Knowledge and Practice of taking Influenza Vaccine among Adult Diabetic Patients in Bahrain Defense Force Hospital

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Abstract

The objective of this study is to assess the knowledge and practice of taking the annual influenza vaccine among adult diabetic patients in BDF Hospital. The study is a descriptive cross-sectional hospital-based study.

Three hundred diabetic patients who were eligible for the study were interviewed, using a structured questionnaire.

Results of the survey indicated that males and females included are 48% to 52% respectively, 95.3% of the cohort were doing follow up, but only 55.3% were doing it regularly.

Although 65.3% are aware and have heard about the flu vaccine only 10% have taken the flu vaccine in the last 2 years. Only 27.3% were advised to take the flu vaccine, 30% of the study population know that the vaccine helps reduce the flu illness and 47.33% know that it helps prevent seasonal influenza.

From our study, it was found that the main reason for not taking the flu vaccine is that they mainly did not know about the vaccine which constituted 49.33% of the study population.

So, knowledge and use are lower than optimal compared to the literature but here it is the lowest, which may mostly be due to reduced awareness of the benefits of the vaccine and vaccination. This will most probably increase if there are increased efforts on advising direct contacts with the patients in the diabetic or other PHC clinics or through the media, to have the seasonal flu vaccine.

Keywords: Influenza vaccine, diabetes patients

Abbreviations

BDF Bahrain defense force
CMC Christian Medical College
DFID Distance Fellowship in Diabetes Management
DM Diabetes mellitus
MOH Ministry Of Health
FU Follow up
HCW Health Care Workers
CDC Centers for Disease Control and Prevention
NIAID National Institute of Allergy and Infectious Diseases
HCP Health Care Provider
UK United Kingdom
NHS National Health Surveys
COPD Chronic Obstructive Pulmonary Disease
RIV3 Trivalent Recombinant Hemagglutinin

Introduction

No one questions the important role of vaccination in protecting and preventing or reducing the incidence rate of fatal diseases.

From this point vaccinations worldwide are programmed according to vaccine recommendations, from birth till later for the elderly with different forms and compositions.

Vaccination is well known to enhance immunity and usually starts when the body is building its defenses against diseases early in childhood. It is a well-known program from birth, with some modulation in different (MOH) systems depending on many factors which are geographical and endemic in the region.

Also, there is a role for adult vaccinations especially for those who are vulnerable to be attacked due to some illness, or due to less immunity, such as those with chronic illness and at the top of the list comes diabetic patients.

Hence this study was conducted to evaluate the knowledge and practice of taking influenza vaccine among adult diabetic patients in BDF hospital outpatient clinics, as diabetes is now one of the most common non communicable diseases globally and presents as a huge burden for the whole health system, and is one of the recommended areas for vaccination during adult life.

The study evaluates the factors that are taken as variables affecting the knowledge and practice of taking the flu vaccine, where these variables are to be used in an open and closed questionnaire. The interview was guided by doctors and Nurses in the GP clinics. The variables taken were age, sex, level of education, duration of being diabetes, whether the patient is on regular follow up for DM, source of knowledge about flu vaccine, basic knowledge about the vaccine, when, how, and why it should be taken, and any concerns or doubts about taking the flu vaccine, and if the patient had ever had the flu vaccine.

Literature Review

Although the flu vaccine is well known and has been shown in many studies to reduce the incidence, morbidity and mortality of influenza and hence the cost of management of this contagious disease, many people are not aware of the recommendations to take the vaccine. Of those who know, very few respond to the message of Flu vaccine usage.

The influenza vaccination is an annual vaccination using a vaccine specific for a given year to protect against the highly variable influenza virus [1]. Each seasonal influenza vaccine contains antigens representing three or four influenza virus strains: one influenza type A subtype H1N1 virus strain, one influenza type A subtype H3N2 virus strain, and either one or two influenza type B virus strains [2]. Influenza vaccines may be administered as an injection, also known as a flu shot, or as a nasal spray.

The U.S. Centers for Disease Control and Prevention (CDC) recommends that everyone over the age of 6 months should receive the seasonal influenza vaccine. [3], Vaccination campaigns usually focus on people who are at high risk of serious complications if they catch the flu, such as the elderly and people living with chronic illness or those with weakened immune systems, as well as health care providers (HCP) [3][4].

Despite somewhat limited research, the safety of flu vaccines is reassuring; there is no evidence that they can cause serious harm and no reason for serious side effects to be a concern. [5].

Purpose and benefits of annual flu vaccination:
Influenza vaccines cut the risk that elderly people will die of the virus by 50% and reduces the incidence of hospitalization by more than 25%, according to a study released by the New England Journal of Medicine [6] [7]. Having the flu vaccine is the best way to protect against the flu and helps prevent its spread throughout a community. The influenza vaccine can also reduce the severity of the flu should a person contract a strain of the flu that the vaccine did not contain [8].

An influenza epidemic emerges during flu season each winter. There are two flu seasons annually, corresponding to the occurrence of winter in the Northern and Southern Hemispheres.

Although difficult to assess, these annual epidemics are thought to result in between three and five million cases of severe illness and between 250,000 and 500,000 deaths around the world every year [9].

A review at the National Institute of Allergy and Infectious Diseases (NIAID) division of the National Institutes of Health (NIH) in 2008 concluded that “Seasonal influenza causes more than 200,000 hospitalizations and 41,000 deaths in the U.S. each year, and is the seventh leading cause of death in the U.S.”[10]. The average total economic costs caused by the annual influenza outbreak in the U.S. has been estimated at over $80 billion[12] [13]. The number of annual influenza-related hospitalizations is many times the number of deaths [14].

Benefits of vaccination:
According to research published in July 2010, vaccination against influenza is also thought to be important for members of high-risk groups who would be likely to suffer complications [15][16].

Vaccination of school-age children has a strong protective effect on the adults and elderly with whom the children are in contact [17].

For healthy, working adults, influenza vaccines can provide moderate protection against confirmed influenza, but such protection is greatly reduced in some seasons. Evidence for protection in adults aged 65 years or older is lacking [18].

Influenza vaccination has been shown to be highly effective in Healthcare Workers (HCW), with minimal adverse effects. In a study of forty matched nursing homes, staff influenza vaccination rates were 69.9% in the vaccination arm versus 31.8% in the controls. The vaccinated staff experienced a 42% reduction in sick leave from work (P=.03) [19].

An analysis of data and patient population health in New Mexico's 75 long-term care facilities and nursing homes found that as vaccination rates of HCPs with direct patient contact rose from 51 to 75 %, the chances of a flu outbreak among patients in that facility went down by 87%. The New Mexico study showed that vaccinating HCPs provided more protection to residents than vaccinating the residents themselves [20].

In a 2010 survey in United States HCW, 63.5% reported that they received the flu vaccine during the 2010–11 seasons, an increase from 61.9% reported the previous season. Health professionals with direct patient contact had higher vaccination uptake, such as physicians and dentists (84.2%) and nurse practitioners (82.6%) [21][22][23].

It is important to note that the flu vaccine takes about two weeks to build up enough antibodies to protect against the flu, [2] and that the vaccine does not protect against every strain of the flu [2].

Safety:

Flu vaccination may lead to side effects such as runny nose and sore throat, which can last for up to several days. Egg allergy may also be a concern since flu vaccines are typically made using eggs [24][25], however, research into egg allergy and influenza vaccination [26] has led some advisory groups to recommend vaccine delivery protocols for egg allergic persons [27].

Some injection-based flu vaccines intended for adults in the United States contain thiomersal (also known as thimerosal), a mercury-based preservative. Despite some controversy in the media, [28] it was concluded that there is no evidence of toxicity from thiomersal in vaccines as it is in tiny concentration and with no health safety risk. [29]

Although Guillain-Barre syndrome had been feared as a complication of vaccination, the CDC states that some of the studies on modern influenza vaccines have seen no link with Guillain-Barre [30] [31].

Efficacy and effectiveness:

A vaccine is assessed by its efficacy; the extent to which it reduces risk of disease under controlled conditions, and its effectiveness, and the observed reduction in risk after the vaccine is put into use [32].

In the case of influenza, effectiveness is expected to be lower than efficacy because it is measured using the rates of influenza-like illness, which is not always caused by influenza [33]. Influenza vaccines generally show high efficacy, as measured by the antibody production induced in animal models or vaccinated people, [34] or most rigorously, by immunizing healthy adult volunteers and then challenging them with virulent influenza virus [35]. Studies on the effectiveness of flu vaccines in the real world are uniquely difficult; vaccines may be imperfectly matched, virus prevalence varies widely between years, and influenza is often confused with other influenza-like illnesses [36]. But even a mismatched vaccine can often provide cross-protection [37].

Nevertheless, multiple clinical trials of both live and inactivated influenza vaccines against seasonal influenza have been performed and their results pooled and analyzed in several 2012 meta-analyses. Studies on live vaccines have very limited data, but these preparations may be more effective than inactivated vaccines [35]. The meta-analyses examined the efficacy and effectiveness of inactivated vaccines against seasonal influenza in adults [33], children [38], and the elderly [39][40]. In adults, vaccines show a three quarters reduction in risk of contracting influenza (4% influenza rate among the unvaccinated versus 1% among vaccinated persons) when the vaccine is perfectly matched to the virus and a one-half reduction (2% getting flu without vaccine versus 1% with vaccine) when it is not, but with no significant effect on the rate of hospitalization [33].

In children, vaccines again showed high efficacy, but low effectiveness in preventing "flu-like illness". In children under the age of two the data are extremely limited, but vaccination appeared to confer no measurable benefit [38].

In the elderly, while many studies show effectiveness [41] [42] [43], the overall evidence is still insufficient[39] [40] [44].

Available evidence indicates that the high-dose vaccine produces a stronger immune response [46].

During an influenza pandemic, where a single strain of virus is responsible for illnesses, an effective vaccine could produce a large decrease in the number of cases and be highly effective in controlling an epidemic [47]. However, such a vaccine would have to be produced and distributed rapidly to have maximum effect [48]. A 2011 meta-study published in The Lancet, "Efficacy and Effectiveness of Influenza Vaccines," analyzed 31 prior studies on the effectiveness of influenza vaccination trials conducted between 1967 and 2011. The analysis found that flu shots were efficacious 67 % of the time; the populations that benefited the most were HIV-positive adults aged 18 to 55 (76 %), healthy adults aged 18 to 46 (approximately 70%), and healthy children aged 6 to 24 months (66%) [45].

The group most vulnerable to non-pandemic flu, the elderly, is also the least to benefit from the vaccine. There are multiple reasons behind this steep decline in vaccine efficacy, the most common of which are declining immunological function and frailty associated with advanced age [49].

As mortality is also high among infants who contract influenza, household contacts and caregivers of infants should be vaccinated to reduce the risk of passing an influenza infection to the infant [4].

