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RESEARCH ARTICLE

KNOWLEDGE ATTITUDE AND BARRIERS ABOUT TAKING FLU VACCINE AMONG ELDERLY DIABETIC PATIENTS IN CLUSTER ONE IN RIYADH CITY: A CROSS SECTIONAL STUDY

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Abstract

Introduction: The patients at high risk of severe effects of the seasonal influenza affecting the patients with diabetes mellitus are elderly patients. Though the Saudi Ministry of Health has been making efforts to avail free vaccinations by restructured health clusters, there is still poor uptake. The particular socio demographic factors and psychological obstacles should be understood in order to enhance the rate of immunization in the context of the Riyadh Health Cluster One.

Objective: The purpose of the study was to evaluate the levels of knowledge and attitude and barriers to the seasonal influenza vaccine among elderly diabetic patients in Riyadh City and to determine the demographic variables that affect the use of the vaccine and its perception.

Method: The study involved 300 older diabetics (not less than 60 years) of primary care centers and special clinics in Riyadh Cluster One. A structured questionnaire was used to collect data in terms of demographic profiles, history of vaccination, knowledge about the vaccine, attitude toward its safety/efficacy, and perceived barriers. The data were subjected to Chi-square tests in SPSS version 29.0 where Pearson Chi-square tests were used to test the association between categorical demographic factors (Age, Gender, Education, Employment, and Marital Status) and the outcome of the vaccination.

Conclusion: The association between socio-demographic factors and the use of influenza vaccination among old diabetics in Riyadh is also significant. Although the free services offered by the Health Cluster focus mostly on the logistical access, the psychological barriers, specifically the safety factors and insufficient clinical knowledge, are still the most prevalent.

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The shift in the interventions of the sphere of public health should be conducted in the direction of the personalized education-based outreach that would be focused on the fears specific to the gender and the reliance on the social/family and support systems to enhance the rate of immunization.

Introduction:-

The increasing prevalence of chronic illnesses in the world has changed the emphasis of contemporary medicine towards preventive care especially to the vulnerable groups. One of the most important challenges to the 21 st century public health is Diabetes Mellitus (DM). The rates of diabetes in the Kingdom of Saudi Arabia (KSA) are among the highest in the world, and current statistics point to almost one-quarter of adults in the nation having the condition. In the case of the elderly, i.e. individuals of 60 years and above, the combination of diabetes and age produces a condition of immunological vulnerability. The group is highly vulnerable to infectious illnesses, the main of which is seasonal influenza.

An influenza is commonly treated by the common people as a self-limiting respiratory illness. But in the case of an elderly patient having diabetes, the stakes in the physiological sense are much greater. Diabetes may affect the immune system so that the body may not fight off the viral infections. Moreover, the systemic stress of a flu infection may cause the development of serious glycemic instability, which may trigger the development of such complications as diabetic ketoacidosis (DKA) or hyperosmolar hyperglycemic state (HHS). The statistics have always demonstrated a higher risk of hospitalization and mortality among diabetic patients during the period of flu in comparison to healthy persons by six folds. Therefore, annual vaccination against influenza is one of the most cost-effective and crucial interventions of that high-risk group, according to the definitions of the World Health Organization (WHO) and the Saudi Ministry of Health (MOH).

Although the need of the vaccine seems to be evident medically, and the Saudi government offers free vaccinations in primary healthcare facilities, the actual response to the flu vaccine is still not optimal. As applied to Riyadh City and the Cluster one in particular, a gap in the supply of the vaccine and the immunization of the elderly is observable. Cluster One is a high-risk area of the Riyadh health care system, which covers a high population with a unique socioeconomic status. To comprehend the reason why a diabetic patient living in the area will either accept or reject the vaccine, one must go into the depths of their Knowledge, Attitudes, and perceived Barriers.

The health-seeking behavior is based on knowledge. Most of the elderly patients have some form of misconception about the purpose of the vaccine, as they tend to think that the vaccine is some sort of a lifelong solution to the flu or they do not know that the virus is constantly evolving, and they need to get the dose at least once in a year. Attitude, conversely, is inspired by cultural beliefs and personal experiences. The fear of side effects or the ironic idea that the vaccine itself causes flu: a myth prevalent among the Saudi community in most cases leads to the creation of vaccine hesitancy.

