

Effectiveness of The Education Program on Diabetic Patients' Knowledge and Practice Regarding Self-Administration of Insulin in Erbil City

أثر البرنامج التعليمي عن المعلومات والمهارات المصابين بداء السكري حول الحقن الذاتي للأنسولين في مدينة أربيل

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الخلاصة

الهدف: إن الهدف من هذه الدراسة هو تقييم أثر البرنامج التعليمي عن المعلومات والمهارات المرضى المصابين بداء السكري حول حقن الأنسولين بأنفسهم. **المنهجية:** قد أجريت دراسة شبه تجريبية في مركز ليلي قاسم لرعاية المصابين بداء السكري بمدينة أربيل في إقليم كردستان العراق من شهر حزيران ٢٠١٤ إلى شهر تشرين الأول ٢٠١٤. وقد تم اختيار عينة غير احتمالية "هادفة-غرضية" مكونة من ٥٠ مريض مصابين بداء السكري. تم إعداد الاستمارة الإستبائية المكونة من ثلاثة أجزاء. فالجزء الأول تشمل معلومات الديموغرافية والاجتماعية للمرضى، والجزء الثاني يحتوي على معلومات سريرية وأما الجزء الثالث تتكون من مجموعة من الأسئلة حول معلومات ومهارات عن كيفية حقن الذاتي للأنسولين من قبل المرضى المصابين بداء السكري. وتم تحديد الثبات والمصدقية للإستمارة من خلال حساب (معامل الارتباط ألفا) التي أجريت على ١٠ مرضى ($r = 0.885$)، وتم تحقيقها من قبل ١٥ خبير. وقد تم تحليل النتائج باستخدام برنامج ال (SPSS V.20) كوسيلة إحصائية لتحليل البيانات تم استعمال الإحصاء الوصفي الذي تضمن التكرارات والنسب المئوية والوسط الحسابي والانحراف المعياري والإحصاء الاستدلالي الذي شمل اختبار معامل الاختلاف بين الاختبار القبلي والبعدي. **النتائج:** بيّنت نتائج الدراسة بأن عُمر غالبية المرضى المصابين بداء السكري ما بين ١٨-٣١ سنة و معظمهم كانوا من الإناث، أميين، وهم من سكنة المدينة. النسبة العالية منهم يعانون من الداء السكري لمدة يتراوح بين ١-١٥ سنة مع ١-١٠ سنة ويعالجون بالأنسولين. **الاستنتاج:** استنتجت الدراسة بأن مُعدل المعلومات العامة ومهارتهم عن كيفية حقن الأنسولين الذاتي من قبل المصابين بداء السكري زادت بعد المقارنة ما بين الاختبار القبلي والبعدي للبرنامج ($P\text{-value of } t\text{-test} = < 0.001$) وهذا يدل على تأثير البرنامج التعليمي. **التوصيات:** أوصت الدراسة بأعداد برنامج تعليمي عن الحقن الذاتي للأنسولين لجميع المصابين بداء السكري إضافة الى القائمين بعنايتهم.

Abstract

Aim of study: This study aims to assess the effectiveness of educational program on diabetic patients' knowledge and practice regarding self-administration of insulin.

Methods: Quantitative, quasi-experimental study was conducted in Leila Qasim Center for Diabetes Care in Erbil City in the Kurdistan Region of Iraq from 15th June 2014 to 15th October 2014. Non-probability (purposive sample) was used for selection of 50 diabetic patients. Questionnaire and checklist were designed and divided into three parts; socio-demographic and clinical characteristics of diabetic patients, knowledge regarding insulin medication and the practice of insulin self-administration. Pilot study was conducted on 10 diabetic patients for obtaining the reliability of the study and it was statistically adequate ($r = 0.885$). The content validity was determined through 15 experts and all 15 experts agreed the content of the questionnaire and checklist with some changes. The data were analyzed through the SPSS software V.20 application, descriptive data analysis was done through frequency, percentage and mean. Inferential data analysis was done by t-test correlated one sample in two occasions (paired), it was used to test the significant differences between two variables x (test) and y (retest).

