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**DIABETIC PATIENT EDUCATION AND PREVENTION OF DISEASE
PROGRESSION: ROLE OF COMMUNITY PHARMACIST IN SAUDI ARABIA**

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ABSTRACT

This research is designed to explore the role of pharmacists in providing information and education to the diabetic patient. A questionnaire was designed and validated to address the roles of community pharmacists in diabetic patient education in AL Riyadh city, KSA. Data analysis was carried out by using Microsoft Excel. Hundred community pharmacists participated in this survey. Approximately, 88% of participants agreed that Pharmacists clearly understand their roles and responsibility regarding diabetic patient education. Around, 78% of participants agreed that they have enough knowledge about insulin types. Whereas, 69% of participants said that they spend enough time to instruct diabetic patients regarding the disease and how to utilize the medications. However, 63% of pharmacists reported that they always check the dose of insulin with patients to be sure from their understanding. The survey questionnaire successfully identified the roles of pharmacist in providing information and education to diabetics. Majority of pharmacists surveyed, appreciated the importance of their role in diabetic patient education and seemed to have enough knowledge and practice behaviors. Supplementary studies are needed for delineating these findings further.

**Keywords: Diabetic Patient Education, Disease Progression, Diabetes, Community
Pharmacist**

INTRODUCTION

Diabetes is considered to be a major public healthcare issue with a dramatic amplification. It was estimated that the diabetes prevalence across the globe is 2.8% in the year 2000, and 4.4 percent in the year 2030. The total number of individuals with diabetes was considered to rise from 171 million in the year 2000 to 366 million in the year 2030^{1,2}. Al-Shahrani & Hassan et al.¹, reported that in Saudi Arabia, the count of diabetic individuals is elevating due to the growth of population, increasing obesity prevalence, physical inactivity, urbanization, and aging. The Diabetes mellitus prevalence among the Saudi individuals living with the urban regions was reported to be around 25.5% in comparison to the 19.5% who belong to the rural areas³. Considering the benefits of medication of diabetes patients, how they tend to work and what they expect from attaining it is often critical for the medication adherence of the patients.

The level of education and informational support often tends to impact the system of health care. Specifically, diabetics' in Saudi Arabia with lower education levels experience higher risk of mortality and morbidity. The diabetics receiving less technically advanced procedures and poorer hospital care results in

the dissatisfaction of the patients. The education for diabetics play a vital role in encouraging as well as supporting them to presume fundamental responsibility for day to day control of an individual's condition. Patient education is one of the core duties of pharmacists that was proved to represent an important element of pharmaceutical care and clinical pharmacy services^{4,5}. The case management of the pharmacist comprise of the family and patient counseling, patient education, along with close health outcomes monitoring, which tends to be in conjunction with the physician who are considered to improve the chronic illness outcomes,^{6,7} specifically for the patients of diabetes.^{7,8} Over the previous decade, the pharmacist role has been dramatically altered. Conventionally, the pharmacist is thought to be as individuals who tend to dispense medication within public. Slowly and gradually, this role got transferred into one which included development drugs additionally. In the year 1960, the new development growth consequently altered the pharmacy concept to product oriented to one focused primarily on the patients. Thus, the pharmacist often become indispensable as they tend to monitor the drug therapy of the

patients. However, the ultimate role of the pharmacist is to optimize the quality of life of a patient. Such outcome can usually be attained by influencing the disease cure, reduction and elimination of symptoms, slowing or arresting the progress of the diseases, diagnosis and prevention of diseases along with desired changes in the physiological process. A well-known and large trial of the primary care physicians tends to collaboratively work along with the community clinical pharmacists in order to take care of the patients of diabetes, who have shown improvements in clinical consequences at practical cost^{9, 10}.

