



Original Article

Assessment of Knowledge and Practices of Influenza and Pneumococcal Vaccination Among Type 1 and Type 2 Diabetes Patients in Bewal International Hospital

Muhammad Imran¹, Muhammad Shuaib¹, Muhammad Ikram ul Haq², Hafiz Muhammad Zubair³, Hasan Akbar Khan^{4*} and Sara Najeeb⁵¹Department of Medicine, Mohi-ud-Din Islamic Medical College, Mirpur, Pakistan²Department of Medicine, Niazi Medical and Dental College, Sargodha, Pakistan³Department of Medicine, Khan Research Laboratories Hospital, Islamabad, Pakistan⁴Department of Biochemistry, Al Aleem Medical College, Lahore, Pakistan⁵Department of Pathology, Mohi-ud-Din Islamic Medical College, Mirpur, Pakistan

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*Corresponding Author:

Hasan Akbar Khan
Department of Biochemistry, Al Aleem Medical College, Lahore, Pakistan
dr.hasan13@gmail.comReceived Date: 19th April, 2024Acceptance Date: 25th July, 2024Published Date: 31st July, 2024

ABSTRACT

Patients with diabetes have high risk of developing pneumococcal and influenza infections and are advised to take immunization for prevention against the disease. **Objective:** To determine the level of awareness and immunization behaviors for influenza and pneumonia among patients with type 1 and type 2 diabetes received treatment at Bewal International Hospital, Gujjar Khan. **Methods:** This cross-sectional study was performed at the diabetic clinic of Bewal International Hospital, Gujjar Khan, from June 2023 to August 2023. A total of 200 patients with diabetes were included in the study. Socio-demographic details were noted on a pre-structured questionnaire. Questions about knowledge and practices of vaccination particularly influenza and pneumococcal were asked and responses were noted. **Results:** The mean age of the patients was 47.0 ± 1.18 years. 193 (96.5%) had poor knowledge regarding influenza and pneumococcal infections and their vaccines. An alarming 99% of the people did not have any clue about any vaccination against pneumococcal and influenza infection in patients with diabetes. Similarly, only 1.0% of patients had good practices regarding these vaccinations. **Conclusions:** The knowledge and practice of influenza and pneumococcal vaccination in patients with diabetes is drastically low in the study population. The health care providers should educate the patients and the government should take concrete steps towards education and improvement of the socioeconomic condition of people along with cost-effectiveness and availability of vaccines for every individual.

INTRODUCTION

Diabetes Mellitus (DM) is a chronic metabolic condition characterized by increased plasma glucose levels as a result of β -cells malfunction and insulin resistance [1]. It is a grave public health concern, prevailing as an epidemic with an approximate global prevalence of 6.1% [2]. As a chronic disease, DM is associated with a reduction in immunity, making affected individuals more prone to other diseases. Due to immunodeficiency, patients with diabetes have a higher prevalence as well as severity of infectious diseases typically respiratory tract infections. The outcomes of these diseases also tend to be poor in patients

with diabetes [3]. The prevalence of pneumococcal infections are substantially higher in individuals with diabetes [4]. The rate of complications of pneumococcal and influenza disease is higher in these patients as compared to the patients without diabetes [5]. Most international organizations suggest seasonal pneumococcal and influenza vaccination to patients with diabetes in order to reduce hospitalization and complication rates [6,7]. Two types of pneumococcal vaccines including pneumococcal conjugate vaccines and polysaccharide vaccines are available and recommended

for patients with diabetes [8,9]. Similarly, annual vaccination of trivalent inactivated influenza and live attenuated influenza vaccines are also recommended for patients with diabetes [10]. Despite these guidelines, there is unsatisfactory adherence to vaccination in the general population particularly due to lack of awareness. Increasing the knowledge and awareness among these patients related to pneumococcal and influenza vaccination is the most efficacious way to minimize the complications of such infections [11]. There is a poor level of knowledge, awareness, and practice regarding influenza vaccination among patients with diabetes all over the globe, according to several studies that have been conducted [12,13]. According to Sözen *et al.*, the primary obstacle that prevents patients with diabetes from obtaining the influenza vaccination is a lack of understanding about the relevance of the vaccine regarding influenza [7]. There is a paucity of studies on this subject in Pakistan, even though several studies have been carried out to evaluate the knowledge and habits of patients with diabetes about immunization. As a result, the purpose of this research was to investigate the level of awareness and immunization habits about influenza among patients with type 1 and type 2 diabetes who were receiving treatment at Bewal International Hospital Gujar Khan, Punjab, Pakistan.