Results: The study results show that the most of the study sample was between 18-31 years old, female, illiterate from urban area, and the highest percentage of the duration of disease was between 1-15 years and 1-10 years of the duration of the insulin management. The mean scores of the knowledge regarding insulin medication and insulin self-administration practice after the education program were increased in comparing between pre-test and post-test ($p\text{-value of } t\text{-test}$ was very highly significant < 0.001) which is related to the effectiveness of the education program.

Recommendations: The study recommends that preparing educational programs to be implemented for all diabetic patients who have insulin medication and their caregivers.

Keywords: Effectiveness; individual planned teaching; self-administration of insulin; patients with diabetes mellitus; Laila Qasim Center for diabetes care.

INTRODUCTION:

Diabetes Mellitus (DM) is a multisystem disease related to abnormal insulin production, impaired insulin utilization or both. It is the fourth to fifth leading cause of death in developed countries⁽¹⁾.

The prevalence of diabetes is rising worldwide, and Kurdistan region is no exception, the current prevalence rate of diabetes 5-8% based on estimation by International Diabetes Federation. The highest rate of diabetes prevalence is found in North America (7.9%) followed by Europe (7.8%). The prevalence of diabetes is higher in developed countries than in developing countries⁽²⁾.

Diabetes is one of the incurable but easily controllable diseases⁽³⁾. The overall risk of dying among people with diabetes is at least double the risk of their without diabetes⁽⁴⁾.

The underuse reflects numerous barriers to treatment initiation as well as obstacles that hinder treatment adherence. Errors in insulin injection further curtail the ability of many patients to attain glycemia goal⁽⁵⁾. According to two recent surveys, at least one third of patients fail to take their insulin as prescribed, and 20% of adults intentionally skip their doses⁽⁶⁾.

A study was conducted in Germany on “intensive insulin regimens – evidence for benefit” for the diabetic patients. It was found that tight glycemic control achieved with intensive insulin regimens can reduce the risk of developing or progressing diabetes complications. It was found that intensive insulin regimens could achieve strict metabolic control in patients with diabetes⁽⁷⁾.

For patients who are on insulin, insulin should be made available by the health care officers. Insulin administration may include a pen choice devices with various length needles, sizes of the needles or syringe are pre-determined by the healthcare officers. Other supplies expected with insulin are alcohol swap, continuous glucose monitoring machine and strips. How to use glucose monitor and appropriate strips must be known by the patients or people around him or her and strips must be kept fresh and clean⁽⁸⁾.

Taking of medication at the right time, most of the time it is advisable to decrease or avoid the previous medications. During sudden health crises, higher doses may be needed immediately but the maximum one can use must have been instructed by the healthcare officer. Alarm clock can be used to remind the client of the time to take the medication or people living with him or her can remind him. Nam and his colleagues (2011) noted the barriers that are responsible for the failure of diabetes management on the part of patient and on the part of the health care provider⁽⁹⁾.

Mollema and his friends (2000) in their study about “Diabetes; fear of injecting and self-testing questionnaire” found that extreme fear of self-injecting insulin (Injection Phobia) is likely to compromise glycemic control as well as emotional well-being. Cramer and Pugh (2005) in their study “The influence of Insulin use on glycemic control” has described numerous barriers to use of insulin e.g., fear of self-injections, and hypoglycemic events, burden of injections and timings in relation to meals etc.⁽¹⁰⁾.

Assessment and reinstruction for insulin injection technique is important to improve glycemic control, not only for those with erroneous injection skill, but also for those with apparently proper techniques. Individual Planned Teaching (IPT) is one of the effective teaching strategies, which can be used to improve the knowledge and ability of the diabetic patient on self-administration of insulin⁽¹¹⁾.

The researchers during her clinical experience have come in contact with diabetic patients who have reported that they found difficulty in locating a skilled person to administer insulin. Even though they locate a skilled person they have to spend a lot of time, energy and money to avail the service. The researchers also found that there was lack in knowledge regarding the self-administration of insulin. The major problem experienced by them was to administer insulin

administration by themselves and they expressed their desire to learn it⁽¹¹⁾. For these above reasons the researchers intend to educate some of diabetic patients about self-insulin administration.

METHODOLOGY:

Research design: A quantitative, quasi-experimental study.

Setting: The study conducted in Leila Qasim Center for diabetes care in Erbil City of Kurdistan Region of Iraq.

Duration of the study: This study was carried out from 15th June 2014 to 15th October 2014.