Moreover, vaccination barriers are not necessarily logistical. Although the clinics are available in Cluster One, the obstacles tend to be psychological or communicative. Probably one of the most common problems in the Saudi context is that of missed opportunity, as a patient with diabetes comes to a clinic with a check-up of glucose, and the healthcare specialist does not prescribe the influenza vaccination. This underscores the failure of integrated care. The proposed cross-sectional research will fill these gaps in information in Riyadh. With the help of the analysis of the present level of knowledge and the particular challenges that elderly diabetics encounter, we will be in a position to give data-supported information to the representatives of the population health. It is hoped that they can break the barrier of mere awareness and proceed to actionable education where the elderly population of Riyadh will not just be aware of the vaccine but be empowered and motivated to take the vaccine. Denying the existence of these barriers is not just a clinical protocol issue, but it is an essential aspect of lessening the morbidity and mortality rate of our most prized and vulnerable citizens.

Research Problem:-

Elderly people are at a great risk due to the health problem of influenza, especially in the presence of chronic diseases like diabetes. The susceptibility of diabetics to influenza complications of severe type, such as pneumonia, hospitalization, and even death, is made by the weakened immune system of patients. Although there is an access to the influenza vaccine that has been proven to be effective in the prevention of these negative consequences, there is still poor vaccine uptake among elderly diabetic populations. The lack of awareness of the significance of flu vaccination, false beliefs about its safety and effectiveness and absence of individualized health education campaigns are the major contributors to this gap. The problem is also especially topical in terms of Cluster One of the Riyadh City where healthcare services are available, but the vaccination rates are still lower than the

recommended level, which underlines the necessity to employ a specific strategy to raise awareness and levels of uptake.

The background of the present awareness and the elements that can affect the level of vaccination among elderly diabetic patients in Cluster One is crucial to the creation of effective interventions. Unless this gap is bridged, a considerable part of this vulnerable segment of the population is still at risk of preventable health complications, causing more burden to the healthcare system. The study is expected to determine knowledge, attitudes, and practices of elderly diabetic patients in Cluster One, Riyadh City about the flu vaccine. The results will be useful in suggesting the design and program of the public health to enhance the rate of vaccination and, eventually, to reduce the morbidity and mortality rates of this vulnerable group due to influenza.

Rationale:-

The elderly who have diabetes face an increased risk of potentially dangerous complications of the influenza virus because of their low immune reaction and concomitant morbidity. The most effective and cost efficient measure to reduce the effects of these risks is vaccination which, however, is not used optimally in most areas, including Cluster One of the Riyadh City. It is essential to consider the underlying factors that affect the level of awareness and attitudes among this particular population towards flu vaccination in order to develop custom-made interventions in the field of public health. This study has the potential to deliver practical knowledge to close the gap between vaccine accessibility and usage by identifying the knowledge gaps, cultural beliefs, and systemic obstacles affecting vaccine acceptance.

The results of the current study will not only add to the existing research covering the discipline of vaccine awareness among the elderly diabetic population, but will also have a direct effect on the health policy within the population of Riyadh City and the rest of the country. Specific education campaigns and healthcare provider interventions based on the study findings would be valuable to increase vaccine coverage to raise the health outcomes of this vulnerable group. Moreover, the study can be used as an example in other areas, which eventually will help the entire world to achieve better results in terms of coverage of influenza vaccines and prevention of preventable complications among the groups of people at high risk.

Objective of Study:-

The main objective of the study was to assess the level of awareness and factors influencing flu vaccine uptake among elderly diabetic patients in Cluster One, Riyadh City. The study shall also evaluated the knowledge and perceptions of elderly diabetic patients regarding the benefits and safety of the flu vaccine; and identify barriers and facilitators influencing flu vaccine uptake among this population.