Data from the years when Japan required annual flu vaccinations for school-aged children indicate that vaccinating children, the group most likely to catch and spread the disease, has a strikingly positive effect on reducing mortality among older people, due to herd immunity: one life saved for every 420 children who received the flu vaccine [50].

In working adults, a 2010 Cochrane review found that vaccination reduced both influenza symptoms and working days lost, without affecting transmission or influenza-related complications [33].

Duration of protection:
According to work published in 1973, 1983, and 2004, after vaccination against seasonal flu, antibody titers peak after typically two to four weeks. They decrease by about 50% over the next six months (the decrease is less for older adults), then remain stable for two to three years; protection without revaccination persists for at least three years for children and young adults [51]. It was previously thought that vaccination provided lifelong protection against specific strains [52]. This is not untrue; a 2010 study found a significantly enhanced immune response against the 2009 pandemic H1N1 in study participants who had received vaccination against the swine flu in 1976 [53].

Injection versus Nasal Spray

Flu vaccines are available either as, TIV, QIV (flu shot (injection), or trivalent (three strains; usually A/H1N1, A/H3N2, and B), quadrivalent (four strains; usually A/H1N1, A/H3N2, and representatives of B/Yamagata and B/Victoria lineages) inactivated (killed) vaccine), or LAIV; Q/LAIV (nasal spray (mist) of live attenuated influenza vaccine).

TIV induces protection after injection (typically intramuscular, though subcutaneous and intradermal routes are also immunogenic) [54], based on an immune response to the antigens present in the inactivated virus. While cold-adapted LAIV works by establishing infection in the nasal passages [55], LAIV is not recommended for individuals under age 2 or over age 50 [56], but might be comparatively more effective among children over age 2 [57].

A study of military personnel in the USA showed that flu shots yielded less illness than nasal sprays. This study was based on one of the largest head-to-head studies comparing LAIV and TIV. It was conducted by the U.S. Armed Forces Surveillance Center, on military personnel stationed in the U.S. during three flu seasons from 2004 through 2007.

Cross protection

Annual seasonal flu vaccination provides some protection against flu viruses that the vaccine was not designed for, including novel viruses [57]. The CDC made the following statement regarding the 2007-2008 vaccine; antibodies made in response to vaccination with one strain of influenza viruses can protect against different, but related strains [57].

In addition, it is important to remember that the influenza vaccine contains three virus strains so the vaccine can also protect against another two viruses.

For these reasons, even during seasons when there is a less-than-ideal match, CDC continues to recommend influenza vaccination. This is particularly important for people at high risk for serious flu complications and their close contacts [57].

Vaccination recommendations

Various public health organizations, including the WHO, have recommended that yearly influenza vaccination be routinely offered to patients at risk of complications of influenza and those individuals who live with or care for high-risk individuals, including: the elderly (UK recommendation is those aged 65 or above), Patients with chronic lung diseases (asthma, COPD, etc.), patients with chronic heart diseases (congenital heart disease, chronic heart failure, ischemic heart disease), patients with chronic liver diseases (including cirrhosis), patients with chronic renal diseases (such as the nephrotic syndrome), patients who are immunosuppressed (those with HIV or who are receiving drugs to suppress the immune system such as chemotherapy and long-term steroids) and their household contacts, people who live together in large numbers in an environment where influenza can spread rapidly, such as prisons, nursing homes, schools, and dormitories, people who plan to attend or participate in a high profile important event with large numbers of people from various places (such as Olympic Games etc.), people who are in the armed forces and HCW [58]. For pregnant women, however, a 2009 review concluded that there was insufficient evidence to recommend routine use of trivalent influenza vaccine during the first trimester of pregnancy [59]. Influenza vaccination during flu season is part of the recommendations for influenza vaccination of pregnant women in the United States [60].

Both types of flu vaccines are contraindicated for those with severe allergies to egg proteins and people with a history of Guillain-Barre syndrome [61].

According to the recommendations of the Advisory Committee on Immunization Practices, (ACIP) United States, 2013-14, recommend the Flu vaccination to all children aged 6 through to 59 months; all persons aged ≥50 years; adults and children who have chronic pulmonary (including asthma) or cardiovascular (except isolated

hypertension), renal, hepatic, neurological, hematologic, or metabolic disorders (including diabetes mellitus); persons who have immune-suppression (including immune-suppression caused by medications or by HIV infection); women who are or will be pregnant during the influenza season; children and adolescents (aged 6 months-18 years) who are receiving long-term aspirin therapy and who might be at risk for experiencing Reye's syndrome after influenza virus infection; residents of nursing homes and other long-term care facilities; American Indians/Alaska Natives; persons who are morbidly obese (BMI ≥40) [10].

When vaccine supply is limited, vaccination efforts should focus on delivering vaccination to persons at higher risk for influenza-related complications listed above, as well as these persons: HCW; Household contacts (including children), and caregivers of children aged ≤59 months (i.e., aged <5 years) and adults aged ≥50 years, with particular emphasis on vaccinating contacts of children aged <6 months; and Household contacts (including children) and caregivers of persons with medical conditions that put them at higher risk for severe complications from influenza. HCPs and persons who are contacts of persons in these groups and who are not contacts of severely immune-compromised persons (those living in a protective environment) may receive any influenza vaccine that is otherwise indicated.

Individuals who care for the severely immune-compromised should receive either IIV or RIV3. Women who are or will be pregnant during influenza season should receive IIV. Live attenuated influenza vaccine (LAIV) is not recommended for use during pregnancy. Postpartum women can receive either LAIV or IIV. Pregnant and postpartum women do not need to avoid contact with persons recently vaccinated with LAIV.

Persons who report having had reactions to egg involving such symptoms as angioedema, respiratory distress, lightheadedness, or recurrent emesis; or who required epinephrine or another emergency medical intervention may receive RIV3 if aged 18 through to 49 years and there are no other contraindications. If RIV3 is not available or the recipient is not within the indicated age range, such persons should be referred to a physician with expertise in the management of allergic conditions for further risk assessment before receipt of the vaccine.

Administration of IIV to persons receiving influenza antiviral drugs for treatment or chemoprophylaxis is acceptable. LAIV should not be administered until 48 hours after cessation of influenza antiviral therapy. If flu antiviral medications are administered within 2 weeks after receipt of LAIV, the vaccine dose should be repeated 48 or more hours after the last dose of antiviral medication.

Persons receiving antiviral drugs within the period 2 days before to 14 days after vaccination with LAIV should be revaccinated at a later date with any approved vaccine formulation.

After administration of a live vaccine, at least 4 weeks should pass before another live vaccine is administered [10].

Also, the former abbreviation TIV (Trivalent Inactivated Influenza Vaccine, previously used for inactivated influenza vaccines) has been replaced with the new abbreviation IIV (Inactivated Influenza Vaccine) [10].

Cost effectiveness

The cost-effectiveness of seasonal influenza vaccination has been widely evaluated for different groups and in different settings. In the elderly (aged over 65 years) the majority of published studies have found that vaccination is cost saving, with the cost savings associated with influenza vaccination (e.g. prevented health care visits) outweighing the cost of vaccination [62]. In older adults (aged 50–64 years), several published studies have found that influenza vaccination is likely to be cost-effective, however, the results of these studies were often found to be dependent on key assumptions used in the economic evaluations [63]. The uncertainty in influenza cost-effectiveness models can partially be explained by the complexities involved in estimating the disease burden [63], as well as the seasonal variability in the circulating strains and the match of the vaccine [65]. In children, the majority of studies have found that influenza vaccination was cost-effective [66]. Several studies have attempted to predict the cost-effectiveness of interventions (including pre-pandemic vaccination) to help protect against a future pandemic, however estimating the cost-effectiveness has been complicated by uncertainty as to the severity of a potential future pandemic and the efficacy of measures against it [67].

Vaccine production

Flu vaccine is usually grown by vaccine manufacturers in fertilized chicken eggs [68] [69]. In the Northern Hemisphere, the manufacturing process begins following the announcement (typically in February) of the WHO recommended strains for the winter flu season[68] [70]. Three strains (representing an H1N1, an H3N2, and a B strain) of flu are selected and chicken eggs are inoculated separately; these monovalent harvests are then combined to make the trivalent vaccine [71]. Both the conventional injection and the nasal spray are manufactured using chicken eggs. The European Union has also approved Opta flu, a vaccine produced by using vats of animal cells [69]. This technique is expected to be more scalable and avoid problems with eggs, such as allergic reactions and incompatibility with strains that affect avians, like chickens [69].

Research continues into the idea of a "universal" influenza vaccine that would not require tailoring to particular strains, but would be effective against a broad variety of influenza viruses under trial [69].

Regional research

Study about Influenza Vaccination among HCWs and their Attitude in Three Middle Eastern Countries, aimed to determine the current influenza vaccination rates among HCWs in three Middle Eastern countries namely the United Arab Emirates (UAE), Kuwait, and Oman, and also to identify the different variables associated with the noncompliance of HCWs to the recommendations of the Advisory Committee on Immunization Practices (ACIP) set in those countries, using 1500 questionnaires which were distributed to HCW.

The study results showed that a total of 42.5% of all the respondents self reported influenza vaccination in the three countries. There was a statistically significant difference in the rate of vaccination among participants in the three countries (p-value <0.0001) with the highest vaccination rate in Kuwait (67.2%) compared to 46.4% in Oman and only 24.7% in UAE.

A small proportion of the respondents reported that they got influenza like symptoms regularly (11.6%) and the majority of the participants reported that they got it rarely (53.0%). When the respondents were asked about their awareness of the CDC recommendations for influenza vaccination, around fifty-one percent of the respondents reported that they were aware of the CDC recommendations regarding immunization against seasonal influenza.

The association between the respondents' characteristics and their vaccination status was tested to identify the different variables associated with the likelihood of influenza-like symptoms. Results from UAE and Kuwait showed that there is no association between respondents' previous history of influenza illness and their vaccination status (p-value > 0.05, $\chi 2$ test) in fact in Oman, the highest vaccination rate (66.4%) was obtained for individuals who never got influenza-like symptoms. Multivariate analysis of the results showed that having a history of influenza illness was less likely to occur in the vaccinated group in Oman (OR=0.662).
Participants' awareness of the CDC recommendations for vaccination against seasonal influenza was assessed which revealed that almost half of the participants (48.5%) were aware of these recommendations. Despite this fact, the vaccination rate was low in all three countries; in the UAE, only
26.7% of the vaccinated workers were aware of the CDC recommendations. In Oman, the majority of the vaccinated individuals (56.5%) were aware of the CDC recommendations and those HCWs were 2.2 times considered more likely to be vaccinated than other groups in the other two countries.
On the other hand, self reported reasons among HCWs for refusal to take the influenza vaccine were assessed and showed that the most common reason that discouraged HCWs from taking the vaccine was "lack of time" as reported by 31.8% of the respondents. Other reasons for not taking the vaccine were unawareness of vaccine availability (29.4%), unavailability of vaccine (25.4%), doubts about vaccine efficacy (24.9%), lack of information about importance (20.1%) and concerns about its side effects (17.3%).

