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Clinical Pharmacist-led Diabetes Management and Education Program Effect on the Arabic-speaking People in Australia: A Pilot Study

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ABSTRACT

The aim of the study was to examine the feasibility of pharmacist-led diabetes educational programme on disease control and health-related quality of life in Arabic-speaking Type 2 diabetes patients in Australia. Participants' HbA1c values improved over the three months period, decreasing from 8.86% to 8.34%, weight decreased from 84.78 kg to 83.88 kg and diastolic blood pressure decreased from 75.40 mm Hg to 72.40 mm Hg. Mean waist circumference of the participants improved from average mean 107.40 cm to 105.88 cm. Goals included the following: quitting or reducing the number of cigarettes per day, choosing healthy food, exercise, reducing weight, and monitoring glucose levels. At the end of the three months period, participants demonstrated clear achievements of goals set. For a feasibility study, the information gathered was valuable for developing future studies in this area. Results from this study indicate that a pharmacist-led diabetes education addressing the spiritual, cultural, lifestyle and educational needs of Arabic speaking people with diabetes when successfully implemented has the potential to improve health related outcomes. In summary, participants in this research did have clear improvements in clinical measures following the intervention.

Keywords: Clinical pharmacist, Education, Arabic, Quality of life, Type 2 diabetes mellitus.

1. INTRODUCTION

Diabetes mellitus is a common chronic disease which, as a result of increase in obesity, changing lifestyles, and an ageing population, is increasing globally[1]. In 2013, it has been estimated that 347 million people have diabetes worldwide.[2] In Australia, more than 3 million people or one in four adults over the age of 25 years have either diabetes or impaired glucose tolerance which is pre-diabetes with a very high prevalence of diabetes in the Arabic community.[3] A report by the Australian Institute of Health Welfare found that Australian men born of Middle Eastern or African background reported to be 3.6 times more prone to diabetes than Australians of European or other descent.[4] However, the difference between Arabic-speaking women and Australian women was not statistically significant.[4] More recent data from the Social Health Atlas of Australia (2011), the prevalence of diabetes in Australia decreased to 3.4%[4].

Diabetes mellitus is associated with substantial morbidity and mortality, and has significant impact on individuals and their families[5,6]. The onset of macrovascular and microvascular complications lowers quality of life with an increased burden of illness and the costs of managing the specified complications of diabetes over time [3].

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As the diabetes epidemic continues to grow, primary care providers will find it difficult to respond to patient needs which results in an increased workload in diabetes clinics[7]. In the near future, patients would need to engage with multidisciplinary teams beyond the traditional health educators (doctors, nurses and dieticians) including clinical pharmacists[8].

Pharmacists are considered well educated healthcare providers in monitoring patients and managing their medicines, adverse effects, drug interactions, initiating new drugs and counselling[7].

Health related quality of life (HRQoL) evaluation is of strong importance in clinical research[9]. Particularly, diabetes specific quality of life is the most important outcome in clinical research as it would provide a goal setting for pharmacists when managing diabetic cases and its complications in hospitals[9].

The primary means of improving disease management in diabetic patients are via prescribing appropriate patient specific pharmacological therapy and through lifestyle changes, both of which require significant cooperation and participation from patients. The aims of pharmacotherapy are to optimise patient's medication and, to ensure the patient is able and willing to adhere to the prescribed treatments. Such adherence can be assisted by improved patient awareness of their disease state and also by the application of a self-monitoring and education programmes.