Review of Literature:-

The literature review of the period 2020-26 documents the existing gap in influenza vaccination levels among high-risk populations in Saudi Arabia, despite the comprehensive government-based awareness programs. According to the recent evidences given by Alnezary et al. (2026) and Almutairi et al. (2025), vaccine hesitancy is a well-deserving challenge, but it is rather caused by the perceived barriers, as opposed to the absence of awareness on the benefits of receiving the vaccine. According to a large multi-centre study carried out in Saudi Arabia by Bazaid et al. (2025) researchers established that though more than 80% of diabetic patients were aware of the purpose of the vaccine, the size of the current season vaccination was only between 34.8 percent, which the researchers explained by deep-seated safety concerns and a lack of direct physician recommendations. It is similar to the research of Abu-Helalah et al. (2025), who used the Health Belief Model (HBM) to demonstrate that the susceptibility and severity of the cases are not perceived by the patients, as they are chronic in the Middle East. The topography is also complicated by regional differences within the Kingdom. A web-based survey conducted by Alenezi et al. (2023) emphasized that the uptake rates in the Central Region (including Riyadh) were lower than in Southern and Western regions, and patients aged 55 years and above were much less likely to vaccinate than younger adults. In the same vein, Alghalyini et al. (2023) found that the presence of the obstacle of misconception-based barriers: the belief in vaccine-induced flu is still present and impedes its uptake in urban centers. Al-Mousa et al. (2021) gave a coverage of 61% of Type 2 diabetics in Southwestern Saudi Arabia but said that only a nonadherence to the knowledge of the annual mutation of the virus (OR = 4.31) was a dominant predictor of non-vaccination. The issue of healthcare providers is referenced in nearly every recent piece of literature as the most crucial determinant. Asiri et al. (2025) discovered that in Riyadh 78.7 percent of motivated vaccinees mentioned the need to prevent complications as their primary motivation but did it after receiving explicit guidance by a clinician. On the other hand, Ahmed et al. (2023) and Mallhi et al. (2022) discovered that it is the simple fact that physicians do not mention the vaccine during

routine diabetic examinations that makes patients think that this is an optional service or that it is not necessary. Almansour et al. (2022) and Fayed et al. (2021) also supported the previous study that fear of side effects (73-75.9% in various groups of patients) is the most frequently reported barrier by the unvaccinated elderly patients. Expanding on the rationale, a systematic review by Zheng et al. (2024) and meta-analysis of high-risk populations in the area implied that in addition to raising overall awareness to the vaccine, the COVID-19 pandemic polarized the attitudes to safety, and the vaccine to seasonal flu attitude spillover. It is observed by Hwang et al. (2020) and Suryadevara et al. (2021) at the beginning of the decade that the socioeconomic factors, namely the literacy and income, establish a more complex and uneven terrain where higher-income people are sometimes more hesitant because of excessive dependence on unverified digital information. Lastly, Alhatim et al. (2022) and Abalkhail et al. (2020) research found that to address this issue, the healthcare clusters of Saudi Arabia, including Cluster One of Riyadh, should shift to integrated preventive care appointments as opposed to the general public service announcements.

Research Gap:-

Even though influenza is a severe health threat to diabetic populations, with free vaccines available at the Saudi Ministry of Health, there remains a significant gap in the research regarding the topic of the specified issue in the context of Cluster One in Riyadh City. Although there are general studies on vaccine hesitancy in Saudi Arabia, high-resolution data on this demographic group specifically aged among the elderly diabetic population is limited in this restructured health cluster system. Existing literature will often categorize any patients with chronic diseases as a universal group, and it does not single out the psychological and logistical challenges that older adults have to deal with as they take up the intricate glycemic management practices and preventive care. The available literature (2020-2024) has either based its studies on a large national sample or concentrated on the immediate post-pandemic period; thus, there is an urgent need to implement a cross-sectional study in 2025-2026, which will assess whether modern digital health literacy and the recent MOH awareness campaign effort have been effective in being translated into higher levels of uptake in this urban high-risk group. The proposed study will address this gap by offering a fine-grained examination of the knowledge gaps and socio-cultural barriers peculiar to elderly diabetics in the primary healthcare environment in Riyadh.

Research Methodology:-**Research Question:-****The research questions of the current study are:-**

- Q1. What is the extent of information about seasonal influenza vaccine amongst elderly diabetic patients in Cluster One, Riyadh?
- Q2. Do the demographic differences (e.g., gender, educational level, and duration of diabetes) serve as predictors of vaccine hesitancy or acceptability?
- Q3. Which are the most reliable sources of information among elderly diabetics in Riyadh on the subject of preventive healthcare?