The most common reason for not taking the vaccine in UAE and Oman was the unawareness of vaccine availability (21.5% and 31.6%, respectively) while in Kuwait "lack of time" was the main reason for not being vaccinated (90.9%) among HCWs.

The most common reasons among HCWs for not taking the vaccine were similar in the three countries but there were statistically significant differences for some factors among the three countries.The results of the present study revealed that the vaccination rate in the UAE (27%) was low compared to 46.4% in Oman and 67.2% in Kuwait [79].

Global research

A similar study done in Singapore in January 2007 using a pilot-tested questionnaire was conducted for a total of 307 diabetics who participated in the study.

Of these, 139 (45.3%) claimed to know the difference between influenza and the common cold, while 98 (31.9) and 18 (5.9%) participants thought that influenza vaccines protected against all influenza strains and provided lifelong immunity. 247 (80.4%) participants were aware that they were at a moderate or higher risk for influenza-related complications, while 181 (58.9%) considered vaccination to be effective in preventing influenza and its complications. Only 94 (30.6%) participants were previously vaccinated. Among those unvaccinated, 117 (54.9%) did not think vaccination was necessary, while 104 (48.8%) had never considered it. As observed from the multivariate analysis, income was a key predictor of influenza vaccination. While 241 (78.5%) participants cited healthcare professional advice as the main guiding factor for getting vaccinated, 199 (64.8%) had never been advised on flu vaccination. Of the 108 (35.1%) participants who had received previous advice on influenza vaccination, the majority had received it from their healthcare professionals [76].

So uptake of influenza vaccination among diabetics in Singapore is low, and the key predictor is income. Perception and knowledge are the main barriers among diabetics [76].

Another descriptive cross-sectional study was conducted on adult subjects (age >16 years) in Spain using individualized secondary data furnished by the 1993 and 2001 NHS. The total number of subjects finally analyzed in the 1993 and 2001 NHSs amounted to 20,880 and 21,034, respectively.

Of these, 911 in 1993 (4.4%, 95% CI4.1– 4.6) and 1,232 in 2001 (5.9%, 5.5– 6.2) were classified as people with diabetes. The proportion of diabetic subjects who reported having been vaccinated was 43.2% (95% CI 40–46.4) in 1993 and 48.8% (46 –51.6) in 2001. Furthermore, influenza

coverage was significantly higher among diabetic versus non-diabetic subjects in both 1993 (43.2 vs. 16.7%) and 2001 (48.8 vs. 17.5%). In both years, after adjusting for potential confounders (age, sex, and comorbidity), the likelihood of being vaccinated was significantly higher among diabetic than among non-diabetic subjects (OR _ 1.68 and 1.65, respectively).

The most relevant results of this study are that influenza vaccination coverage among Spanish diabetic adults is below desirable levels and that, after controlling for the influence of confounding variables, there has been no significant improvement in coverage between 1993 and 2001.

Arguably, the main limitation of this study is that the use of invalidated self-report data on vaccination might entail possible bias.

In this respect, however, several studies observe that self-response on influenza vaccination is highly sensitive and evinces a high degree of agreement [72, 73]. The coverage described for Spain is appreciably lower than that reported for the U.S. and other European countries [74, 75].

Other studies in Slovakia have been analyzed in selected target groups. A questionnaire study was focused on the level of knowledge about flu vaccination and the attitudes towards it among three target groups: medical students, nurses, and printing company workers. The questionnaire survey revealed several surprising facts. Although almost all the respondents knew about the existence of the influenza vaccine, only less than one quarter had ever received an influenza shot. Despite our expectations that the main source of information about influenza prevention in medical students and nurses would be from their medical and nursing studies, it was shown to be from mass media instead. Even more staggering was the distrust towards the vaccination as a reason for not being vaccinated in a high proportion of both the medical students and the nurses. The majority of medical students would not even want to get a vaccination, even if it were to be provided for free [77].

A study in Germany as a population-based cross-sectional analysis of the seasons 2002/2003 and 2003/2004, conducted by random sampling, was a telephone-based household survey among non-institutionalized individuals representative of the population aged > or = 14. The surveys for 2002/2003 and 2003/2004 used the same questionnaire and were subsequently pooled. Four target groups were determined for analysis: (1) persons aged > or = 60; (2) people working in the medical field; (3) persons suffering from chronic illness; and (4) a group composed of persons aged > or = 60 or working in the medical field or suffering from a chronic illness.

The overall sample consisted of 4,011 people. The influenza vaccination coverage rate in Germany increased from 22.3% in 2002/2003 to 25.1% in 2003/2004. This increase is not significant. The most frequent reasons for being vaccinated given by vaccinated clients were: influenza considered to be a serious illness, that people wanted to avoid influenza (90.1%), having received advice from the family doctor or nurse to be vaccinated (71.3%), and not wanting to infect family and friends (70.4%). Reasons for not being vaccinated mentioned by people who have never been vaccinated were: thinking about it, however, not being vaccinated in the end (47.7%), not expecting to catch influenza (43.6%), and not having received a recommendation from their family doctor to be vaccinated (36.6%). Options encouraging influenza vaccination are recommendations by the family doctor or nurses (66.6%), more available information on the vaccine regarding efficacy and tolerance (54.2%), and more information available about the disease (52.4%).[78]

Justification

The risk of influenza is very serious as a cause of morbidity and mortality, especially if it comes in an epidemic as it happened at the beginning of the last century where this could be repeated unless faced by wise protection through the use of the recommended vaccine which is efficacious in those vulnerable to be affected, and where diabetic patients came on the top of the list.

Diabetes emerges as an enormous healthcare dilemma all over the world and is growing day by day, especially in the Gulf area and far Southeast. In Asia, vaccination for this sector of patients is an inevitable demand. Hence the budget for the management of seasonal flu is much needed considering morbidity, mortality, and sick leave days in comparison with vaccination which was proved in many studies to give a hope of better immunity and control of the disease at a lower cost.

Where the precious role of the HCP is to forward the idea of vaccination for a better life without flu and its complications by spreading knowledge and health education to all clients, especially diabetic patients.

Study Objectives

General Objectives
Assess the patients' knowledge and practice of taking the annual influenza vaccine among adult diabetic patients in BDF hospital.

Specific Objectives
To measure the knowledge gained throughout diabetic education.
To evaluate the factors that affect taking the annual influenza vaccine.

Methodology

Study Design
Descriptive cross sectional hospital-based study.

Study Area
BDF Hospital, a PHC-out patient clinic in The Kingdom of Bahrain, the hospital is serving a definitive population with specific criteria with insurance and gives holistic primary, secondary, and tertiary care levels all working in coordination to deliver maximum care for the sponsors.

Study Population
All diabetic patients who attended the outpatient clinic in BDF Hospital.

Study Sample
All diabetic patients who came to the GP clinics during the period of the research.

Sampling
Total coverage samples of patients who agree to be included in the study.

Sample Size
It was calculated according to the standard formula
N = Z2 (PQ) x2
D2
N= sample size
Z= critical value
P= proportion of the problem
D= degree of perception.
The sample size is 300 participants.

Data Collection
Patients were interviewed by a standardized questionnaire.

Inclusion criteria
- Diabetic patients who are willing to be enrolled in the research
- Adult patients of 20-60 years age range.
- Patients who are mentally normal, not seriously ill patients.

Exclusion criteria
Diabetic patients who are severely ill
Those less than 20 or more than 60 years old
Mentally retarded or with psychiatric illness
Ddiabetic patients who refused the interview

Data Analysis
The data analysis was done by using the SPSS program.

Results

After analyzing the data collected, where three hundred diabetic patients were interviewed about the knowledge and practice of taking the influenza vaccine and the findings were as follows:

Figure 1: Sex distribution: Females constitute 52% and males were 48%

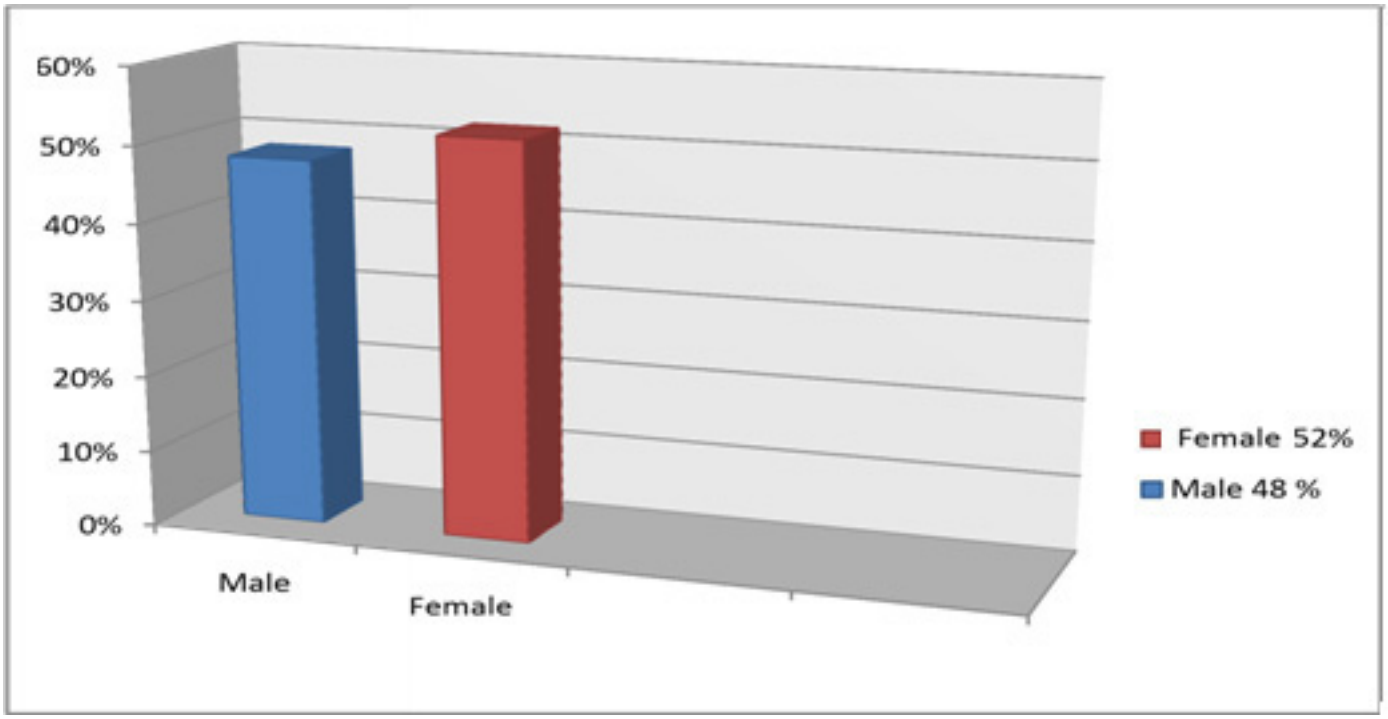

Figure 2: the distribution of the study population according to the duration of being diabetic