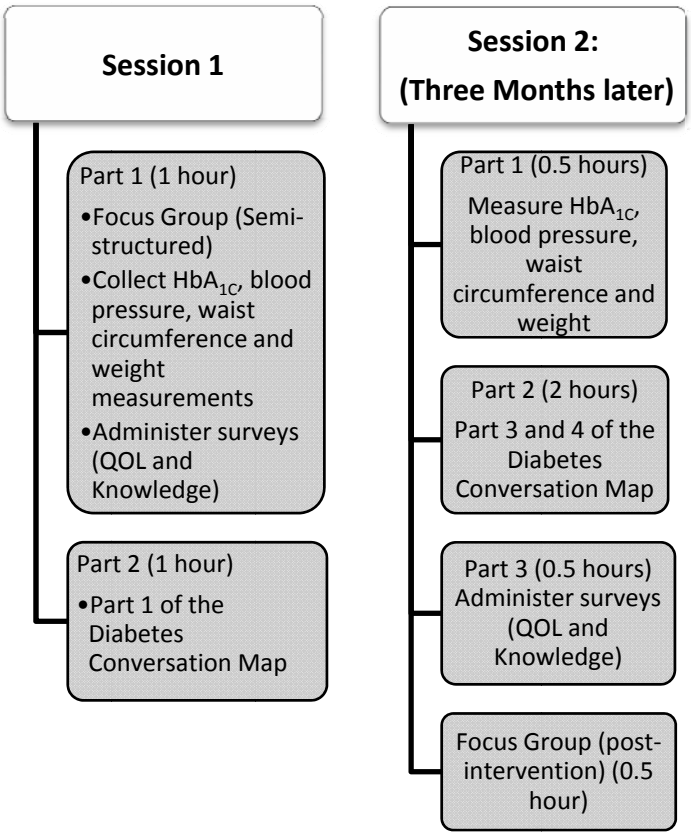

Figure 1: Intervention Plan

Diabetes education has been an essential component of diabetes management since the beginning of the 20th century and is recognized as an essential component of management of patients with chronic diseases[10]. Educating people with Type 2 Diabetes aims to optimize metabolic control; prevent complications; improve

quality of life, enhance knowledge of the patient regarding the disease, and change and develop necessary behaviour to maintain or improve health [10]. Together with hospital-based clinician-monitored programmes, clinical pharmacists-led diabetes education programmes can be devised in an attempt to achieve better health and quality of life outcomes in this patient group.

The aim of this study was to investigate a pilot pharmacist-led group educational intervention for Arabic speaking patients with diabetes and to determine its impact on clinical outcomes and the effect on their quality of life.

METHODS

Study Design

A non-randomized group pretest-posttest design (n=10) was used for this study. The inclusion criteria included patients with Type 2 diabetes aged 18 years or older and Arabic speaking in the Diabetes Ambulatory Care Centre in Royal Prince Alfred Hospital (RPAH). Exclusion criteria included patients under 18 years, people experiencing Type 1 or gestational diabetes mellitus, and patients with dementia.

This study was approved by the Human Research Ethics Committee, RPAH in March 23rd 2011, and ratified by the Human Research Ethics Committee, The University of Sydney, June 8th 2011. The intervention (Figure 1) involved two education sessions over a three months period.

Patients were sent an invitation letter in Arabic and were followed up a few days later with a phone call. The aim of the study and study procedures were explained to every patient on the list who was of Arabic speaking background. Patients who accepted to participate gave their consent on the first session of the intervention and were given participant information statement in Arabic.

Phase one of the intervention involved a Focus group of three to five patients for each session to discuss needs, and perceptions which were related to knowledge of the disease, health beliefs, and impact of the illness on the patients' lives.

Part one of the Diabetes Conversation Map (DCM) counselling session was delivered in Arabic with an accredited translator and interpreter. Topics included general overview of diabetes pathology, symptoms, different types of medication available, and life style counselling.

At the end of each session, patients set goals for self-management and described how they felt about the new information they had gained as a result of the educative session. Patients were provided with handouts about nutrition and exercise based on Arabic cuisine and exercise in Arabic.

The second visit, three months after the first session, participants were introduced to Part Three and Part Four of the DCM. Clinical measurements, assessment of patients' quality of life, and knowledge were also collected. The session involved educating participants about nutrition, exercise, and insulin.

Clinical outcomes were taken as a surrogate measure indicative of the impact of the education session. Knowledge and quality of life outcomes measurements were calculated from scores achieved in the used surveys.

A second focus group was conducted three months after the first session. The aim of this session was to gain insight into the participants' views about the intervention, and to integrate feedback about this pilot study into an improved intervention. Participants were asked about their views about the DCM, any changes in their level of knowledge about their condition, the goals they had achieved, and feelings about the intervention in general.

Study tools

To address the aim of this project, an amalgamated survey, combining two validated translated surveys by the researcher was employed to complement the focus group method of exploring patients' knowledge, quality of life (QOL) and attitudes at baseline, and after the intervention.

The impact of the intervention on diabetic patients' quality of life was assessed using the Diabetes Symptom Checklist (DSC-R). This questionnaire has been validated by Arbuckle et al [11]. Patients responded to items

with a 5 point Likert scale, and the total and average for each section of the questionnaire was calculated [9].

The Diabetes Symptom Checklist (DSC-R) translated to Arabic is a 34 item scale designed to assess six categories of symptoms[9]. These categories are psychological (fatigue and cognitive), neurological (pain and sensory), cardiac, ophthalmic, hypoglycaemia and hyperglycaemia domains. Whilst administering this checklist, question 3-which is about numbness (loss of sensation) in the feet-was omitted, as it is repeated in question 9 and participants found this unnecessary repetition. Higher scores on this measure indicated greater psychological and/or physical distress.