Research Methodology:-**Study Design:-**

The proposed research was conducted in a cross-sectional research design to determine the level of awareness about flu vaccine among elderly diabetic patients at the Primary Care centers within Cluster One, Riyadh City. The structured questionnaires were used to collect data by administering them to the participants over the study process.

Study Setting and Population:-

The research was carried out in primary care facilities in the Cluster One of the Riyadh City. The target population was the aged diabetic patients aged 65 years and above who were enrolled in these healthcare centers. Participants should have had diabetes and been willing to give an informed consent, which was act as inclusion criteria.

The study excluded patients who were cognitively impaired or had an underlying serious illness that prevents them to participate.

Sample Size, and Sampling Method:-

The optimal sample size was calculated with the help of Openepi, an epidemiological calculator, through 18.5% influenza vaccine uptake of the participants of a similar study by Korani. The minimum sample size of 232 under 95 percent confidence interval and a margin of error of five percent was calculated, which was further adjusted to 300. A systematic random sampling technique was used to sample the participants in the diabetic registries of the healthcare centers.

Data Collection Tool:-

The information was collected through the use of a structured questionnaire that was designed and validated according to the previous research and professional consultation. The questionnaire was divided into sections that include demographic information, medical history, knowledge regarding flu vaccine, attitude towards vaccination, and perceived barriers or facilitators to vaccination.

Data Collection Tools:-

In this study, we collected information through face-to-face interviews conducted by professional study team members. The study's aims were explained to all prospective study participants, and they were required to sign and provide written informed consent before they were given the questionnaires.

Data Analysis Plan:-

All data from the study was entered, compiled and analyzed with the Statistical Package for the Social Sciences (SPSS) software program (Version 23.0, Armonk, NY: IBM Corp). Continuous variables were reported as the means and standard deviations, while categorical variables were reported as counts and percentages. Chi-square (χ^2) tests were used to assess any relationships and/or differences between two categorical variables. The p-value (statistical significance) was ≤ 0.05 .

Ethical Considerations:-**The research paper was carried out by adhering to the Declaration of Helsinki:-**

The study protocol was approved and reviewed by an IRB that had proper credentials. Participants were provided written documentation to emphasize confidentiality and voluntary participation. Personal identifiers were removed from the data to ensure anonymity and all data collected in the study was stored securely and used only for research purposes. This study was conducted among elderly adults (≥ 65 years of age) at primary health care centers in the Cluster 1 area of Riyadh City, with a total of 300 participants.

Data Analysis and Interpretation:-**Table 1: Association of Socio-Demographic Variables with Flu Vaccine Knowledge, Attitude & Barriers**

Variable (Common Outcome Item)	Age (χ^2 / p)	Gender (χ^2 / p)	Marital Status (χ^2 / p)	Education (χ^2 / p)	Employment (χ^2 / p)
DM medications	105.437 / .000	0.283 / .868	21.339 / .002	16.959 / .002	7.690 / .104
Ever vaccinated	41.817 / .014	10.197 / .001	14.330 / .002	11.780 / .003	5.553 / .062
Number of times vaccinated	203.158 / .425	14.098 / .169	23.025 / .814	26.861 / .139	16.665 / .675
Knowledge of free vaccine	49.965 / .001	4.232 / .040	22.993 / .000	29.801 / .000	10.715 / .005
Vaccine prevents flu	47.701 / .003	1.515 / .218	2.312 / .510	20.940 / .000	28.080 / .000
Suitable for elderly diabetics	41.918 / .013	0.242 / .622	5.039 / .169	9.301 / .010	16.331 / .000
Prevent serious complications	40.966 / .017	3.899 / .048	19.098 / .000	15.706 / .000	20.910 / .000
Yearly vaccination important	37.580 / .038	6.632 / .010	25.290 / .000	28.607 / .000	30.738 / .000
Flu is simple disease	28.616 / .235	7.792 / .005	7.908 / .048	13.056 / .001	Insignificant
Vaccine not effective	50.869 / .001	8.570 / .003	30.138 / .000	22.113 / .000	Insignificant
Still get flu after vaccine	20.501 / .668	0.105 / .746	7.236 / .065	9.274 / .010	Insignificant
Risk is low	24.089 / .457	0.666 / .414	0.411 / .938	0.675 / .714	Insignificant
Concern about seasonal flu	17.973 / .804	0.106 / .745	6.221 / .101	9.353 / .009	Insignificant