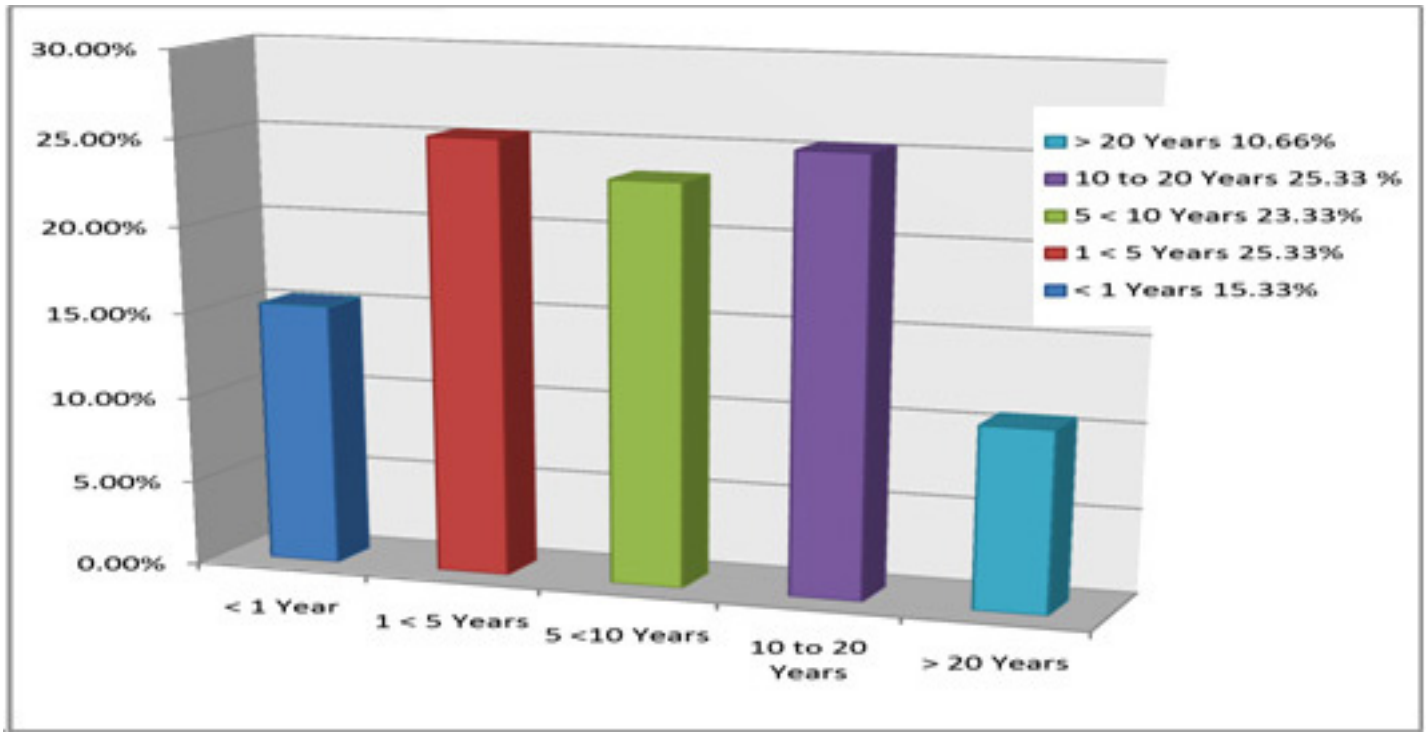

Figure 3: the distribution of the population of the study according to regular follow up

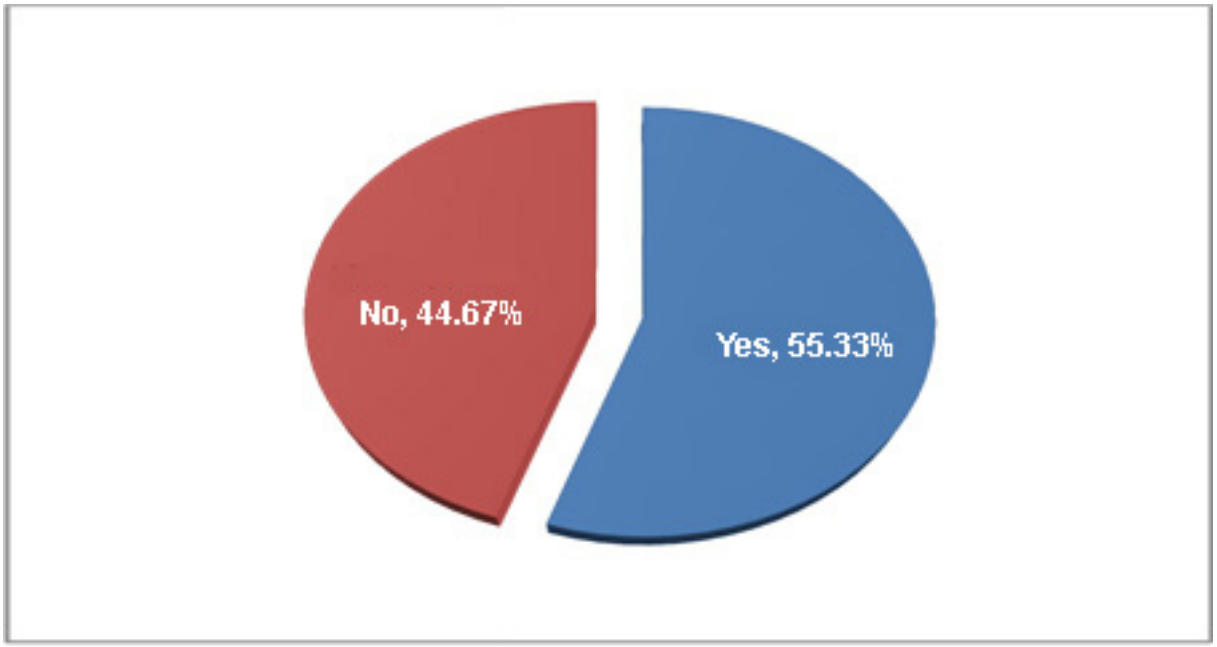

Figure 4: the distribution of the population of the study according to Place where follow up occurs

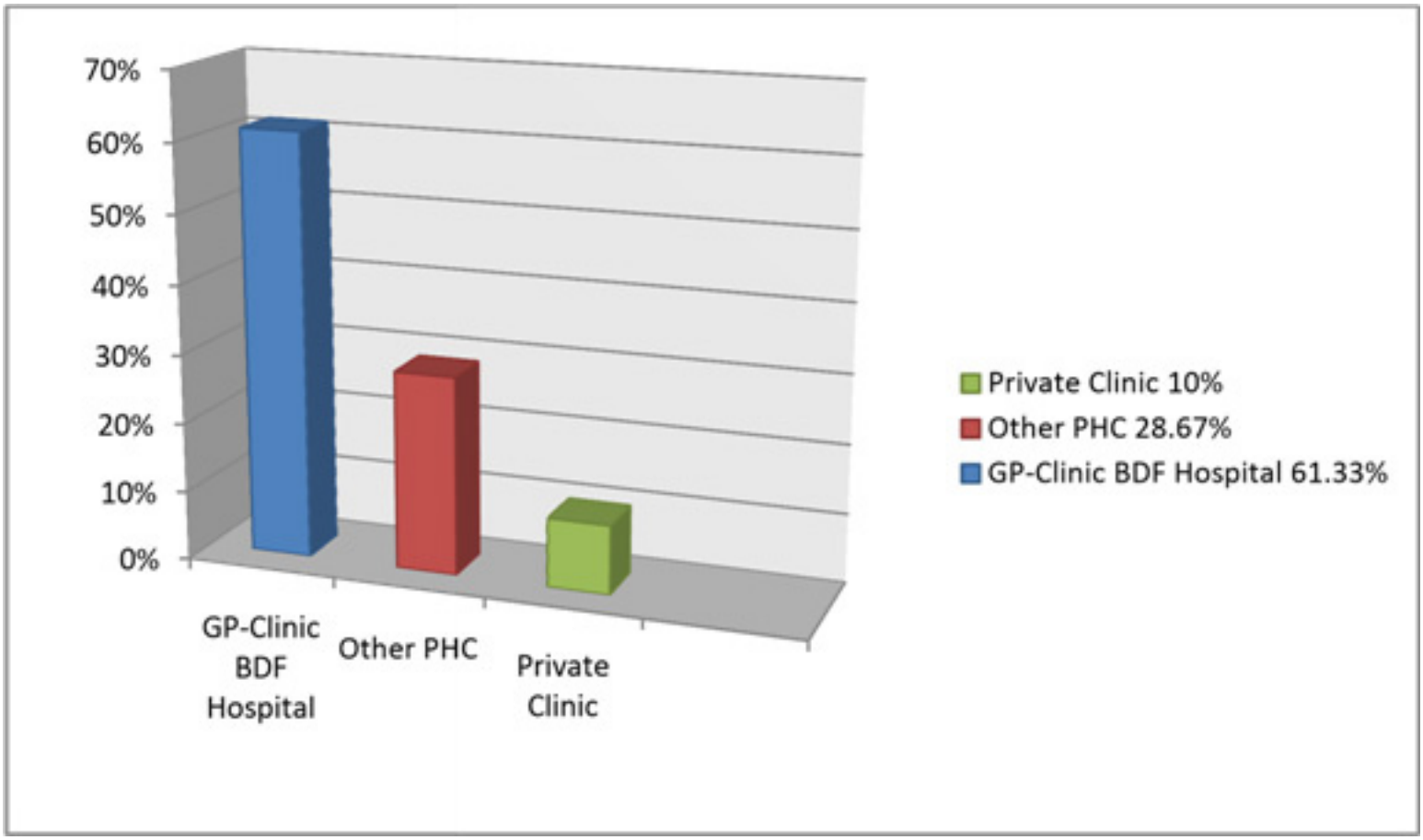

Figure 5: Shows the distribution of the population of the study according to Influenza Vaccine Awareness or if they have heard about the vaccine