Study sample: The population of this study was made of adult diabetic patients attending Leila Qasim Center for Diabetes Care in Erbil City. A non-probability (purposive sample) of 50 diabetic adults were selected from Leila Qasim Center for Diabetes Care in Erbil City according to the following criteria: Type 1 and type 2 diabetic patients under the insulin management, agreement to be the subject in the study, age more than 18 years, both genders, and good personal communication; without Gestational diabetic patients.

Tools and methods of data collection: The aims of this study are to assess knowledge and practice of self-administration of insulin of diabetic patients and also to assess the effectiveness of a patient education program on self-administration of insulin. There were two tools used for data collection. The first tool was a questionnaire for assessing knowledge about insulin drug which refers to the level of understanding of diabetic patients regarding insulin medication as measured by the correct responses to the items through using of two options for answering (where 0=No, 1=Yes). The second tool which used was a checklist for assessing diabetic patients' performance regarding insulin self-administration, which refers to the injection expected to be administered by the patients at home without assistance; two options were used for doing the step or not (where 0=Not done, 1= Done). Data were collected by two methods. The first tool (questionnaire) used through the direct interview. The second tool (checklist) through direct observation method was used. At the first time both of the tools were used to assess the knowledge and practice of diabetic patient (pre-test). After that the researcher started to educate them through the Individual Planned Teaching (IPT) which refers to a systematically developed teaching material and teaching aid designed for educating the diabetic patients. This includes diabetes mellitus in common, self-administration of insulin, action of insulin, side effects and demonstration of self-administration of insulin. At the end the second assessment was done through using the same tools (post-test) to determine the effects of the educational program between the two assessments.

Reliability and validity: Pilot study was conducted on 10 diabetic patients for obtaining the reliability of the study tools and it was statistically adequate ($r = 0.885$). The content validity was determined through 15 experts. The results indicated that all 15 experts agreed the content of the questionnaire and checklist with some changes. The researcher took into consideration their responses and prepared the final version of the study tools.

Ethical considerations: The researcher obtained this permission from the Ethical Committee at the College of Nursing/Hawler Medical University. The researcher promised to keep the patient's information confidential, and use these data for this study only. Then he explained the purpose of

this study to each participant without affecting the routine visiting and care. In addition to above the researcher told each participant that this is an involuntary work, and they can leave any time even the data collection process is not completed.

Statistical analysis: The data were analyzed through the SPSS software V.20 (Statistical Package for Science Service) application for statistical data analysis, which include descriptive (frequency, percentage and mean) and inferential (t-test) statistical analyses.

RESULTS:

Table 1: Socio-demographic and Clinical Characteristics of Fifty Diabetic Patients

Socio-demographic data		F	%
Age groups / years	18-31	18	36
	32-45	10	20
	46-59	12	24
	60-73	10	20
Gender	Male	16	32
	Female	34	68
Years of education	Illiterate	21	42
	1-6	14	28
	7-12	9	18
	≥ 13	6	12
Residency area	Urban	43	86
	Rural	7	14

The table 1 indicated that the higher percentage of the study sample were within 18-31 years old (36%). Most of the study sample were female (68%). Regarding the years of education, the present study found that half of the study samples were illiterate (42%). Most of the study sample was from urban area (86%).

Table 2: Clinical Characteristics of Fifty Diabetic Patients

Clinical data		F	%
Duration of Diabetes (years)	1-15	43	86
	16-30	7	14
Duration of insulin management(years)	1-10	45	90
	11-20	5	10

Table 2 found that the most of study sample have 1-15 years of the duration of diabetes (86%). Concerning the duration of insulin management in the table 1, the majority of study sample have 1-10 years (90%).