METHODS

This cross-sectional study was performed at the diabetic clinic of Bewal International Hospital, Gujar Khan, Punjab, Pakistan, from June 2023 to August 2023. A sample size of 200 patients was estimated using 95% confidence level, 5% margin of error and 15.3% rate of pneumococcal disease in adults with chronic medical conditions [14]. The study was approved by the hospital Ethical Committee i.e. Ref No: /01/01/2023/S2 ERB. Consecutive sampling technique was used to collect data. Patients of either gender with age ≥ 18 years having type I or type II diabetes diagnosed at least one year before were included. Type II Diabetes was considered if the patient was currently on hypoglycemic drugs or previous history of taking hypoglycemic drugs, and had random blood glucose ≥ 200 mg/dL, a fasting blood glucose ≥ 126 mg/dL, or 2-hour blood glucose of 200mg/dL on 75g oral glucose tolerance test [15]. Type I diabetes was considered if the patient had a positive islet cell autoantibody test in addition to the other diagnostic findings of diabetes. Patients < 18 years without confirmed clinical diagnosis of diabetes mellitus, having cognitive impairment or psychological problems (on history) and critically ill patients were excluded. Following the receipt of clearance from the ethical committee and the provision of informed consent from patients, a total of two hundred diabetes patients who fulfilled the inclusion criteria contributed to the research project. Clinical history

was taken in form of the duration of the disease and diabetic control. Diabetic control was assessed using glycated hemoglobin. In the present study, the structured survey questionnaire was used as a tool for data collection. The tool was designed after reviewing different studies [16-17]. The Cronbach's α coefficient was found to be 0.817 for the total questionnaire. While, it was 0.796 for knowledge and 0.756 for practices section of the questionnaire. For the accuracy of data, most of the questions in the questionnaire were close-ended. Initially, a self-administration method was attempted, but this approach led to many unanswered questions due to language barriers. Consequently, direct interviews lasting 15-20 minutes were conducted instead. During these interviews, the participants did not have trouble understanding the questions. The questionnaire had three sections. The first part included the socio-demographic data comprised of questions about the respondents personal details such age, gender, area of residence, educational status, and monthly income. The second part of the questionnaire was about the knowledge of influenza and pneumococcal infection and vaccination. Nine main close-ended questions related to knowledge were included. Responses were scored, percentages were calculated and divided into two categories. The total score ranged from 0 to 9. In terms of knowledge about pneumococcal and influenza vaccination, respondents were graded based on their correct answers: a score of 65% or higher was considered good, while a score below 65% was taken as poor, as reported in a similar study [17]. The third part of the questionnaire was about the practices of the respondents regarding vaccination. Practices were also assessed through direct interviews and structured questions within the survey were used to estimate it. Four main close-ended questions related to practices were included. Each correct answer was given a score of one and wrong answer a score of zero. Responses were scored, percentages were calculated and divided into two categories. The total score ranged from 0 to 4. For practices, the study classified respondents with any two positive responses as good, representing 50%. Conversely, two negative responses were categorized as poor on the basis of the answers in the Practices section, as reported in a comparable study [17]. All data were entered and analyzed using SPSS version 24.0. Quantitative data such as age were presented using mean and standard deviation. Qualitative data such as age groups, gender, residence, education status, financial status in terms of monthly income, and responses about knowledge and practices regarding pneumococcal and influenza vaccination in patients with diabetes were presented using frequencies and percentages.

RESULTS

A total of 200 patients with diabetes were included in the study. Socio-demographic parameters are shown in table 1.

The mean age of the patients was 47.0 ± 1.18 years. There were 54.5% males and 45.5% females in the study. The majority was living in Gujar Khan 63.0%. 40.5% patients received no formal education and only 3.5% patients were post-graduate. Monthly income ranged between 10,000 to 20,000 PKR in majority (43.0%) of the patients. The M majority of the patients (37.5%) had diabetes for less than 5 years. 54.5% patients had good diabetic control.