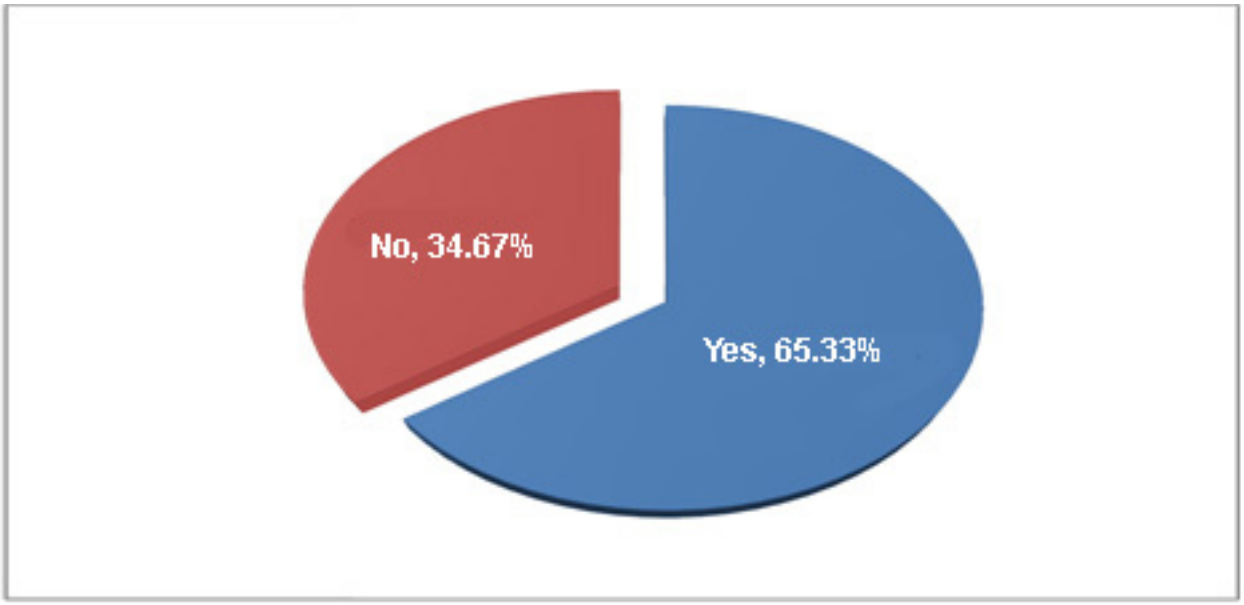

Figure 6: the distribution of the population of the study according to the source of Influenza Vaccine Awareness

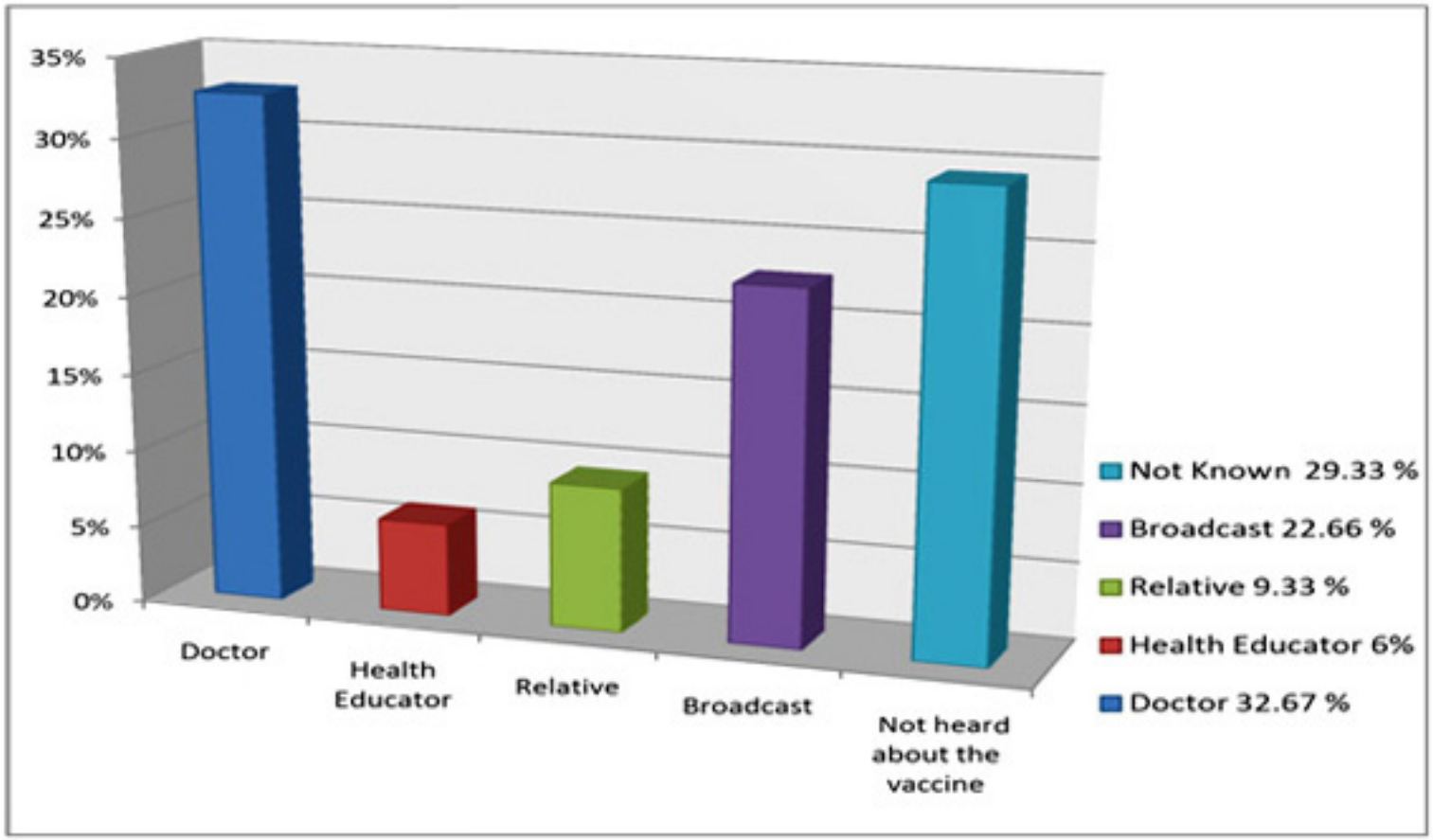

Figure 7: the distribution of the population of the study according to being advised to take the Influenza

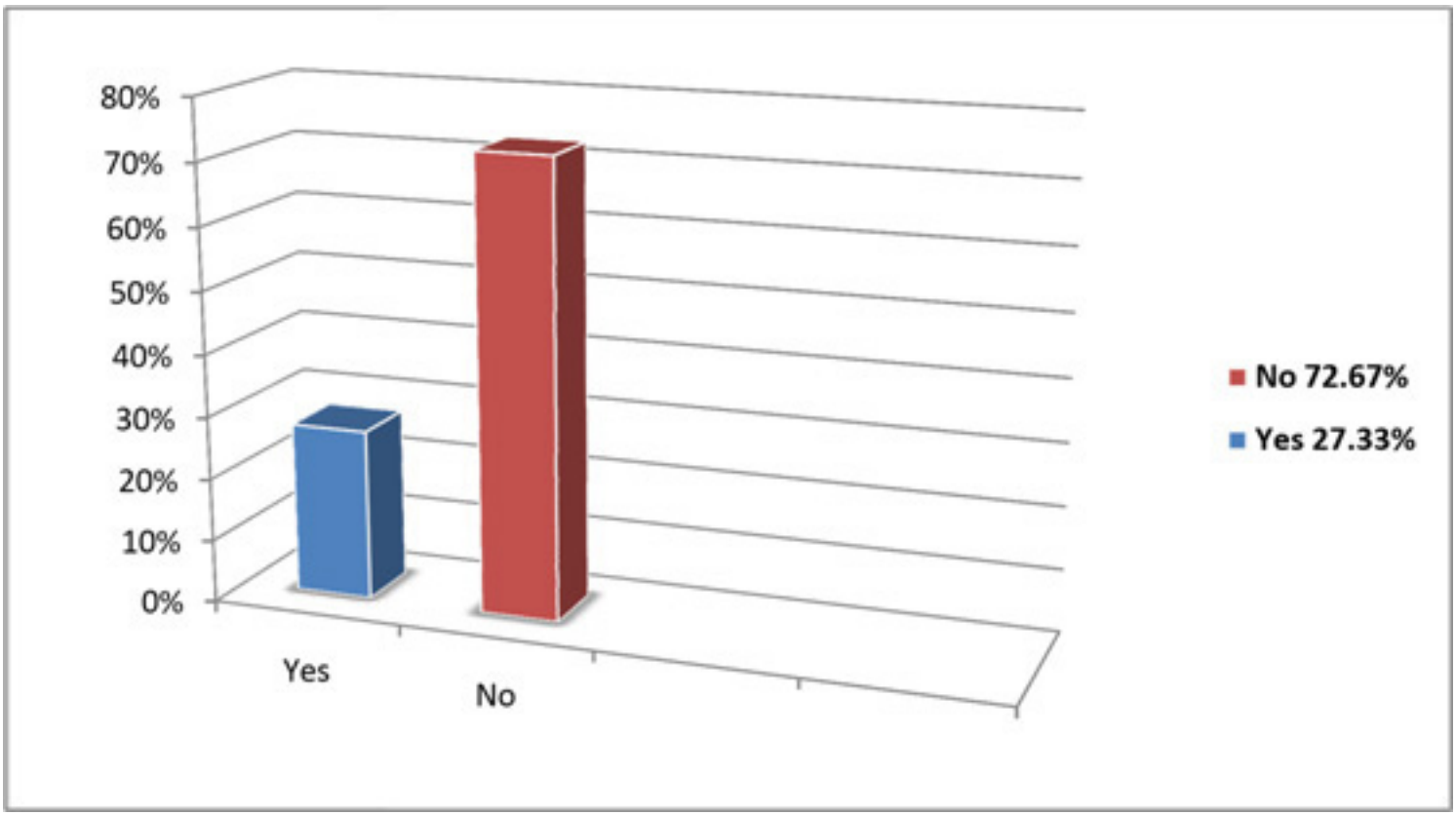

Figure 8: the distribution of the population of the study according to the last time of taking Influenza Vaccine