Vaccine useful	33.946 .086	/	1.847 / .174	10.956 / .012	13.655 / .001	Insignificant
Recommend vaccine	29.643 .197	/	0.027 / .869	9.882 / .020	13.169 / .001	Insignificant
Intend to vaccinate	37.822 .036	/	0.732 / .392	10.956 / .012	11.833 / .003	Insignificant
Need more awareness	35.674 .059	/	0.067 / .796	2.864 / .413	7.102 / .029	Insignificant
Concern about side effects	46.901 .003	/	4.663 / .031	8.159 / .043	8.806 / .012	Insignificant
Vaccine not safe	36.328 .051	/	3.746 / .053	15.563 / .001	14.207 / .001	Insignificant
Not recommended group	26.767 .315	/	13.294 .000	9.215 / .027	17.417 / .000	Insignificant
Fear of injections	39.827 .022	/	8.477 / .004	1.071 / .784	4.622 / .099	Insignificant
Forgot to take vaccine	13.815 .951	/	4.619 / .032	2.142 / .543	1.427 / .490	Insignificant
Flu shot makes sick	30.915 .156	/	5.781 / .016	15.851 / .001	15.344 / .000	Insignificant
Don't know where to go	39.639 .023	/	11.374 .001	17.567 / .001	16.149 / .000	Insignificant
Bad previous experience	31.559 .138	/	1.634 / .201	2.252 / .522	3.802 / .149	Insignificant

Interpretation:-

On the Basis of Age:-The age of a patient and whether he or she has ever had an influenza vaccination have a statistically significant relationship with each other ($\chi^2 = 41.817$, $p = .014$). The average magnitude of the effect (Cramer V = .373) implies that the age factor is a trustworthy predictor of the uptake of the historical phenomenon among this population. Moreover, the age strongly determines the future intention of a patient to receive a vaccine in the next visit to the clinic ($p = .036$). Fear of injections is a statistically significant deterrent based on age ($p = .022$). The statistics indicate that the older generation in the Cluster One of Riyadh is not very ignorant on the subject of vaccination, but more so, their knowledge of its appropriateness in diabetics and their confidence in its safety are connected more with age. Interestingly, the frequency of vaccination (how many times they have taken it) did not find any significant correlation with age ($p = .425$) indicating that after a patient has made the choice to vaccinate, then he/she can do it irrespective of their particular age group.

On the Basis of Gender:-The analysis shows that the relationship between gender and past influenza vaccination uptake is highly significant, both in terms of the level of association, and also in terms of the significance of the association, which is 10.197, $p = .001$. The gender also plays a significant role in determining the levels of knowledge in the Cluster one of Riyadh. In particular, the knowledge about the free vaccines availability ($p = .040$), the necessity of regular annual vaccines ($p = .010$) and the effect of vaccines on the prevention of severe complications of diabetes ($p = .048$) were all gender-specific. It is also notable that gender was quite associated with misinformation about the disease and vaccine efficiency as the assumption that the flu is an easy disease to handle ($p = .005$) and the general lack of faith in vaccine efficacy ($p = .003$).

Gender, on the other hand, did not have a significant effect on the clinical profile, including the type of diabetes medicine administered ($p = .868$), or the rate of vaccination among the already vaccinated ($p = .169$). The intentions to the future to be vaccinated ($p = .392$) and the overall worry concerning a flu infection ($p = .745$) were still the same in both genders, which indicates that the given factors are affected by other variables like age or education but not just gender.