Table 1: Clinical and Socio-Demographic Parameters of Patients with Diabetes (n=200)

Variables	Mean ± S.D
Mean Age* (Years)	47.0 ± 1.18
Age Groups (years) N (%)	
18 - 30	12 (6.0%)
31 - 40	20 (10.0%)
41 - 50	40 (20.0%)
51 - 60	65 (32.5%)
>60	63 (31.5%)
Gender N (%)	
Male	109 (54.5%)
Female	91 (45.5%)
Residence N (%)	
Gujar Khan	126 (63.0%)
Other Areas of Punjab	74 (37.0%)
Education Status N (%)	
No formal education	81 (40.5%)
Islamic education	10 (5.0%)
Primary	49 (24.5%)
Intermediate	40 (20.0%)
Graduation	13 (6.5%)
Post-graduation	7 (3.5%)
Monthly income (PKR) N (%)	
<10,000	34 (17.0%)
10,000 - 20,000	86 (43.0%)
20,001 - 30,000	36 (18.0%)
30,001 - 40,000	24 (12.0%)
>40,000	20 (10.0%)
Duration of disease (years) N (%)	
<5	75 (37.5%)
5 - <10	56 (28.0%)
10 - <15	29 (14.5%)
15 - <20	18 (9.0%)
≥20	22 (11.0%)
Diabetic control N (%)	
Good (HbA1c ≤ 6.5%)	109 (54.5%)
Poor (HbA1c >6.5%)	91 (45.5%)

n=number of patients; %=percentage of patients; * = mean ± standard deviation; PKR = Pakistani rupee; HbA1c = Glycated hemoglobin

Table 2 explains the knowledge of patients with diabetes regarding pneumococcal and influenza infection and vaccination. Only 3.0% patients knew that influenza and pneumococcal infections are caused by a virus or a

bacteria. 5.0% patients knew that these infections can spread from person to person while only 2.0% patients knew that they can be prevented. 7.0% of patients knew that patients with diabetes are at higher risk of infection, and 5.5% reported that symptoms are worse in patients with diabetes. Only 1.0% of patients reported that they had ever heard about vaccination against influenza and pneumococcal infections, while 1.0% believed that it can prevent the disease. 4 (2.0%) patients reported that vaccine can protect from infections for 1 year.

Table 2: Knowledge of patients with diabetes regarding pneumococcal and influenza infection and vaccination

Questions	n (%)	
What do you know about influenza and pneumococcal infection?	It is caused by a virus or a bacteria	6 (3.0%)
	It can spread from person to person	10 (5.0%)
	It can be prevented	4 (2.0%)
	Patients with diabetes are at a higher risk of infection	14 (7.0%)
	Symptoms are worse in patients with diabetes	11 (5.5%)
Have you ever heard of that a vaccine could prevent influenza and pneumococcal infection?	Yes	2 (1.0%)
	No	198 (99.0%)
Does the vaccine prevent this infection?	Yes	2 (1.0%)
	No	198 (99.0%)
How is the vaccine administered?	Injection	10 (5.0%)
	Oral drops	102 (51.0%)
	Nasal drops	88 (44.0%)
Does the vaccine have side effects?	Yes	109 (54.5%)
	No	91 (45.5%)
How long vaccine can protect you?	1 year	4 (2.0%)
	2 year	7 (3.5%)
	Lifelong	189 (94.5%)
Does vaccine prevent serious complications associated with the influenza and pneumococcal infection in patients with diabetes?	Yes	14 (7.0%)
	No	186 (93.0%)
When is the appropriate time to take vaccine?	Before the start of winters	9 (4.5%)
	During winters	81 (40.5%)
	Immediately after winters end	110 (55.0%)
Is it true you can never get infection as long as you are vaccinated?	Yes	126 (63.0%)
	No	74 (37.0%)

n = number of patients; % = percentage of patients

Table 3 demonstrates the differentiation of the patients based on their knowledge scores. The scoring of the participants' knowledge documented that 96.5% of patients had poor knowledge regarding influenza and pneumococcal infections and their vaccination.

Table 3: Patients' knowledge score

SCORE	Good knowledge (Score ≥ 65%) n (%)	Poor knowledge (Score < 65%) n (%)
Influenza and Pneumococcal Vaccination Knowledge	7 (3.5%)	193 (96.5%)

n = number of patients; % = percentage of patients

Table 4 explains the practices of patients with diabetes regarding pneumococcal and influenza infection and vaccination. Only 1.0% of patients had received the vaccination before, among whom 0.5% patients received it every year. Among these 1.0% of patients, vaccine was recommended by their doctor. Reasons of not receiving vaccination included lack of knowledge about the vaccine in 96.5% of patients, followed by the vaccine being expensive (1.0%), having alternate protection (1.0%), and perceived side effects of the vaccine (0.5%).

