitus disease, the second sub-part includes 16 questions related to the attitudes of adolescents about self-injection of insulin. Each question has three options (agree, disagree and not sure). Where 3 = agree, 2 = not sure and 1 = disagree, and 3 represent the high value scale. The reliability coefficient of Cronbach Alpha, which determines the questionnaire's accuracy, is 0.86. Data collection is assessed and analyzed using SPSS-25.

RESULTS

70.0% and 66.7% were between the ages of 15 and 18, while 30.0% of the experimental group and group of the control 33.3% were between the ages of 10 and 14. Males made up 46.7% of the study group and 43.3% of the control group, respectively, while females made up 53.3% and 56.7%. Literate; 25.0% of the experimental group and group of the control 28.3% had completed primary school, while the remaining participants (75.0% and 71.7%, respectively) had completed

secondary school. Majority of participants lived in urban areas (60.0% study, 55.0% control), with the remaining participants coming from rural areas. 63.3% of the experimental group and group of the control 66.7% had been diagnosed with diabetes for five years or less. Nearly half of each group (46.7% study, 50.0% control) said they had previously received self-insulin injection training. About 25% of people used rapid-acting insulin, 33% used slow-acting insulin, and the remaining people used both types equally. The groups were statistically comparable at baseline, according to chi-square analysis, which revealed no significant differences between groups across all sociodemographic variables ($p > 0.05$) [Table 1]. The study results display that the study participants are normally distributed. So, the student researcher will go to parametric statistical measures ($p > 0.05$) [Table 2].

At the pre-test, the majority of participants held negative attitudes, while only 11.7% ($n=7$) had positive attitudes. Following the educational intervention, Post-test I showed a marked improvement: 81.7% ($n=49$) of adolescents now held positive attitudes, and only 18.3% ($n=11$) remained negative, with the mean score rising to 33.41 ± 14.96 . In Post-test II, positive attitudes were largely maintained, with 80.0% ($n=48$) positive and 20.0% ($n=12$) negative, and the mean score slightly decreased to 32.31 ± 14.26 . At the pre-test, most participants (88.3%, $n=53$) held negative attitudes, with a mean total score of 23.63 ± 13.84 , and only 11.7% ($n=7$) held positive attitudes. In Post-test I, the distribution remained largely unchanged, with 86.7% ($n=52$) negative and 13.3% ($n=8$) positive, and the mean score slightly increased to 24.56 ± 14.68 . At Post-test II, negative attitudes persisted in 88.3% ($n=53$) of participants, with a mean score of 24.24 ± 13.02 , and positive attitudes were unchanged at 11.7% ($n=7$) [Table 3].

The three measurement points showed a significant change in attitudes, as evidenced by the highly significant effect of time. The study and control groups' patterns of attitude changes over time were significantly different, as evidenced by the highly significant time \times group interaction (Table 4)

The study group demonstrated higher, more positive scores as a result of the educational intervention, and the effect of Group was statistically significant (Type III SS = 1672.81, $df = 1$, MS = 1672.81, $F = 7.34$, $p < 0.01$, Partial $\eta^2 = 0.058$). The error term had a Type III SS of 26,990.12 with $df = 118$ and MS = 228.84. When compared to the control group, these results demonstrate that the intervention significantly changed the attitudes of teenagers regarding self-insulin injection (Table 5).

For attitudes, large effect sizes were found between the pre-test and post-test ($\eta^2 = 0.642$), indicating that the educational program had a significant immediate impact. Smaller effect sizes were seen between post-test one and post-test two, suggesting a slight decrease or stabilization over time, while overall improvements remained substantial (Table 6).