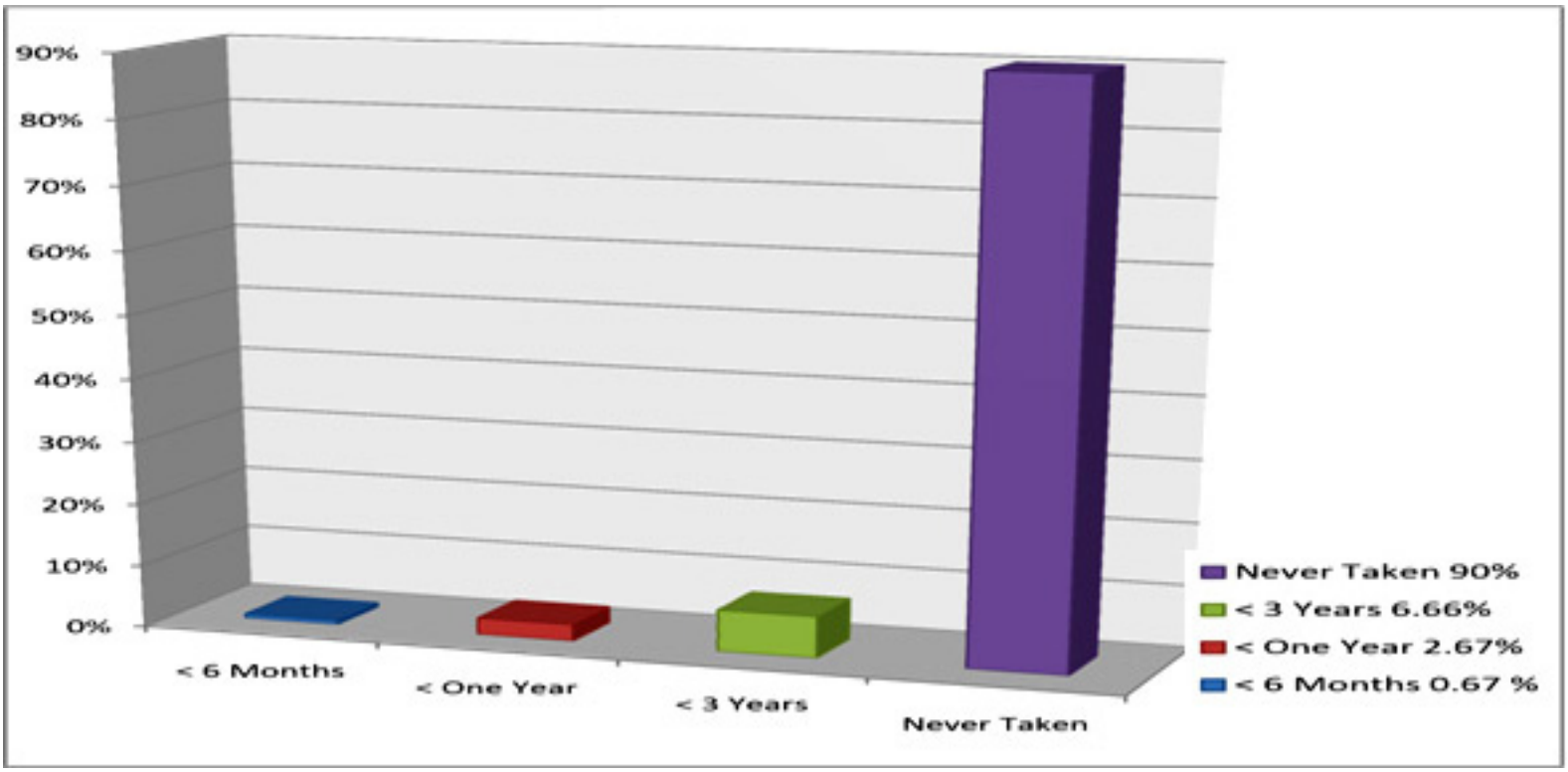

Figure 9: the distribution of the population of the study according to the benefit of taking the Influenza Vaccine

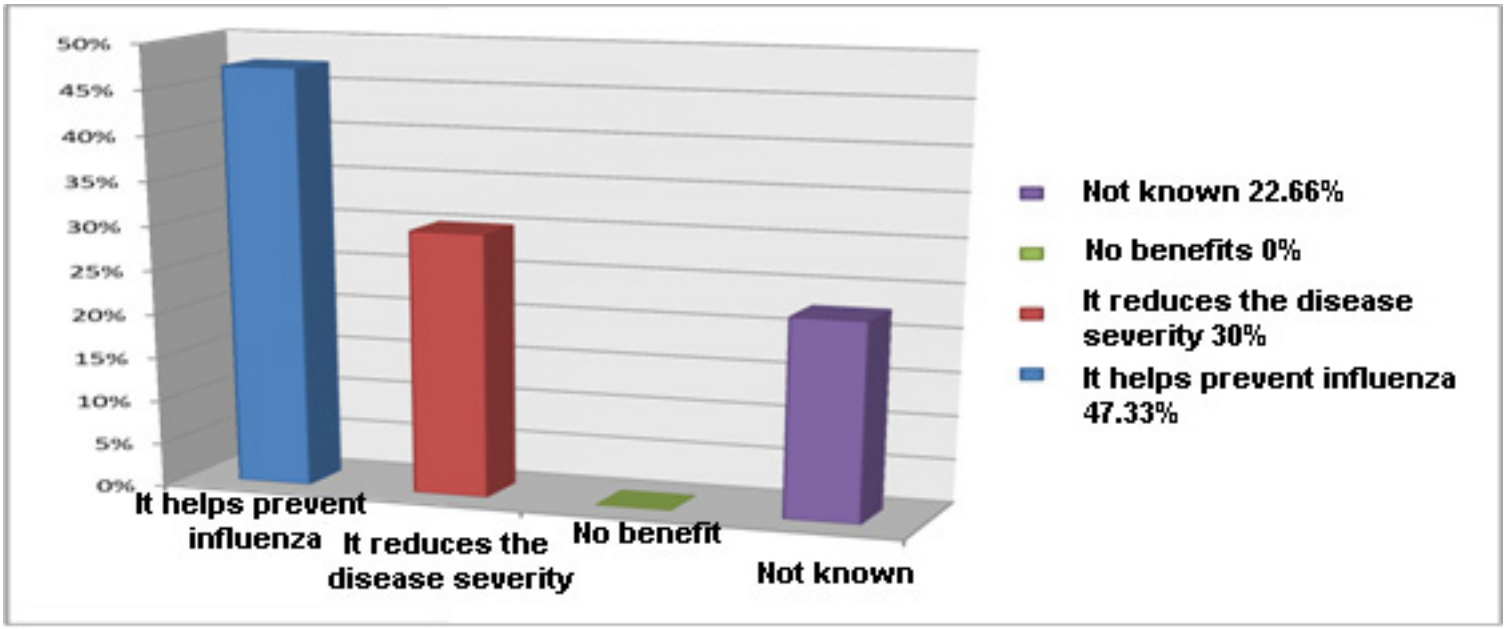

Figure 10: the distribution of the population of the study according to how frequently they take Influenza Vaccine.

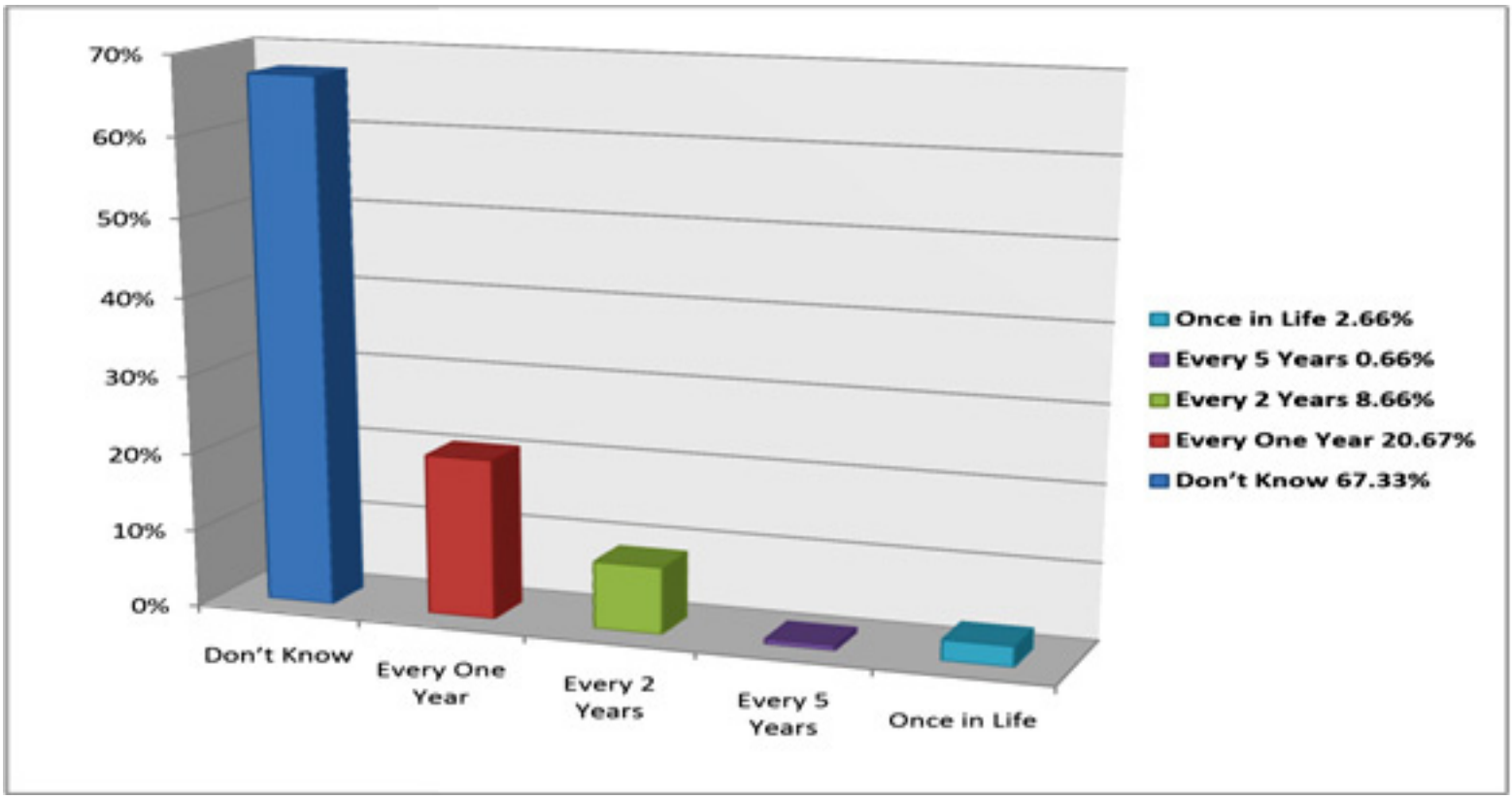

Figure 11: distribution of the population of the study according to Influenza Vaccine optimum time.