It is a well established fact that the patients are not able to take medications as per the requirements. This non-compliance cannot be controlled due to the adverse effects, interactions and problems related to drugs. There is also an extensive research available on the drug interactions among eth hospitalized patients. However, there is less information about the prescribing part and the rate of exposure to the interactions of drug. Several people experience the adverse drug effects which can cause unnecessary expenditure, prolonged illness, and even death. The development of the pharmacists' role is continuously emphasized as a

counselor for medications and they should also be provided with an important place in the care delivery. Regarding studies demonstrating the role of community pharmacists to provide care for diabetic patients, as well as monitoring and educating them in Saudi Arabia are very limited. Therefore, the study aims to explore the role of community pharmacists in providing diabetic patient education at Riyadh, Saudi Arabia in order to prevention the progression of this disease.

METHODS

Study Design

The method is a procedure utilized to gain empirical evidences. It analyzes the research question; moves forward from the exploratory queries, to answer the question being studied and inspect the foreshadowed concerns. The research design used in this research includes the quantitative design which helps to measure the numerical data quantitatively. By using the numerical data, one can effortlessly establish the logical methodical objective computation along with empirical evidences. This approach is often lined with the positivist tradition of the research design that often links to the data being studied. Moreover, it follows the strategy which utilizes limited

procedures and tools for answering the query being investigated.

Data Collection

A questionnaire was developed by the researcher consists of closed and open questions. Polit & Beck define the validity of questionnaire as the degree to which the instrument measures what it is intended to measure¹¹. Self administered questionnaire were distributed among the community pharmacists located in the AL Riyadh city, KSA. It is important that the questionnaire should adequately address all aspects of the issues being studied. The questionnaire is considered to highlight the primary objectives and aims linked with the research. The findings of the questionnaire will recognize the likelihood to work efficiently and will assist in offering excellent care quality. It will also assist to offer feedback to the community pharmacist which may serve as a baseline data promising the patient's satisfaction.

Study Recruitments Methods

For any research study, the results are often considered to be generalized. Due to this reason, it is essential to select a random sample so that the findings can be easily generalized. Therefore, the sample comprise of community pharmacists who were randomly selected from AL Riyadh city,

KSA. An invitation letter was sent to these individuals, together with the explanatory statement and consent form comprising of contact details of the investigator in order to determine if these participants wish to participate in the study.

Data Analysis

The analysis of data will be carried out using Microsoft Excel. Once the data had been gathered, the data was inserted straight into excel sheet and as coded numerically. The data was presented and analyzed in whole figures and as a percentage of respondents who answered each question.

RESULTS

The counseling of the patient is an essential means for attaining the care within pharmacy. It is referred to as offering medication relation information in either written form or orally for the representatives and patients. It often includes diet and life style modifications, storage, precautions, side effects advices, and direction of use. The counseling and educating the diabetics by community pharmacist is an interactive process which often includes one on one interaction between the caregiver, patients and pharmacists. Hence, the eventual goal of counseling is to offer knowledge directing at encouraging appropriate usage and safe use of medications

in order to improve the outcomes of the individuals. Hence, it is essential that the pharmacist should be educated enough to counsel the diabetics effectively.

Approximately, 100 community pharmacists agreed to participate in this research effort. Approximately, 37% (N=37) of participants worked in a professional capacity in the community pharmacy for more than one year but less than three year. However, 29% (N=29) worked in a professional capacity in the community pharmacy between three and six years. Moreover, 20% (N=20) worked in a professional capacity in the community pharmacy more than 6 month but less than one year , and an additional 7%, (N=7) worked in a professional capacity in the community pharmacy for less than six months and same percentage worked for 6 years or more. **Figure 1** shows the distribution of study participants among different experience categories.

Concerning the knowledge of pharmacists about diabetic patient education 88% of participants agreed that pharmacists clearly understand their roles and responsibility regarding diabetic patient education, the same percent (i.e.88%) agreed as well as the pharmacists have adequate knowledge about diet for diabetic patients. When participants

were asked whether or not they agreed with the statement “The pharmacists should have extra training and education when they deal with diabetic patients,” the responses were mixed, however, the majority were in agreement. A total of 54% strongly agreed, with an additional 22% agreeing with the statement directly. A surprising 12% were disagreed with the statement, and 7% strongly disagreed with the statement indicating that they are possibly not in need for further training in concerning dealing with diabetic patients. Regarding knowledge about insulin types, 89% of participants agreed that they have enough knowledge about insulin types; however, 17% of pharmacists were uncertain. In addition, 95% agreed that they receive adequate orientation concerning diabetic patients care and education when they join the pharmacy staff. **Table 1**, shows the pharmacist’s responses concerning their knowledge about diabetic patient education.