Table No. 1: Distribution of sociodemographic variables

Variable		Study Group (n=60)	Control Group (n=60)	Chi-square	p-value
Age (years)	10-14	18 (30.0%)	20 (33.3%)	0.267	0.967
	15-18	42 (70.0%)	40 (66.7%)		
Sex	Males	28 (46.7%)	26 (43.3%)	0.133	0.715
	Females	32 (53.3%)	34 (56.7%)		
Educational level	Able to read & write	60 (100%)	60 (100%)	0.267	0.964
	Primary school	15 (25.0%)	17 (28.3%)		
	Secondary school	45 (75.0%)	43 (71.7%)		
Residence	Urban	36 (60.0%)	33 (55.0%)	0.300	0.584
	Rural	24 (40.0%)	27 (45.0%)		
Type 1 diabetes duration	≤ 5 years	38 (63.3%)	40 (66.7%)	0.133	0.715
	> 5 years	22 (36.7%)	20 (33.3%)		
Training on Self-Insulin Injection	Yes	28 (46.7%)	30 (50.0%)	0.133	0.715
	No	32 (53.3%)	30 (50.0%)		
Type of insulin used	Rapid-acting	15 (25.0%)	17 (28.3%)	0.267	0.964
	Slow-acting	20 (33.3%)	18 (30.0%)		
	Both	25 (41.7%)	25 (41.7%)		

Table No. 2: Normality tests

Pre-test	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	Df	Sig.
	.215	60	.079	.850	60	.081

Table No. 3: Overall adolescents' attitudes about self-insulin injection in study and control groups

Weighted	Pre-test			Post-test one			Post-test two		
	No.	%	Mean±SD	No.	%	Mean±SD	No.	%	Mean±SD
Study Group									
Negative (≤32)	53	88.3	23.58±13.	11	18.3	33.41±14.96	12	20.0	32.31±14.26
Positive (>32)	7	11.7	65	49	81.7		48	80.0	
Control group									
Negative (≤32)	53	88.3	23.63±13.	52	86.7	24.56±14.68	53	88.3	24.24±13.02
Positive (>32)	7	11.7	84	8	13.7		7	11.7	

Table No. 4: Effects of within subjects (study versus control)

Source	Type III SS	df	MS	F	p-value	Partial η ²
Time	5206.42	2	2603.21	120.43	0.000**	0.669
Time × Group	7053.28	2	3526.64	178.61	0.000**	0.758
Error (time)	1834.77	117	15.68			

Table No. 5: Between-subjects effects

Source	Type III SS	df	MS	F	p-value	Partial η ²
Group	1672.81	1	1672.81	7.34	0.008**	0.058
Error	26990.12	118	228.84			

Table No. 6: Effect sizes of intervention on attitudes

Outcome	Time Point	F / t	p-value	Partial η ²	Interpretation
Attitudes	Pre vs Post-test one	212.31	0.000**	0.642	Large
	Post-test one vs Post-test two	7.84	0.006**	0.062	Small
	Pre vs Post-test two	188.74	0.000**	0.616	Large

DISCUSSION

There were no statistically significant differences (p>0.05) in the sociodemographic variables between the experimental and control groups in this study. This reflects successful randomization and supports baseline equivalence, which is essential for attributing any later differences to the intervention rather than to

confounding factors. The sample was predominantly older adolescents (15-18 years; 70% in both groups) and gender distribution was comparable (46.7% males in the experimental group vs. group of the control 43.3%). All participants had basic literacy, and nearly three-quarters had secondary school attainment, suggesting an adequate cognitive foundation to understand insulin self-management instructions. The

dominance of older adolescents is particularly relevant because developmental maturity at this stage may enhance learning and performance of complex self-care skills such as insulin self-injection. The higher proportion of urban residents may imply differential access to diabetes services; therefore, generalizing these findings to rural adolescents should be done cautiously. Significantly, baseline gaps in knowledge and attitudes remained despite the fact that roughly half of participants reported having received prior training. This highlights the need for structured reinforcement in addition to exposure.

This study supports a study by Aldossary and Snelgrove⁶ that emphasized family-related factors in management while highlighting similar adolescent profiles in insulin-dependent populations. Additionally, this study supports a study by Jain et al⁷ and Ajhmed et al⁸ showed that structured educational programs with reinforcement are the most effective way to incorporate hands-on training.