The Diabetes Knowledge survey translated to Arabic provided complete assessment of patients' knowledge of diabetes mellitus disease including causes of diabetes; medications used for treatment, home glucose monitoring, foot care, and treatment modifications. The questionnaire was developed and validated by Garcia *et al*[12]. Patients respond to the 24 item questionnaire by selecting either 'yes', 'no', or 'do not know'.

Table 1. Disease Demographics

Participant	Gender	Other Conditions	Smoking	Alcohol
1	Male	HTN, CKD, Lipid,	Yes	Yes
2	Female	HTN, HF, Lipid	Yes	No
3	Male	HTN, Lipid, Stroke	Yes	No
4	Female	HTN, HF, Lipid	Yes	Yes
5	Male	HTN, Lipid.	Yes	No
6	Male	HTN, Lipid, HF	Yes	No
7	Female	HTN, Lipid, CKD	Yes	No

HTN: Hypertension, HF: Heart Failure, Lipid: Dyslipidaemia,
CKD: Chronic Kidney Disease

Table 2. Baseline Clinical Measurements

Participant	Gender	HbA_{1c} (%)	BGL (mmol/L)	Systolic BP (mm Hg)	Diastolic BP (mm Hg)	Weight (Kg)	Waist Circumference (cm)
1	Male	9.5	10.2	116	80	102.9	119
2	Female	8.9	5.3	128	76	83.4	103
3	Male	6.6	12.6	110	75	88.3	109
4	Female	9.2	9.1	116	74	62.3	87
5	Male	10.1	13.8	122	72	98	108
6	Male	9.0	11	125	79	90	100
7	Female	8.7	10.5	125	75	82	97

Results

Recruiting for this study was challenging, given a short timeframe and limited access to patient details due to privacy laws applicable to hospital outpatients. After repeated attempts at distributing pamphlets, or sitting in at the clinic to personally invite patients to participate came to no avail, a list of Arabic-speaking clients was compiled by staff at the clinic. The list consisted of 150 Arabic speaking adult patients with Type 2 diabetes. Each patient was subsequently contacted by telephone, and invitation letters were mailed out, with clear description of the study in Arabic and gift vouchers offered to

reimburse for travel/parking costs. However, the majority of those on the list were elderly, (age range: 47 to 73), with many health related problems (e.g. cardiovascular, renal problems and/or waiting for major surgery), living at distant locations, some with no means to travel conveniently, and some had even passed away. Thirteen Arabic speaking adult patients with Type 2 diabetes agreed to participate in the study, but only seven actually attended the first session. Those who could not attend offered apologies due to sudden illness, change of circumstances or difficulty arranging a convenient time with family or carers. For the purposes of this study we chose to pursue the study plan and establish the pilot of the intervention design with this relatively small sample of participants.

It was also noted that all smoked and some had alcohol intake. No cultural sensitivities were observed when asked about alcohol, but the researchers were careful in framing the question to avoid implicating or insulting any participant with regard to their religious and social obligations. At baseline, participants did not have clinical measurements within the ranges recommended by Diabetes Australia 2011 practice guidelines [13] (Table 2). Patients tended to be obese (waist circumference range: 87-119 cm) and body weight range of 62.3 to 102.9 kg, with most of the participants presenting with elevated HbA_{1c} (range: 6.6-10.1%) and blood glucose levels (BGL) (range: 5.3-13.8 mmol/L). However, all participants in this research had normal levels of systolic blood pressure (range: 110-128 mm Hg) and diastolic blood pressure (range: 72-80 mm Hg). All participants were being treated with angiotensin converting enzyme inhibitors (ACE-I) with or without calcium channel blockers.

Goal Setting

Goals included the following: quitting or reducing the number of cigarettes per day, choosing healthy food, exercise, reducing weight, and monitoring glucose levels. A time line of three months was set for achieving these self-assigned targets.