Concerning pharmacist’s responses regarding their practice of patient education, 88% of respondents stated that they encourage diabetic patients to talk about their medication. However, 69% of participants said that they do spend enough time talking to diabetic patients about how to use their medications. Majority of pharmacists also

agreed that they tell diabetic patients important information about their new prescription and they inform diabetic patient about the best time to use their medication. Furthermore, 80% stated that they usually discuss ways to prevent recurrent medication errors. Concerning checking the dose of

insulin with patients to be sure from their understanding, 63% of pharmacists reported doing so, while 17% of participants were uncertain. **Figure 2** shows questions and responses of pharmacist concerning their practice of patient education activities.

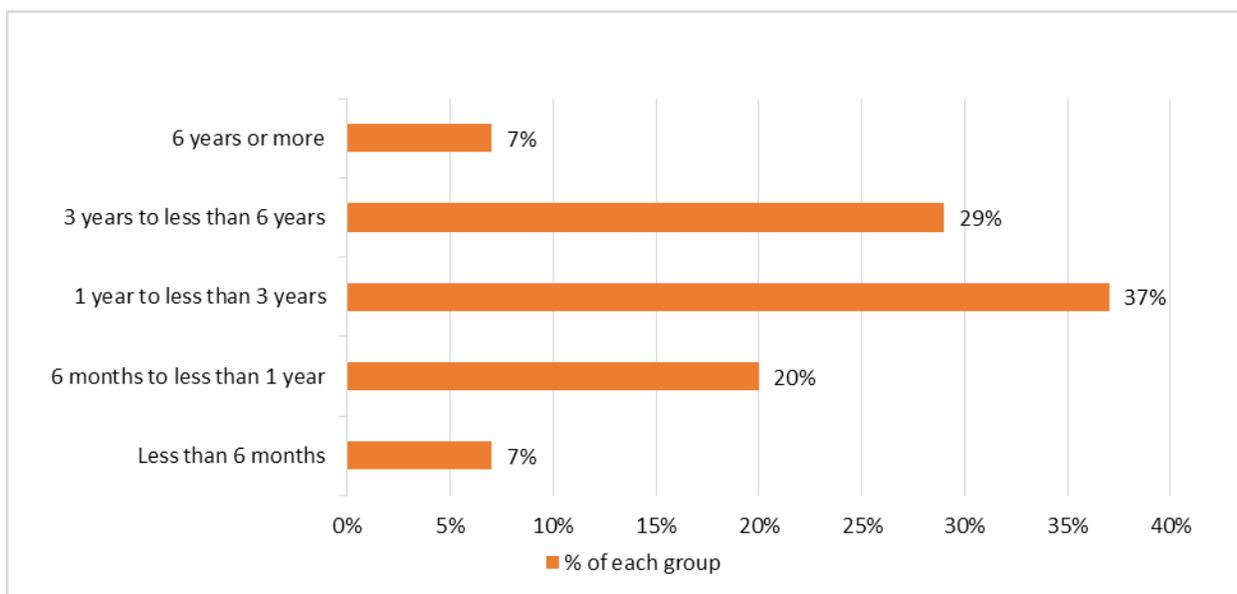


Figure 1: Categorization of years of experience of study participants

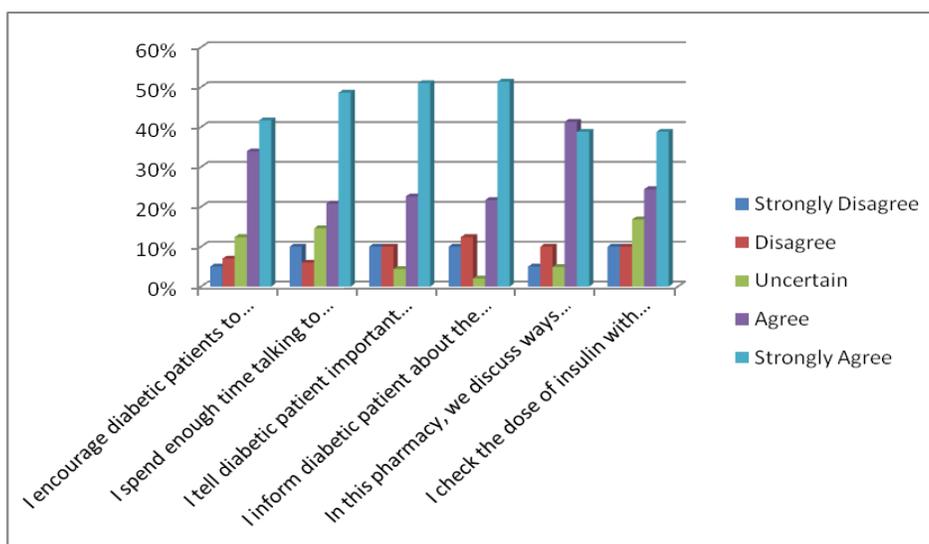


Figure 2: Pharmacists responses concerning their practice of patient education activities

Table 1: Pharmacists responses concerning their knowledge about diabetic patient education

No	Question	Strongly disagree	Disagree	Uncertain	Agree	Strongly agree
1	Pharmacists clearly understand their roles and responsibility regarding diabetic patient education	0%	6%	5%	45%	44%
2	Pharmacists have adequate knowledge about diet for diabetic patient	5%	5%	3%	37%	50.0%
3	Pharmacists should have extra training and education when they deal with diabetic patients	8%	12%	4%	22.0%	54%
4	Pharmacists have enough knowledge about insulin types.	5%	3%	15%	27%	50%
5	Staffs who are new to this pharmacy receive adequate orientation concerning diabetic patients care and education	6%	4%	5%	40%	45%

DISCUSSION

The survey successfully identified the roles of pharmacist in providing information and education to diabetic patients. It further examined the significance to community pharmacist to plan and deliver education accordingly. The vast majority of pharmacists surveyed appreciated the importance of their role in diabetic patient education and seemed to have enough knowledge and practice behaviors, at least, in their opinions. The results are essential as an investigation of learning issue however; the result generalizability is limited due to the size, geographical location, and nature of the sample selected. The community pharmacist who volunteered for this study was likely to receive adequate orientation concerning diabetic patients care and education when they join the pharmacy staff. Rothman et al.¹¹