Table 3 of the study demonstrates a significant shift in the attitudes of teenagers toward self-administration of insulin over the course of the three measurement points. Just 11.7% of the study group's participants expressed positive attitudes at the pre-test stage, while the vast majority (88.3%) showed negative attitudes. This baseline pattern emphasizes the psychological resistance, fear, and ambivalence that often accompany insulin use during adolescence and reflects a significant affective barrier to effective diabetes self-management. Prior to the educational intervention, negative emotional and cognitive perceptions predominated, as further supported by the low mean attitude score (23.58 ± 13.65).

After test I, there was a significant reversal in attitude polarity. Positive attitudes increased dramatically to 81.7% while negative attitudes decreased to 18.3%. The mean attitude score rose to 33.41 ± 14.96 in tandem with this change, indicating a 9.83-point improvement or a 41.7% reversal. Notably, there was no overlap between the pre-test and post-test I 95% confidence intervals, indicating that the observed improvement was statistically significant and unlikely to be the product of chance. From an interpretive standpoint, rather than being merely a minor improvement, this change reflects a qualitative shift in how teenagers perceive insulin self-administration. The post-test II results provide additional evidence for long-term attitude change. Overall, the attitude profile was still much better than baseline, although positive attitudes slightly decreased from 81.7% to 80%. The small 1.1-point difference between post-test 1 and post-test 2 indicates minimal attitudinal decay and good retention of positive perceptions. This pattern, which demonstrates stabilization rather than regression, supports the conclusion that the intervention produced long-lasting affective change rather than transient enthusiasm.

It is equally important that after the intervention, 18-20% of participants still have negative attitudes. Clinically speaking, this result should not be seen as a

program failure but rather as a sign of individual differences in coping mechanisms, psychological preparedness, and emotional fortitude. In addition to educational interventions, some teenagers might need extra psychosocial or counseling-based support. Further evidence that the intervention successfully addressed both cognitive and affective domains concurrently rather than focusing only on information delivery comes from the nearly parallel improvement in attitudes.⁹

This study supports previous research only 20.7% of Ethiopian adolescents with type I diabetes showed favorable attitudes toward insulin self-administration, according to Metu-Karl et al¹⁰ and Workneh et al.¹¹ This indicates widespread affective resistance in the absence of structured education. Over 80% of participants in the current study had positive attitudes after the intervention, indicating a significantly higher degree of success. This study also supports to Mohamed et al¹² and Mohamed et al¹³ found that attitudes significantly improved following structured education, direct quantitative comparison is hampered by the lack of percentage-based classifications.

The findings are also in line with a larger body of research that identifies psychological barriers specifically, anxiety and injection-related fear as significant impediments to insulin adherence. Citing Cramer and Pugh, the American Diabetes Association⁸ highlighted that one of the biggest obstacles to using insulin is still injection-related fear. The high percentage of participants reporting positive attitudes after the intervention shows that structured, adolescent-appropriate educational interventions can effectively reduce such barriers.

According to this study, the control group showed little change in attitude over the course of the three time points, with negative attitudes continuing to be high at roughly 88%. The mean attitude scores showed modest increases that were neither clinically nor statistically significant (Table 4). From the perspective of a researcher, this stagnation draws attention to a critical flaw in conventional clinical care: in the absence of intentional educational and psychosocial intervention, adolescents' attitudes regarding insulin self-administration essentially remain unchanged.

Negative attitudes are known to predict poor adherence, insufficient glycemic control, and an increased risk of complications. The lack of improvement in the control group implies that regular clinic visits, natural disease progression, and even repeated assessment are not enough to change ingrained emotional reactions. This result is consistent with earlier studies that indicate negative attitudes toward insulin persist in the absence of focused psycho-educational strategies.^{14,15}

This study clearly showed that structured educational interventions lead to substantial and sustained improvements in teens' attitudes toward self-administration of insulin. The difference between the experimental and control groups demonstrate that intentional, well-thought-out educational initiatives are

what lead to attitude change rather than living with diabetes mellitus. These results strongly support the integration of structured attitude-focused education into standard diabetes care for adolescents, with additional tailored support for those who continue to exhibit resistance or ambivalence despite intervention.