> *"I am going to start eating healthy, exercise, monitor hyper- and hypoglycaemia, reduce weight, and stop smoking. I will start today before tomorrow."* FG2 Participant 2

Base line results

By the time the surveys were served however, the patients had become fatigued and reluctant to fill out the surveys. Only three volunteered to fill the surveys. Participants in this study demonstrated unawareness about the relationship between diabetes and some of the symptoms (e.g. cardiovascular, depression, pain in legs and hands, and tiredness) which contributed to low quality of life measures in this cohort; i.e. attributing these symptoms to other conditions[14]. From previous studies, researchers concluded the higher the score, the better the quality of life.[14] In general most studies had scores of 70 considered high.[15]

Despite the researchers' good command of the language, it was difficult to maintain participants' focus. They found the surveys too long, which was why some did not feel comfortable completing the surveys, particularly when delivered after two hours of education, followed by the goal setting session. This feedback was noted for consideration of modifying the intervention for future studies.

Table 3. Quality of Life Scores

Patient Number	Hyper-glycaemia	Hypo-glycaemia	Cardio-vascular	Neuro-pathic Sensory	Neuro-pathic Pain	Fatigue	Cognitive	Ophthalmic
1	42	34	29	26	27	42	32	26
2	45	48	36	29	30	60	45	39
3	52	59	35	24	34	53	37	38

For reasons mentioned above, only three participants completed the questionnaire at baseline. The percentage of the correct answers for the three participants at baseline ranged from 45% to 65%, which was considered poor to medium level of knowledge and familiarity with diabetes related issues.

Post-intervention results

Of the seven participants who started with the study, five completed the study and demonstrated tangible improvement in clinical measures after three months. Participants' HbA1c values improved over the three month period, decreasing from a mean of 8.9 % to 8.4 %, weight decreased from 84.8 kg to 83.9 kg and diastolic blood pressure decreased from 75 mm Hg to 72 mm Hg.

Mean waist circumference of the participants in this study improved from average mean 107 cm to 106 cm. These changes were not statistically significant due to small sample size. The intervention did not have an impact on systolic blood pressure and blood glucose levels (Table 4).

Table 4. Mean Outcome Measures [Standard Deviation] at Baseline and after Three Months

Measurement	Baseline [SD] (n=5)	After 3 Months [SD] (n=5)	Mean Change [SD] (n=5)	*P* Value (n=5)
HbA_{1c} (%)	8.86 [1.39]	8.34 [1.55]	-0.52 [1.41]	0.457
Blood Glucose Levels (mmol/L)	10.20 [3.31]	11.14 [3.45]	0.94 [4.93]	0.692
Systolic Blood Pressure (mm Hg)	118.40 [6.84]	118.60 [7.13]	0.20 [2.28]	0.854
Diastolic Blood Pressure(mm Hg)	75.40 [2.96]	72.40 [6.19]	-3.00 [5.95]	0.323
Weight (Kg)	84.78 [14.6]	83.88 [13.69]	-0.9 [1.88]	0.346
Waist Circumference (cm)	107.40 [7.83]	105.88 [7.13]	-1.52 [1.89]	0.147

Discussion

In this study, we found that the Arabic translation of the DCM was not very relevant to the Arabic population. Several strategies to overcome the identified issues, such as formality of the language used and relevance of the nutrition part for Arabic diet in the DCM.

It is important to have an educational component in an intervention relating to diabetes self-management that can be assessed with measurable outcomes, such as knowledge. As the knowledge scores were not completed at baseline, it was difficult to ascertain the quality of the education in the intervention. Clinical outcomes, which demonstrated modest improvements, were taken as a surrogate measure indicative of the impact of the education session. The study by Baradaran *et al* has shown that conducting a culturally competent educational intervention in patients with Type 2 diabetes from ethnic minority groups is feasible and can improve their knowledge and lead to change in behaviour[16].

This pharmacist-led educational intervention indicated the benefits of providing education using the Arabic version of the DCM and goal setting. Several strategies could be added to the diabetes specialist pharmacist program in future studies, including providing drug regimen adjustments when needed and medication reviews. These are based on results from previous studies[17,18] and reviews in the field of pharmacists diabetes care. [19]

In a pharmacist diabetes educational study by Raguccie*t al* in the USA, the intervention achieved significant reductions in HbA_{1c}, blood pressure, and costs. Pharmacists providing diabetes education services were certified diabetes educators. These clinical pharmacists reviewed the chart of each patient referred to the management and education program provided. Chart reviews included, assessments of social and family

history, medication history, and the need for pathological tests. Individualised goals were established for each patient. Written educational materials regarding lifestyle management (diet and exercise) and general diabetes information were provided. Assessment of needs were completed to priorities specific needs and goals for each patient. Medication regimens were adjusted by the clinical pharmacist when necessary. This approach, over a period of one year led to improvements in clinical measurements and reductions in management costs[20].