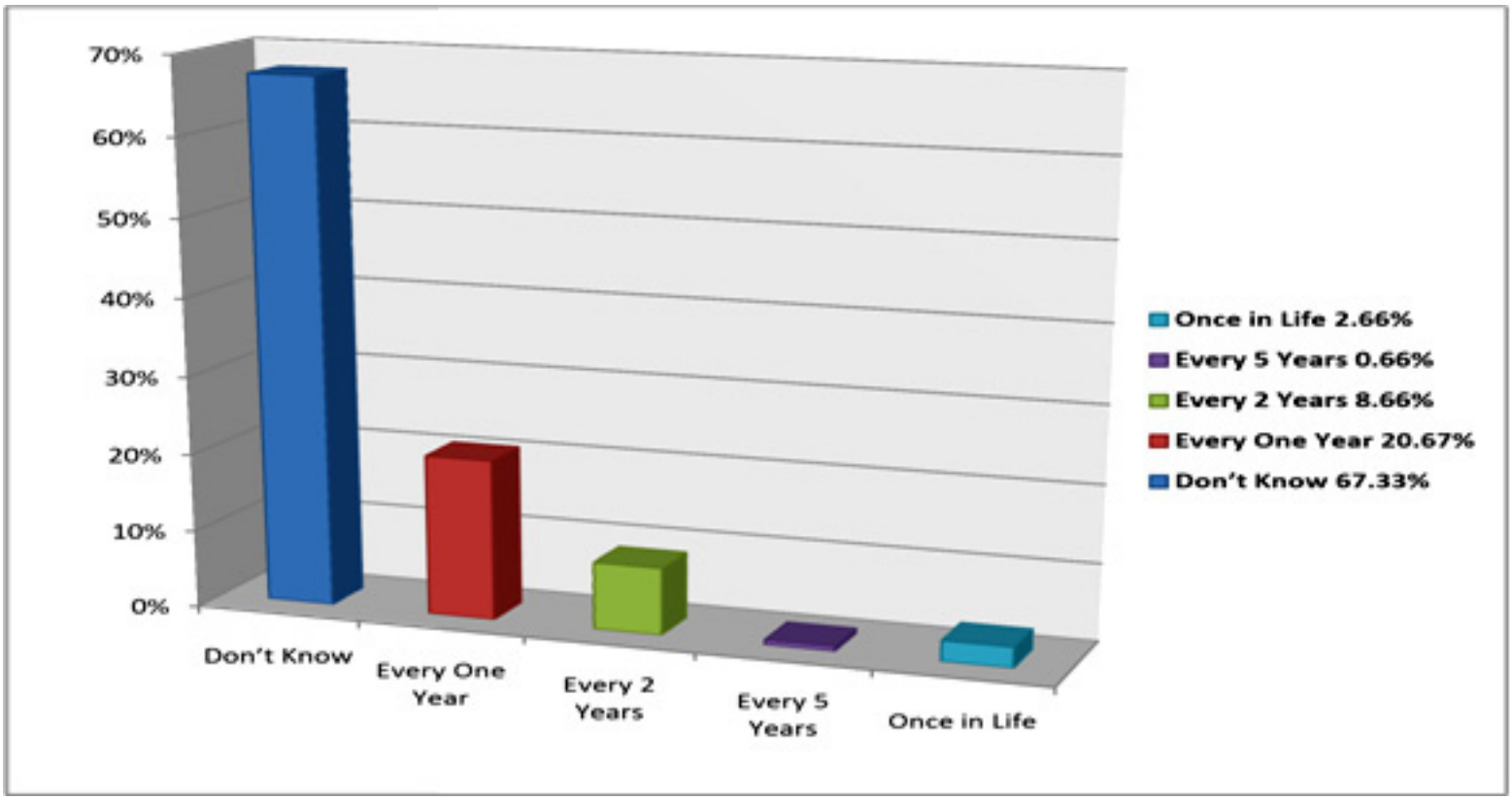

Figure 12: distribution of the population of the study according to the route of taking the Influenza Vaccine

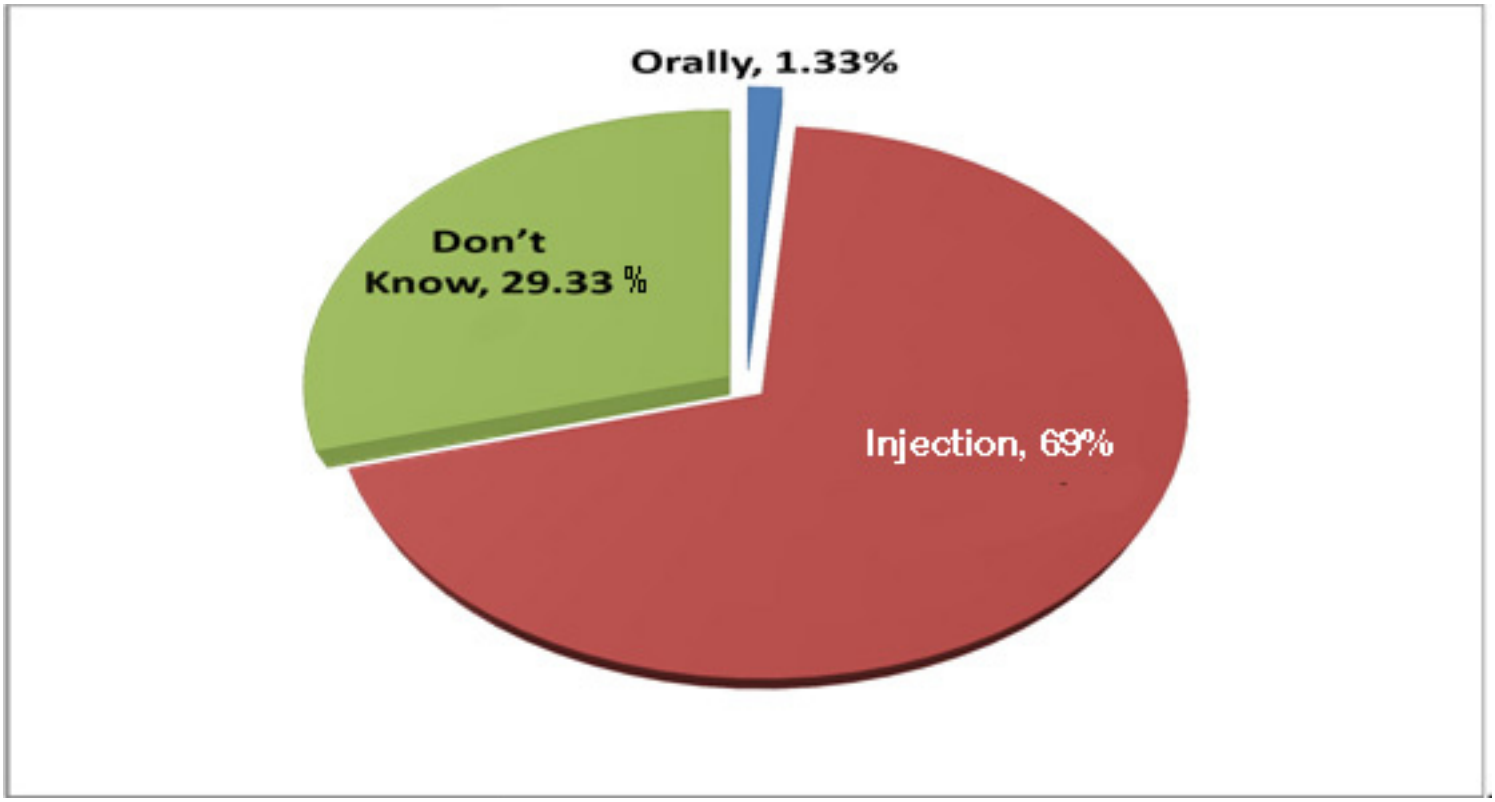

Figure 13: distribution of the population of the study according to reasons why not taking the Influenza Vaccine

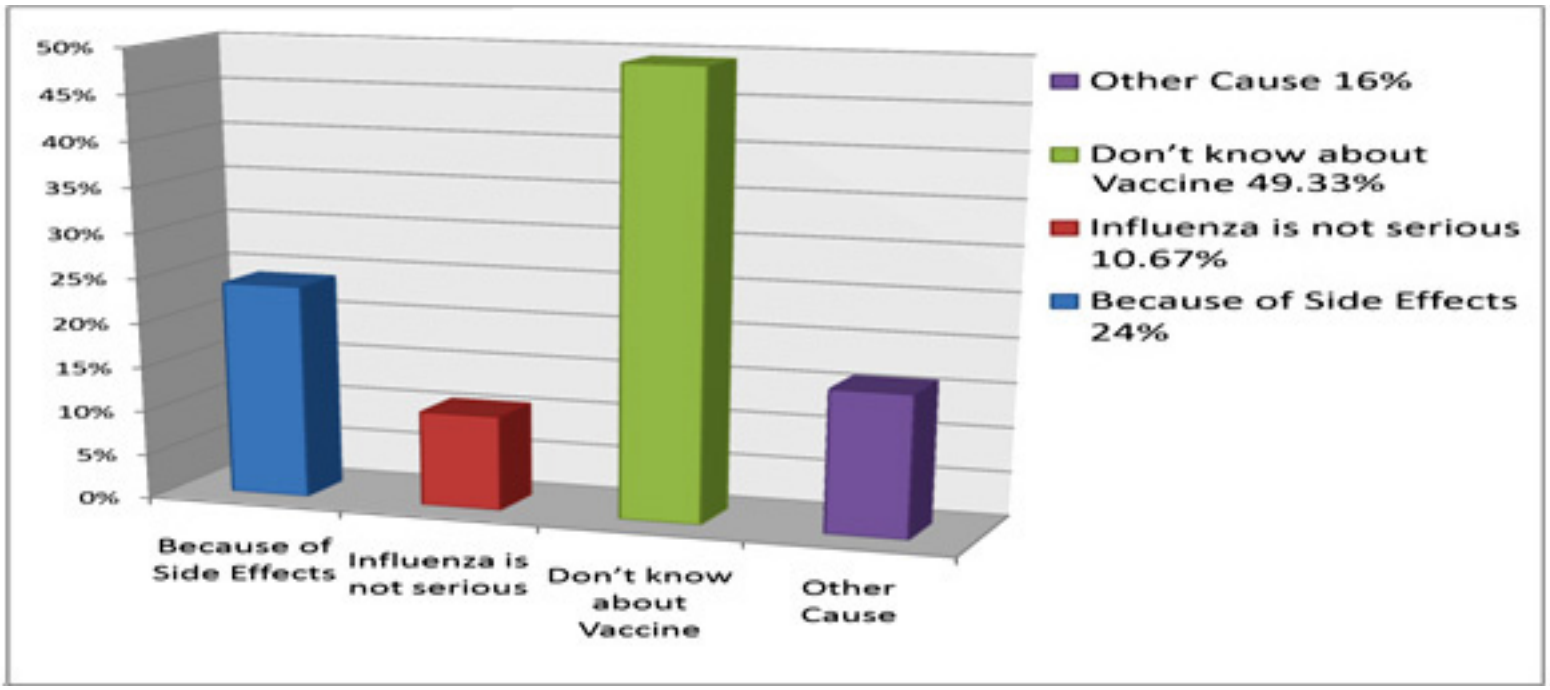

Table 1: distribution of the population of the study according to age.