successfully established a team of clinical pharmacist within the clinics of primary care that offered medication management to the patients of diabetes, case management, and patient education. They concluded that a disease management program led by a pharmacist enhanced the medication management, case management, and patient education can effectively improve the outcomes of diabetes at a practical cost¹². In a detached pharmacist-run program for managing diabetes, average A1C chopped down from 9.5% at baseline to about 7.8 % after one year, whereas, 42 with a total avoidance cost from which the benefit will be calculated to equal \$59.^{13,14} Furthermore, survey results revealed that pharmacists demonstrated good practicing standards in terms of diabetic patient education evidenced by spending enough time talking to diabetic

patients about how to use their medication, talking about their new prescription, discussing the best time to use their medication, and checking the dose of insulin with patient to be sure from their understanding^{15,16}.

Rosenstock, et al.¹⁷ supported the timely insulin usage for treating the condition of diabetes but the community pharmacist were reluctant to prescribe insulin due to the fact that utilization of insulin was an alternative for complicated treatment therefore, a burden to the manage diabetes was supplemented. The more rapidly a patient was capable to accomplish the recommended goal of A1C up to 7%, the less was patients risk to develop the diabetes related complications. Recent studies indicated that the safety and effectiveness in prescribing the newly developed and long-acting basal insulin analog. The failure to attend the education is considered to be responsible for disease complications, poor quality of life, and frequent re-hospitalizations. Hence, the community pharmacists can deeply contribute to the prevention of progression of this disease by means of conducting and promoting community education programs along with assessment by facilitating the population in Saudi Arabia who are at risk for