CONCLUSION

Most of the teenagers in the study sample were between the ages of 15 and 18 and resided in urban areas. Adolescent attitudes in the study group had a significant change; the mean was 23.58±13.65 in the pre-test, before to instructional program sessions; 33.41±14.96 in the post-test one, following educational program sessions; and 32.31±14.26 in the post-test two. Throughout the pre-test, post-test one, and post-test two, adolescent attitudes in the control group stayed constant. The study group's attitudes between the pre-test, post-test one, and two, where the level was greater, show that the educational program is effective.

Recommendations: Attending conferences and educational health programs on insulin self-injection can inspire and encourage teenagers with type I diabetes, teaching teenagers with type I diabetes the importance of adhering to health organizations' recommendations and instructions about the self-injection of insulin.

Author's Contribution:

Concept & Design or acquisition of analysis or interpretation of data:	Nawfel Fadhil Hamza, Muna Abdulwahab Khaleel
Drafting or Revising Critically:	Nawfel Fadhil Hamza, Muna Abdulwahab Khaleel
Final Approval of version:	All the above authors
Agreement to accountable for all aspects of work:	All the above authors

Conflict of Interest: The study has no conflict of interest to declare by any author.

Source of Funding: None

Ethical Approval: No. 84 Dated 04.05.2025

REFERENCES

1. Wicklow B. Classification and management of diabetes mellitus across the lifespan. *Lancet Diabetes Endocrinol* 2023;11(3): 201-10.
2. Langat MK. Knowledge and practices related to blood glucose monitoring among patients with diabetes mellitus. *BMC Endocrine Disord* 2020; 20: 11-5.
3. Bandarian F. Comprehensive care strategies for children with type 1 diabetes mellitus. *J Pediatr Endocrinol Metabol* 2023;36(4): 389-98.

4. Motilal B. Insulin therapy adherence and self-administration challenges in diabetes management. *Diabetes Metabol Syndrome Clin Res Rev* 2019; 13(5): 2847-52.
5. Kalra S. Injection techniques in insulin therapy: Current best practices. *Diabetes Therapy* 2023; 14(2): 345-57.
6. Aldossary A, Snelgrove S. Family involvement in the management of adolescents with type 1 diabetes mellitus. *J Pediatr Nurs* 2020; 52: e1-7.
7. Jain A, Gupta P, Mehta S. Effectiveness of structured diabetes education with hands-on training on insulin administration skills among adolescents. *Int J Nurs Studies* 2021;115: 103846
8. 8 Ahmed FA, Marzouk SA, Mahmoud S. Effectiveness of video-assisted training on insulin self-administration level among adolescents with type 1 diabetes. *IJND* 2018; 8(07): 30-39.
9. American Diabetes Association. Standards of medical care in diabetes. *Diabetes Care* 2022; 45(Supplement 1): S1-264.
10. Metu Karl R, Tadesse A, Mekonnen B. Attitudes and practices of insulin self-administration among adolescents with type 1 diabetes in Ethiopia. *BMC Public Health* 2019;19.
11. Workneh Fego M, Tahir Yasin J, Mamo Aga G. Knowledge, attitude and practice towards insulin-self administration among diabetic patients attending Bedele Hospital, Southwest Ethiopia, 2019/2020. *Diabetes Metab Syndr Obes* 2021;14:1919-25
12. Mohamed EIE, Ahmed SA, Osman HM. Effect of a structured educational program on insulin self-administration knowledge and attitudes among adolescents with type 1 diabetes. *J Pediatr Nurs* 2024;74:45-52.
13. Mohamed EIE, Mohamed ATM, Ali HGE, Abd El-RahmanRMM. Effect of structured educational program on diabetic patients' knowledge attitude, and practices regarding self-administration of insulin injection. *Egypt J Health Care* 2024; 15(2): 18-35.
14. Endale A, Teni FS. Attitudes toward insulin therapy and associated factors among patients with diabetes mellitus. *Diabetes, Metabolic Syndrome Obesity Targets Therapy* 2020; 13: 2011-20
15. Almheiri A, Binjab EA, Albloushi MM, Alshamsi MT, Khansaheb HH, Zidan M, et al. Knowledge, attitude and practices of insulin therapy among patients with type 2 diabetes: a cross-sectional study. *BMJ Open* 2024;14(3): e079693.