Patient Age	Frequency	Percent	Valid Percent	Cumulative Percent
20-35	22	7.3	7.3	7.3
36-50	96	32	32	39.3
51-60	182	60.7	60.7	53.4
Total	300	100	100	100

Table 2 distribution of the population of the study according to the Level of Education.

Education	Frequency	Percent	Valid Percent	Cumulative Percent
HIGHER SEC	134	44.7	44.7	44.7
ILLITERATE	8	2.7	2.7	47.3
INTERMED	32	10.7	10.7	58
PRIMARY	46	15.3	15.3	73.3
UNIVERSITY	80	26.6	26.6	76.6
Total	300	100	100	300

Table 3: distribution of the population of the study according to doing follow up for Diabetes.

Follow Up	Frequency	Percent	Valid Percent	Cumulative Percent
NO	14	4.7	4.7	4.7
YES	286	95.3	95.3	95.3
Total	300	100	100	100

Table 5: distribution of the population of the study according to the relation between the duration of DM against advice to take the flu vaccine

Duration of DM	Advice		Total
	NO	YES	
1-5 Years	30	36	66
10-20 Years	57	0	57
20-30 Years	18	0	18
5-10 Years	80	0	80
< 1 Year	0	46	46
>20	22	0	22
>20	11	0	11
Total	**218**	**82**	**300**

a. 2 cells (14.3%) have an expected count of less than 5. The minimum expected count is 3.01.

Chi-Square Tests

	Value	df	Asymp. Sig. (2 sided)
Pearson Chi-square	217.614[a]	6	.000
Chi-square Likelihood Ratio	260.978	6	.000
No. of Valid Cases	300		

Table 6: distribution of the population of the study according to the relation between sexes against advice to take the flu vaccine

Count	Advice		Total
	NO	YES	
Female	156	0	156
Male	62	82	144
Total	**218**	**82**	**300**

Table 7: distribution of the population of the study according to the frequency of flu illness against the last vaccination

Count of frequency of flu illness	Last vaccination				Total
	1	2	3	4	
1	2	8	20	58	**88**
2	0	0	0	102	**102**
3	0	0	0	84	**84**
4	0	0	0	26	**26**
10	**2**	**8**	**20**	**270**	**300**

a. 9 cells (56.3%) have an expected count of less than 5. The minimum expected count is .17

Chi-Square Tests

	Value	df	Asymp. Sig. (2 sided)
Pearson Chi-square	80.303[a]	9	.000
Chi-square Likelihood Ratio	82.122	9	.000
N of Valid Cases	300		

Table 8: distribution of the population of the study according to the relation between the level of education against awareness or if they have heard about the flu vaccine

	N	Percent	N	Percent	N	Percent
Education Awareness	300	100	0	0	300	100

a. 1 cells (10.0%) have an expected count of less than 5. The minimum expected count is 2.77.

Chi-Square Tests

	Value	df	Asymp. Sig. (2 sided)
Pearson Chi-square	213.013[a]	4	.000
Likelihood Ratio	261.246	4	.000
No. of Valid Cases	300		

Table 9: the distribution of the population of the study according to the relation between awareness sources about flu vaccine against the optimum time for vaccination

Awareness source * Time of vaccination	300	100.0 %	0	.0%	300	100.0%

a. 12 cells (60.0%) have an expected count of less than 5. The minimum expected count is .12.

Chi-Square Tests

	Value	df	Asymp. Sig. (2 sided)
Pearson Chi-square	100.664[a]	12	.000
Likelihood Ratio	109.128	12	.000
No. of Valid Cases	300		

Discussion

Professional healthcare organizations must activate internal policies and provide educational and informational resources to support seasonal influenza immunization programs in general and for diabetic patients as an urgent need due to the rising number of diabetic patients.

Concerning the results propounded from our study, though 65.3% were aware and had heard about the flu vaccine only 10% were vaccinated which is among the lowest in the literature as shown in a study done in Singapore where those vaccinated were 30.6%, and another study done in three Middle East countries namely United Arab Emirates (UAE), Kuwait and Oman also show vaccination rate in Kuwait (67.2%), 46.4% in Oman and 24.7% in UAE. Also, there was a similar result to our study done in Slovakia concerning both populations having a good knowledge and awareness about the flu vaccine, but only 10% and 25% of the populations respectively take the seasonal flu shots. Also, another result propounded from our study is that most of the knowledge or awareness about the vaccine is from doctors 32, 6% and secondly from mass media 22.6%, where there should be a role for the health educators, which is deficient.

Hence the doctors leading a busy clinic find it difficult to cover education and advice for patients to be vaccinated against the flu in most occasions, where there is a major role for the health educators to give the message and follow the response aiming at the target in the global recommendations.

Even though the response rate was good the study has some limitations with respect to that the questionnaire assessed self-reported vaccination rate and are not based on chart review which may resulted in a biased, over-reported vaccination rate.

Conclusion

The purpose of this study was to describe the knowledge and practice of taking seasonal flu vaccine among diabetic patients where the study population was taken as a sample. Our study results show clearly that neither the knowledge nor the practice of taking the seasonal flu vaccine is enough to reduce the risk of morbidity and mortality encountered by influenza.

In our study the practice of taking the vaccine constitutes the lowest rate compared with other studies in the literature.

Recommendations

- It is recommended to enhance the knowledge about influenza vaccine esp., among diabetic patients who constitute of more than 20% of the population in Bahrain and almost the same percentage in the Gulf according to their huge number vaccination will lower the risk of a pandemic flu illness or at least the rate of the incidence of the disease will be reduced significantly.
- Targeting the CDC recommendations regulatory bodies must increase the awareness about flu vaccination by the use of the mass media, preparing training courses, educational programs, and vaccination campaigns about Flu vaccination, and activating the protocol for its usage in all the PHC centers.
- To introduce the knowledge about Flu in the schedule of the elementary and secondary level of education which should be supervised by the school health system with an important role for health educators.
- To increase diabetic patients' compliance with influenza vaccination, diabetic clinics and healthcare facilities should implement appropriate follow-up and reminder systems which would be
successful and supposedly have a positive effect on increasing the rate of flu vaccinations.
- Also, it is mandatory, for family physicians, health educators, and PHW to provide education about this vaccine an important part of their daily practice.
- The idea of fixed or one vaccination for both hemispheres will be promising as it will aid international efforts and give more knowledge, confidence, and compliance to clients towards the flu vaccine

Dedication
I would like generously to give my dedication to those who have suffered with me all over the past years, Before Birth and since childhood, my beloved parents, and siblings.

And for my wife, 'who stands beside me, and supports me with all her love to complete this project in an honorable view.

My thanks extend to all those who devote themselves seek a new life full of pleasure and health.

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30 million outpatient visits, resulting in direct medical costs of $10 billion annually. Lost earnings due to illness and loss of life added over $15 billion in direct costs annually and the average of all direct and indirect economic burdens of annual influenza epidemics (funeral expenses, lost productivity, etc.) amounts to over $80 billion.
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Appendix

Questionnare for Diabetic Patients about Knowledge and Practice of Taking the Influenza Vaccine

1. AGE: > 20 YEARS ( ) > 35 YEARS ( ) > 50 YEARS( )
2. SEX: MALE( ) FEMALE( )
3. LEVEL OF EDUCATION:

ILLITERATE ( ) PRIMARY SCHOOL ( ) INTERMEDIATE ( ) HIGHER SECONDARY SCHOOL ( ) UNIVERSITY AND POSTGRADUATE ( )

4. DURATION OF BEING A DIABETIC:

< 1 YEAR ( ) < 5 YEARS ( )<10 YEAR ( )
10 TO 20 YEARS ( )> 20 YEARS ( )

5. ARE YOU DOING F.U. FOR DIABETES? YES( ) NO ( )
6. IS IT A REGULAR F.U? YES( ) NO ( )
7. WHERE ARE YOU DOING F.U. FOR DIABETES?

GP-CLINIC BDFHOSPITAL ( ) OTHER PHC ( ) PRIVATE CLINIC ( )

8. DID YOU HEAR ABOUT THE INFLUENZA VACCINE?

YES ( ) NO( )

9. FROM WHERE DID YOU HEAR ABOUT THE INFLUENZA VACCINE?

DOCTOR ( ) HEALTH EDUCATOR ( )
RELATIVE ( ) BROADCAST ( ) NOT HEAR ABOUT THE VACCINE ( )

10. DID ANYONE ADVISE YOU TO TAKE AN INFLUENZA VACCINE SINCE YOU BECAME DIABETIC? YES ( ) NO ( )
11. WHAT IS THE LAST TIME YOU TAKE INFLUENZA VACCINE?

<6 MONTHS ( )< ONE YEAR ( )< 3 YEAR ( ) NEVER TAKE IT ( )

12. WHAT DO YOU THINK IS THE BENEFIT OF TAKING THE INFLUENZA VACCINE?

IT HELP PREVENT INFLUENZA ( ) IT REDUSE THE DISEASE SEVERITY ( ) NO BENEFIT ( ) not known to me ( )

13. DO YOU KNOW HOW FREQUENTLY YOU HAVE TO TAKE THE SEASONAL INFLUENZA VACCINE?

Do not know ( ) EVERY ONE YEAR ( ) EVERY 2 YEARS ( ) EVERY 5 YEARS ( ) ONCE IN LIFE ( )

14. YOU HAVE TO TAKE THE INFLUENZA VACCINE ON: OCTOBER ( ) APRIL ( ) JUNE ( ) DO NOT KNOW ( )
15. INFLUENZA VACCINE IS TO BE TAKEN:

ORALLY ( ) INJECTION ( ) DO NOT KNOW ( )

16. HOW MANY TIMES HAVE YOU GOTTEN INFLUENZA-LIKE DISEASE DURING THE LAST YEAR?

ONCE ( ) 2- 3 TIMES ( )> 3TIMES ( ) DID NOT GET FLU ON THE LAST EAR ( )

17. IF YOU DID NOT TAKE THE INFLUENZA VACCINE, WHAT IS THE REASON FOR NOT TAKING IT? BECAUSE OF SIDE EFFECTS ( ) INFLUENZA IS NOT SERIOUS ( ) YOU DID NOT KNOW ABOUT THIS VACCINE ( ) OTHER CAUSE ( )