Table 3. Knowledge regarding Insulin Medication with Comparing between Pre-test and Post-test of Fifty Diabetic Patients

No.	Items	Pre-test					Post-test					P-value t-test
		Yes		No		*MS	Yes		No		*MS	
		F	%	F	%		F	%	F	%		
1	Indications	33	66	17	34	0.66	46	92	4	8	0.92	< 0.001 * VHS
2	Contraindications	20	40	30	60	0.40	43	86	7	14	0.86	
3	Side effects	10	20	40	80	0.20	40	80	10	20	0.80	
4	Storage	41	82	9	18	0.82	49	98	1	2	0.98	
5	Expiration checking	27	54	23	46	0.54	44	88	6	12	0.88	
6	Assessment	28	56	22	44	0.56	40	80	10	20	0.80	
7	Right medication	37	74	13	26	0.74	48	96	2	4	0.96	
8	Right dose	40	80	10	20	0.80	45	90	5	10	0.90	
9	Right time	36	72	14	28	0.72	39	78	11	22	0.78	
10	Right route	39	78	11	22	0.78	44	88	6	12	0.88	
11	Documentation	8	16	42	84	0.16	26	52	24	48	0.52	
12	Evaluation	23	46	27	54	0.46	30	60	20	40	0.60	

* MS = Mean of Scores * VHS = Very Highly Significant

Table 3 shows that the mean scores of the knowledge regarding insulin medication after the education program were increased in comparing between pre-test and post-test (6.42 to 9.82 out of 12), and the p-value of t-test was a very highly significant (< 0,001) it means that the difference between pre-test and post-test was very high.

Table 4. Assessment of Self-insulin Administration Practice with Comparing between Pre-test and Post-test of Fifty Diabetic Patients

No.	Steps	Pre-test					Post-test					P-value t-test
		Done		Not done		*MS	Done		Not done		*MS	
		F	%	F	%		F	%	F	%		
1	Perform hand hygiene	24	48	26	52	0.48	48	96	2	4	0.96	< 0.001 * VHS
2	Take the cap off the needle, being careful not to touch the needle to keep it sterile	40	80	10	20	0.80	49	98	1	2	0.98	
3	Withdraw medication in the amount ordered	41	82	9	18	0.82	48	96	2	4	0.96	
4	Check the syringe for air bubble	39	78	11	22	0.78	50	100	0	0	1.0	
5	Assessment the site of injection	34	68	16	32	0.68	42	84	8	16	0.84	
6	Pinch the skin and put the needle in at a 45° angle	27	54	23	46	0.54	48	96	2	4	0.96	
7	Push the needle all the way into the skin. Let go of the pinched skin. Inject the insulin slowly and steadily until it is all in.	20	40	30	60	0.40	44	88	6	12	0.88	
8	Applying gentle pressure at the injected site with a dry gauze	13	26	37	74	0.26	38	76	12	24	0.76	
9	Place the needle and syringe in a safe hard container. Close the container, and keep it safely away from children. Never reuse needles or syringes	17	34	33	66	0.34	32	64	18	36	0.64	
10	Perform hand hygiene again	13	26	37	74	0.26	39	78	11	22	0.78	

*MS = Mean of Scores * VHS = Very Highly Significant

Table 4 shows that the mean scores of self-insulin administration practice were increased in comparing between pre-test and post-test (5.36 to 8.76 out of 10). There was a very highly significant difference between pre-test and post-test (p-value of t-test $< 0,001$), that's related to the education program which the researchers done for them.

DISCUSSION:

The findings of the present study show that the majority of the sample was 18-31 years old with the mean age 41 ± 15 years old. This may be related to the type 1 of diabetes that occurs mostly in young patients and using just insulin for treatment. This result is supported by the study which was done in Islamic Republic of Iran by Azimi-Nezhad and others in 2008, who showed that the mean age of their study sample was 43 ± 11 years old⁽¹²⁾.

With regards to gender the more than half of the sample were female. This result is similar to the study of Ovbiagele et al. (2011) who found that there were significant effects of diabetes mellitus on gender, and they reported that women were more likely to have diabetes mellitus than men⁽¹³⁾. A cross-sectional case control study done by Al-Nozha et al. (2012) in al-Madinah al-Munawarah in the Kingdom of Saudi Arabia showed that the high risk of diabetes mellitus was in females and they concluded that the gender difference was largely explained by the persistently more favorable survival rate of women⁽¹⁴⁾. Abdulrahman (2010) also found that the prevalence of diabetes mellitus in females (15.2%) was higher than in males (11.8%)^{(15),(16)}.

Regarding the educational level, the result indicates that nearly the half of the subjects were illiterate. The present study findings are supported by the results of Azimi et al. (2008) which were done in Iran; showed that although 43% of participants were illiterate⁽¹⁷⁾. Furthermore, Aksu et al. (2006) in the study done in Turkey found that the higher number of diabetic patients were illiterate, and also the study done by Arafa and Amin (2010) in Egypt showed that the prevalence of diabetes was higher among those with lower educational levels^{(18),(19)}.