the development of diabetes. It is important for the pharmacist to educate the diabetic population regarding the proper medications usage, explain monitoring devices, drug interactions screening, along with using the recommendations for ancillary services as well as products. The community pharmacist and the professionals of the health care not only diagnose this condition, but it essentially aids the patient to prevent this condition. The pharmacist usually tends to monitor the levels of blood glucose as well as keeps track of this condition. When the patient is not able to inquire about any issue during contact with the physicians they often tend to ask and get knowledge from the community pharmacist. The community pharmacist also counsels the patients related to the administration of insulin on regular basis so that the complication onset can be delayed by possessing tight glycemic control. One of an essential pharmacist role is to be available for answering any patient query. Overall, it is the role of the pharmacist to assist the patients of diabetes in excellent possible means to prevent and cope up with this issue. Therefore, the results of the study have confirmed the role of community pharmacist in prevention, detection, and education related to the complications of diabetes. Additional

studies are encouraged so that this can be expanded to community pharmacies throughout Saudi Arabia.

The Cioffi et al.¹⁸ undertook a study for examining the outcomes of the pharmacist who were directed to manage the diabetes related conditions and glycemic control in the clinics. One of a major endpoint was the impact of nine to twelve months of contribution in the HbA1C clinics. This research helped to demonstrate that the community pharmacist can offer effectual care for the diabetic patients as they have high knowledge related to diabetes¹⁹. Conversely, Gerber et al²⁰ assessed the impact of pharmacist consultations costs and healthcare utilization offered to the diabetic patients. This research demonstrated that the consultation of the pharmacist offered to the patients can diminish the total cost of health with the clinics and health care organizations. Moreover, Cranor et al²¹ examined the determination of outcomes for up to five years subsequent the beginning of community-based care services within pharmacies for the diabetic individuals. One of a longitudinal and quasi experimental cohort pre-post study was undertaken within 12 community pharmacies. This study indicated that diabetic patient's attained ongoing patient centered care was

capable of maintaining the HbA1c improvement over a certain time period. Moreover, the employers experienced decline in the mean entire direct medical costs²¹. The effect of specifically designed program for insulin dependent patient's compliance and patient education upon diabetes was examined by Powell et al²². This program was flourished to produce improvements in both the compliance and knowledge but there existed a requirement for efforts individualization of the education of the efforts of the patients²².

Odegard et al²³ evaluated the effects on interventions on controlling diabetes, self-reporting and medical appropriateness being matters of secondary concern. The study included a sample size based on 77 individuals, who were randomized to obtain a usual care (n = 34) and pharmacist intervention (n = 43) for about six months, followed by a 6-month usual-care observation period for both groups. According to the obtained insight, interventions by pharmacists does not cause a substantial effect on controlling diabetes, but controls HbA (1c) even when fewer physicians could visit. In comparison to the individuals having poor control on diabetes, significant progress was observable amongst LDL and Hb A1C being

frequent in preventive care as is found in the study of McCord and Kiel²⁴. The study concluded that the diabetes management program that is coordinated amongst pharmacists indicated positive results for patients.

CONCLUSIONS

Since, the diabetes prevalence is thought to rise over the subsequent decades. Hence, there is a need to use pharmacists. The community pharmacists are considered to be in an exclusive position to counsel, educate, and monitor the patients suffering from diabetes. There is a requirement for enhanced care for the diabetic patients as they tend to present outstanding opportunity for community pharmacists to become more concerned in the follow up and management of the diabetes sufferers. This study reveals a positive impact that these pharmacist can impose in attaining the primary goal to decline the diabetes progression in patients. Team care uses a unique pharmacists training in management of medication in chronic diseases especially diabetes. Pharmacists should continuously refresh and update knowledge regarding diabetes and disease management; hence, they can be a great resource for primary care delivered to diabetic patients. The evidences based on education

from reliable sources were observed as important. This current research raises numerous concerns that need additional exploration to ensure flourishing implementation of educational programs. It is also essential to observe whether the preferences and concerns were identified by this motivated sample, have equal degree among the individuals of general community pharmacy profession.

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