The pharmacist-led intervention, targeted for Arabic speaking people with diabetes using the Arabic version of the DCM and goal setting, led to clear improvements in the clinical outcomes of participants in this study. Proof of concept of this intervention have been demonstrated. Valuable information was gathered in this study which will inform modifications and improvements of the intervention. With modifications, this intervention may then be used for a large scale study to generate more generalizable results.

Understanding cultural diversity and health related beliefs in people with Type 2 diabetes is important for developing educational and counselling interventions[21]. In this study, participants were from a mix of religious backgrounds. There is a possibility that Muslim Arabic-speaking patients might take offence at being asked about alcohol intake. The researchers therefore, were careful to generalize the topic and allow the participants to come forward with information related to alcohol intake spontaneously without direct questions. For example, a group question was posed instead of individually directed questions regarding alcohol. It was observed that all participants were comfortable with the approach. Brown *et al* provided three months weekly group educational sessions on nutrition, self-monitoring of blood glucose levels, exercise, and other self-care diabetes related topics, and nine months of biweekly/ monthly support sessions for Mexican American people with diabetes. The approach was culturally directed in terms of language, nutrition, family engagement, and health beliefs related to diabetes and complications. At the end of six months, mean HbA_{1c} of the experimental group was 1.4% below mean HbA_{1c} of the control subjects[22]. The approach was similar to what was performed in this study. Thus when providing diabetes education for Arabic speaking Australian people with Type 2 diabetes, a culturally directed approach should be facilitated. This would help in enhancing patient engagement in self-management which would lead to improved clinical and quality of life outcomes.

Feedback from participants in this study was very valuable. Several suggestions were made by the participants and the researchers (reported elsewhere) to maximise the benefit of this tool and intervention. It was agreed that the DCM is best used when patients are firstly diagnosed, with more frequent, staggered meetings at convenient locations for the participants. Patients would be invited to subsequent sessions to coincide with the time of follow up with their physicians. Adequate training should be provided to the Arabic-speaking healthcare professional facilitating group discussion to ensure optimal flow of discussion with patients participating in the program and in future studies. Training should comprise the ability to assess individual's specific educational needs, identification of the patient's specific diabetes self-management goals, ability to offer an education and behavioural intervention directed at helping the individual at achieving identified self-management goals, and evaluating patient's progress in attaining the self-management goals. Pharmacists should also be trained on advising patients with diabetes on the safe use of medicines, incorporating physical activity and nutritional management into lifestyle. Educating patients on preventing, detecting, and treating acute and treating chronic complications would be an essential skill of the pharmacist diabetes educator. Pharmacists should also be trained in helping patients developing personalized strategies to address psychosocial issues and concerns, and to promote health and behaviour change.

Baseline demographics revealed smoking and alcohol consumption as health issues in the Arabic speaking participants, which was not addressed at all in the DCM. Combating tobacco use in people with diabetes require

partnerships between the patient and the healthcare team[23]. For health care providers who take care of diabetic patients, providing smoking cessation counselling should be of the highest priorities[23]. Clinicians should provide counselling about the developing risks of smoking, such as cardiovascular disease, cancer, and emphysema. Strategies for smoking cessation include cognitive behavioural therapy and/or the initiation of pharmacological therapy [23]. This intervention lacked advice about smoking and alcohol and should be addressed either within the DCM or standalone. Additionally, while there is some evidence that modest alcohol consumption may have beneficial long term effects (e.g. modest cardiovascular benefits) on people with diabetes, alcohol may also lead to significant complications[24]. These include induction of hypoglycaemia, and hypertension[24,25]. To minimise the risk of hypoglycaemia, people with diabetes are advised to eat when drinking alcoholic beverages[26]. Australian diabetes guidelines[13] recommend ≤ 2 standard drinks (20 g) per day for both men and women, as many people with Type 2 diabetes are overweight or obese. This important information could also be included in the Arabic version of the DCM for patient education.