Table 4: Practices of patients with diabetes regarding pneumococcal and influenza infection and vaccination

Questions	n (%)	
Have you ever received influenza or pneumococcal vaccine before?	Yes	2 (1.0%)
	No	198 (99.0%)
How regularly do you take this vaccine?	Every year	1 (0.5%)
	Received only once	1 (0.5%)
	Never received	198 (99.0%)
What influenced you to take the vaccine?	Recommended by doctor	2 (1.0%)
	Been told by a fellow patient	0 (0.0%)
	Vaccine is available free of cost	0 (0.0%)
	Advised by pharmacist	0 (0.0%)
	Media campaign	0 (0.0%)
What are the reasons for not taking vaccine?	Don't know about vaccine	193 (96.5%)
	I have alternative protection	2 (1.0%)
	side effects	1 (0.5%)
	Not effective	0 (0.0%)
	Not necessary	0 (0.0%)
	Expensive	2 (1.0%)
Fear of injection	0 (0.0%)	

n = number of patients; % = percentage of patients

Table 5 demonstrates the differentiation of the patients based on their practices scores. Only 1.0% patients reported to have good practices regarding vaccination based on the cut-off value of 66.3%.

Table 5: Patients' practices score

Practices	n (%)
Good practices (≥50%)	2 (1.0%)
Poor practices (<50%)	198 (99.0%)

n = number of patients; % = percentage of patients

DISCUSSION

Diabetes is an epidemic condition worldwide and is associated with an alarming decrease in immunity causing patients to become more prone to infections, typically respiratory tract infections [17,18]. Although vaccines are available to protect against these diseases and to reduce the hospitalization and complication rates in patients with diabetes, this practice is not common in developing countries like Pakistan [19]. Therefore, the purpose of this research was to investigate the level of awareness and

immunization habits about influenza among patients with type 1 and type 2 diabetes who were receiving treatment at Bewal International Hospital, Gujar Khan. The findings of this research showed that there is a lack of knowledge regarding pneumococcal and influenza vaccination in patients with diabetes. Only 1% of patients knew such vaccinations in patients with diabetes. A study by Alsaad SM et al., showed that Saudi patients had a good knowledge of the flu (70.9%), vaccine (64.3%) and affirmative attitudes towards vaccination (65.7%) [20]. Al-Qerem W et al., reported that 70.6% never had the influenza vaccine, and only 23.7% planned to take it in the coming season [12]. A study conducted in Lahore, Pakistan revealed that 52% had awareness regarding increased susceptibility to pneumonia and influenza among patients with diabetes. However, only 12 % had received the vaccines against it during the last five years [19]. These results contradict the findings of the current study. An Indian study reported that influenza and pneumococcal vaccination was administered in only 2% and 0.7%, respectively. After counseling, 52% of individuals agreed to get the vaccination owing to its safety and efficacy but only 17.4% got it [21]. In a study performed in Saudi Arabia, it was documented that 47.8% of the patients with type II diabetes took the flu vaccine while only 2.8% received the pneumococcal vaccine. There was a lack of awareness regarding the pneumococcal vaccine [22]. Another South Indian study reported that only 4.8% and 4.1% of the patients with diabetes had Knowledge about influenza and pneumococcal infections, respectively. While the majority (98.7%) had no awareness regarding the availability of the vaccines [23]. These findings are comparable to the current study. However, this study also has some limitations. Firstly, the geographical limitation as it was carried out in Gujar Khan with the majority of the population residing in Gujar Khan, so the results cannot be generalized. Secondly, it did not consider the availability of the vaccinations which might have impacted the frequency of awareness in patients with diabetes. Based on the results, the study suggests that healthcare providers should play a pivotal role in creating awareness as well as motivating them to take the vaccine.

CONCLUSIONS

The knowledge and practice of influenza and pneumococcal vaccination in patients with diabetes is drastically low in the study settings. The foremost barrier is the lack of knowledge followed by socioeconomic conditions and perceived decreased benefits of vaccines. The health care providers should educate the patients and the government should take solid steps towards education and improvement of the socioeconomic condition of people along with cost-effectiveness and availability of vaccines for every individual.

Authors Contribution

Conceptualization: MS, HAK, MI

Methodology: MS, HAK, MI, MKUH, MZ, SN

Formal analysis: MS, HAK, MI, MKUH, MZ, SN

Writing, review and editing: MS, HAK, MI, MKUH

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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