With regard to the residential area, the highest percentage of the sample was from urban area. This may be related to the distance of the area from the diabetes center and transportation costs. The present study results agree with Pan et al. (2010) in a prospective diabetes prevalence rates study in China found that the diabetes prevalence rate in urban area was greater than in rural area (urban 5.2%, rural 2.9%)⁽²⁰⁾. Another study which was done by Al-Nozha et al. (2004) observed that the diabetes mellitus was more prevalent among Saudis living in urban areas (25.5%) compared to rural Saudis (19.5%). The results may be due to the type of diet and physical activity⁽¹⁴⁾. However, the present study disagrees with (Arafa and Amin, 2010 in Egypt; Akhteret et al., 2011 in Bangladesh) who said that the high prevalence of diabetes mellitus was found in rural population⁽¹⁹⁾. This could be related to the life style and the ignorance of health prevention by rural populations. In a study done by Choi and Shi (2001) the results showed that the prevalence of diabetes was not found to be related to urban or rural residence. That may be due to lack the differences between the urban and rural peoples in their study samples⁽²¹⁾.

In relation to the duration of diabetes mellitus by years, the highest percentage of the sample the duration of diabetes mellitus was between 1-15 years. The present study result is supported by Shaikhet al. (2012) which was done in Jamshoro in Pakistan. Their study showed that the highest number of diabetic patients had diabetes mellitus for 6-15 years⁽²²⁾.

The present study found that the higher percentage of the duration management of high blood glucose level by insulin drug were between 1-10 years, this may be related to the age of diabetic patients which most of them were young and their age group between 18-31 years old. This result agreed with the study done by Singha in Malleswaram of Bangalore she reveals that maximum number of diabetic patients, 96.7% were on Insulin Therapy for lesser than 7 years⁽²³⁾.

Regarding the mean score of the knowledge about insulin medication and practice to perform self-administration of insulin, it was inadequate according to the mean score results of the present study. This result is similar with the study done by Sarkar under the title A study to assess the effectiveness of structured teaching programme on knowledge and practice regarding self-administration of insulin among insulin requiring diabetic patients; which published in Asian Journal of Cardiovascular Nursing, it revealed that majority of the sample had inadequate knowledge and also found that 53% of the subjects had inadequate existing practice level regarding self-administration of insulin⁽¹¹⁾.

Regarding the knowledge about insulin medication, the mean score after the education program were increased in comparing between pre-test and post-test, and the p-value of t-test was very highly significant it means that the difference between pre-test and post-test was a very high; which is related to the effectiveness of the Individual Planned Teaching program. This result was agreed with the study done in Mangalore by Parecatty which showed that the mean post-test knowledge score ($x_2=80.86$) of diabetic patients was higher than the mean pre-test knowledge score ($x_1=66.86$). The computed 't' value showed a significant difference between the pre and post-test of knowledge scores⁽¹⁾.

The mean score of self-insulin administration practice were increased in comparing between pre-test and post-test; and there was a very highly significant difference between pre-test and post-test, that's related to the education program which the researchers done for them. The present study supported by the study was done by Parecatty in Mangalore; she found that the mean post-test ability scores ($x_4=19$) were higher than the mean pre-test ability score ($x_3=16.08$). The range of the post-test scores was significantly higher than the pre-test ability score⁽¹⁾.

Finally, the findings of the present study showed that the knowledge and practice mean scores of diabetic patients were less before the Individual Planned Teaching (IPT). IPT facilitated them to learn knowledge and how to administer insulin correctly and independently, which is indicated by the post-test knowledge and practice scores.

CONCLUSIONS

The study concluded that the knowledge regarding insulin medication and self-administration of insulin practice after the education program were increased which is related to the effectiveness of the education program.

RECOMMENDATIONS:

1. Preparing educational programs for other diabetic patients who have insulin medication and their caregivers, to provide adequate information about knowledge and practice of insulin self-administration.
2. Developing media education programs (TV and Radio), newspaper, journal, seminars, booklets and internet sites to inform people about diabetes and enforcing the routine assessment of insulin self-administration practice, and knowledge updating regarding insulin self-administration.

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