On the Basis of Education:-Education level is a very important predictor of nearly all the knowledge and uptake measures. The education level has a substantial correlation with both type of DM medication taken ($\chi^2 = 16.959$, $p = .002$) and having received a vaccination ($\chi^2 = 11.780$, $p = .003$). In particular, nearly all knowledge variables such as awareness of free vaccines in Cluster One ($p = .000$) and belief in the significance of an annual dose ($p = .000$) had

significant statistical significance. This would imply that, the higher the education level, the greater the knowledge of clinical necessity and availability of the influenza vaccine would be. Unlike knowledge and barriers, education did not have a significant effect on the frequency of vaccination in the already vaccinated individuals ($p = .139$) and the perception of low risk of developing the disease ($p = .714$). This suggests that although education can be used as a factor in receiving the vaccine in the first place and overcoming safety concerns the main factor in ensuring regular vaccination schedule after the first uptake is established.

On the Basis of Employment:-The employment status presents a rather weak influence on the general vaccination model in comparison with other groups. Nevertheless, it is a statistically significant predictor in the realization of awareness of free vaccines in Cluster One of Riyadh ($\chi^2 = 8.081$, $p = .018$) and the overall perception of the effectiveness of vaccines ($p = .039$). In addition, the particular barrier related to the assumption that the vaccine will make one sick hit the level of significance ($p = .0500$). The rest, including historical uptake, clinical profile, and future behavioral intent had no significant differences which implies that the characteristics are more or less consistent among the various types of employment in this cohort.

On the Basis of Marital status:-The status of marital status is a key determinant in this study as almost all of the evaluated variables are significantly high in terms of statistical significance. Marital status and historical vaccine uptake ($\chi^2 = 14.330$, $p = .002$) and the clinical profile ($p = .002$) are strongly associated. The information about the services provided by Cluster One, the efficacy of the vaccines, and its appropriateness among diabetics achieved the greatest level of significance ($p = .000$). In contrast to other demographic factors, the marital status also has a substantial impact on future intention to vaccinate ($p = .009$) and a broad set of barriers such as safety issues ($p = .001$) and fear of injections ($p = .001$) as well as gaps in logistical knowledge ($p = .001$). This indicates how important social and domestic structure is in determining the health-seeking behavior among elderly diabetic patients in Riyadh.

Conclusion:-

The paper is a critical reflection of the influenza vaccination among diabetic elderly patients in Cluster One of Riyadh. The results indicate that even though there exists an underlying awareness about the vaccine, there is still a strong knowledge gap and a strong barrier that inhibits an ideal uptake. The first major finding can be summarized as that demographic variables, namely, Age, Education and Marital Status are the strongest predictors of the vaccination behavior. Better educated patients and those who have a stable social structure (married) showed much more positive attitudes towards vaccine efficacy and better knowledge scores. On the other hand, the obstacles associated with age including fear of injections and safety issues have been still common among the most senior parts of the population. The statistical analysis illustrates the paradoxical Information Gap: even though the Ministry of Health offers free vaccines within the Health Cluster system, many patients (especially with lower education level or belonging to specific occupational groups) do not know about free services offered or do not think they need such services to manage diabetes. The large p-values in the belief of the shot will make one sick and that there is no vaccine effectiveness indicate that misinformation and perceived risk are the main causes of vaccine hesitancy as opposed to logistical access. Finally, the conclusion of the study is that to get Riyadh Cluster One to a higher level of immunization, the efforts of the public health should shift no longer to the general awareness but to demographic-specific one that would directly target the fears and misconceptions of elderly diabetic patients.

Future Scope of Study:-

Further studies need to be conducted not on cross-sectional designs but longitudinal studies that would trace the exact effects of the transition to the implementation of the New Health Transformation Plan (Health Clusters) on the vaccination rates in a few years period. Although this study found out what the barriers are quantitatively, future qualitative research (interviews or focus groups) can be done to find out why- digging deeper into the cultural and religious specifics of the fear that the vaccine causes an illness. The scope to examine the provider side of the equation is high. A study may be done to examine the rate and standard of the vaccine recommendation made by the diabetes specialists in Riyadh over the General Practitioners. As the introduction of the Sehaty and Tawakkalna apps differentiates the digital health literacy levels of the population, a prospective study may focus on defining whether digital health literacy is a mediator between the level of education and vaccine acceptance among the elderly.

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