As quality of life and knowledge outcomes were measured by some of the participants at the beginning and were not measured at the end of the study because of patients' fatigue and the length and repetitiveness of the surveys, some strategies should be sought to address these issues. Previous health related quality of life (HRQOL) instruments, have not transitioned to health care professional's offices because of their length[27]. Despite desirable content, validity, and reliability, the survey takes long time to be completed in its original form[27]. Using a shortened adapted version of the quality of life questionnaire ($DSC\text{-}_R$) and knowledge questionnaires could make participants feel comfortable with taking time answering the questions. As the $DSC\text{-}_R$ tended to be lengthy and not user-friendly to patients with Type 2 diabetes, it is difficult to integrate the questionnaire in its complete form into routine clinical practice. In fact Burroughs *et al*[27] had developed and validated a shortened version of the Diabetes Quality of Life (DQOL) survey. A combined set of 15 questions, found reliable (alpha = 0.85) and valid[27]. For type 2 diabetics the 15-item brief questionnaire accounted for as much variance as the original 60-item DQOL (shortened scale R2 = 0.513; full scale R2 = 0.492)[27]. This shortened survey, takes less than 10 minutes to be completed, but not available in Arabic[27]. A validated translation of this version of the questionnaire could be used in future studies for Arabic speaking people with Type 2 diabetes. Despite using the shortened version in this study, patients did not feel comfortable filling a combined 48 itemed questionnaires. To overcome these issues, the 15-item DQOL and 24-item DKQ surveys could be used either in a separate session or directly before the education session with a well-trained facilitator helping patients fill the questions, to ensure optimal time for completion.

Limitations

This explorative pilot study had a limitation, which was the relatively small sample of participants, all from the Diabetes Ambulatory Care Centre in Royal Prince Alfred Hospital. This prevented collecting more meaningful data which could have further enriched the analysis. Recruiting for this study was challenging, given a short timeframe, one source of recruitment and limited access to patient details due to privacy laws applicable to hospital outpatients. To increase recruitment and participation in future studies, researchers should seek patients in hospitals in other suburbs where the majority of Arabic-speaking population live. The length of the sessions should also be decreased to make the participants more comfortable, as we found the sessions too long and the participants became tired after long hours of different activities. However for a pilot study, the information gathered was valuable for developing future studies in this area.

Conclusion

For a feasibility study, the information gathered was valuable for developing future studies in this area. Results from this feasibility study indicate that a pharmacist led

diabetes education addressing the spiritual, cultural, lifestyle and educational needs of Arabic speaking people with diabetes when successfully implemented has the potential to improve health related outcomes. In summary, participants in this research did have clear improvements in clinical measures following the intervention. This project enabled the researchers to identify several primary recommendations that will be important to consider for future research or implementing a similar program in the clinical setting. These include using a modified, culturally sensitive version of the Arabic version of the DCM, implementing the education session at the time of diagnosis, use of shorter surveys, and more staggered meetings at convenient locations for patients. Future work should assess the effect of the similar more current and shorter instruments available now in a larger study population.

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تأثير البرنامج التعليمي وعلاج السكري الذي يقوده الصيدلي السريري على الشعوب الناطقة بالعربية في استراليا: دراسة جدوى

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[5] تطبق كلية الصيدلة، جامعة العلوم، عمان، الأردن.

ملخص

الهدف من هذه الدراسة: دراسة البرنامج التعليمي الذي يقدمه الصيدلي المختص في السكري للسيطرة على الأمراض المتعلقة بالصحة ونوعية الحياة لمرضى السكري الذين يتحدثون العربية في أستراليا.

فقد تحسن المشاركون على مدى فترة ثلاثة أشهر حيث أن المعدل التراكمي لمستوى السكري انخفض من 8.86% إلى 8.34% والوزن انخفض من 84.78 كيلو غرام إلى 83.88 كيلوغرام وضغط الدم انخفض من 75.40 ملم زئبق إلى 72.40 ملم زئبق. محيط الخصر للمشاركين تحسن من متوسط 107.40 سم إلى 105.88 سم. وشملت الدراسة الأهداف التالية: الإقلاع عن التدخين أو إنقاص عدد السجائر يوميا، واختيار الغذاء الصحي، ممارسة تقليل الوزن، ورصد مستويات السكر. في نهاية فترة الثلاثة أشهر، أظهر المشاركون الإنجازات الواضحة للأهداف المحددة لدراسة الجدوى، والمعلومات التي جمعت كانت قيمة لتطوير الدراسات المستقبلية في هذا المجال. النتائج من هذه الدراسة تشير إلى أن تعليم الصيدلي لمرضى السكري للتصدي للاحتياجات التعليمية وأسلوب الحياة ومناقشتهم في الحاجات الروحية والثقافية ممكن أن يؤدي إلى تحسن المخرجات المتعلقة بالصحة.

باختصار فإن المشاركين في هذا البحث أظهروا تحسناً واضحاً في المنحى السريري بعد هذا التدخل.

الكلمات الدالة: الصيدلي السريري، نوعية الحياة، العربية، التعليم، السكري النوع 2.

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