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Original Article

Assessing Awareness and Utilization of Preventive Services, Complications, and Risk Factors Among Diabetic Patients in Jeddah, Saudi Arabia

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ABSTRACT

Preventive care measurements such as vaccinations and health procedures play a significant part in controlling complications and reducing risk factors in diabetic patients. **Objectives:** To assess awareness and utilization of proven preventive services in diabetic patients and to assess complications and risk factors in diabetic patients. **Methods:** This was a cross-sectional survey study conducted among diabetic patients in Jeddah, Saudi Arabia. The study setting was Primary Health Care Centers in Jeddah Saudi Arabia. The study duration was from November 2018 to January 2020. Data were collected by volunteer students, interns and doctors who were trained for interviews using the questionnaire that was specifically designed for this study. 623 participants were included in the study fulfilling the criteria. The demographic details, complications, risk factors, and assessment of preventive service use among diabetic patients were summarized using descriptive statistics. **Results:** Out of 623 participants, 253 received influenza vaccine, 93 participants received pneumococcal vaccine, 94 participants received Meningococcal vaccine and 60 participants received DTAP vaccine with p-value <0.001. 75 participants had done mammograms, 51 people had done colonoscopy, 65 participants had done fecal occult blood and 37 participants had done Prostate-specific antigen procedure with p-value <0.001. Hypertension was present in the majority of participants accessed by physicians. **Conclusions:** Overall, the study's findings show that diabetic patients need to be more aware of and more likely to use preventative care. The low rates of vaccines and preventive procedures point to a potential weakness in patient education and healthcare delivery.

INTRODUCTION

Millions of people worldwide suffer from diabetes, a chronic metabolic illness that presents serious difficulties for public health systems [1]. Diabetes prevalence has increased to alarming proportions around the world, including Saudi Arabia [2]. Effective diabetes management necessitates a thorough strategy that goes beyond glucose control and incorporates preventive care services intended to lower complications and enhance general well-being. Comprehensive diabetes care must include preventive services like immunizations and medical procedures since they are critical to managing complications and lowering risk factors. It has been demonstrated that vaccinations, particularly influenza and pneumococcal vaccines, significantly lower the incidence

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of infections and related consequences in diabetes patients [3, 4]. It's essential to treat depression, a prevalent comorbidity among people with diabetes, to improve mental health and overall disease management [5]. Although there is no known cause for DM, several of its modifiable lifestyle-related risk factors have been found and investigated. The growing body of research indicates that DM may be curable if its risk factors are recognized and managed early [6-9]. In people who are at high risk of developing DM, lifestyle measures (such as physical activity and weight loss) have shown to be more beneficial than medication in avoiding or delaying the beginning of the condition [6]. However, before initiating any form of intervention, it is necessary to understand the unique needs of these communities to translate such evidence into an effective community intervention programme [10-12]. The first step in prevention is educating the public on DM risk factors and preventative strategies so that they can decide for themselves whether to follow a healthy lifestyle [10, 13]. Additionally, accurate and valid data about the prevalence and contributing factors of DM-related health disorders in the population are required for both policymakers and public health practitioners. To create, carry out, and assess effective intervention programs, these data are required [11]. Despite the significance of these preventative treatments, it is still unclear how much knowledge and utilization there is among diabetic patients in Jeddah, Saudi Arabia. Healthcare professionals and policymakers need to comprehend the degree of awareness, knowledge, and use of preventive services to establish efficient plans and interventions to enhance diabetes care and outcomes in the area. This study seeks to examine and evaluate the knowledge and use of effective preventive services among diabetic patients visiting primary healthcare Centers (PHCs) in Jeddah, Saudi Arabia. The study aims to identify gaps and limitations in the present healthcare system and guide specific initiatives to improve preventive care practices by looking at these factors. The results of this study will give important new information about how diabetes patients in Jeddah, Saudi Arabia, are currently aware of and using preventive treatments. This information can aid in the creation of evidence-based policies, recommendations, and initiatives that will improve diabetes management, lessen complications, and ultimately improve the health and quality of life of people with diabetes in the area.

METHODS

This was a cross-sectional survey study conducted among diabetic patients in Jeddah, Saudi Arabia. The study setting was Primary Health Care Centers in Jeddah Saudi Arabia. The study duration was from November 2018 to January 2020. A random sampling technique was employed and routine diabetic patients coming to PHCs in Jeddah were selected. 623 participants were included in the study fulfilling the criteria. Inclusion criteria: Diabetic patients, both gender, aged 18 years and above, diagnosed with diabetes at least 6 months before and patients regularly visiting. Exclusion criteria: non-diabetic individuals, individuals below 18 years, and non-routine patients. Data were collected by volunteer students, interns and doctors who were trained for interviews using the questionnaire that was specifically designed for this study. The questionnaire included sections for collecting information on demographics, vaccination, preventive procedures, complications, and risk factors. The demographic details, complications, risk factors, and assessment of preventive service use among diabetic patients were summarized using descriptive statistics. To find any notable correlations between the use of preventive services and complications and risk factors, inferential statistical tests were used. Data entry and analysis were carried out with SPSS version 25. Quantitative variables were presented with mean ± SD and qualitative variables with frequency and percentage. The Chi square test was applied to see the association between vaccination status, assessment of complications, and assessment of CVD risk factors with study groups. p-value $\leq$0.05 was considered statistically significant. The study adhered to ethical standards, guaranteeing the secrecy and anonymity of participants. Each participant was asked for their informed permission after being fully informed of the study's goals and their freedom to opt-out at any time. Ethical and required approvals were taken from relevant authorities.

RESULTS

Table 1 provides information about the vaccination status of participants for four vaccines (Influenza, Pneumococcal, Meningococcal, DTAP). The p-values indicate the statistical significance of the differences in vaccination rates among the participants. p-value less than 0.05 was considered significant. Out of 623 participants, 253 received Influenza vaccine, 93 participants received Pneumococcal vaccine, 94 participants received Meningococcal vaccine and 60 participants received DTAP vaccine with a p-value <0.001.

Table 1: Preventive Measurement – Vaccination

Vaccines		Participants n (%)	p-value
Influenza Vaccine	No	248 (39.80)	<0.001
	Unknown	122 (19.58)	
	Yes	253 (40.60)	
Pneumococcal Vaccine	No	326 (52.32)	<0.001
	Unknown	204 (32.74)	
	Yes	93 (14.92)	
Meningococcal Vaccine	No	327 (52.48)	<0.001
	Unknown	202 (32.42)	
	Yes	94 (15.08)	

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DTAP	No	327(52.48)	<0.001
	Unknown	236 (37.88)	
	Yes	60 (9.63)	

Table 2 presents the rates of specific medical procedures among participants, along with the corresponding p-values to assess the statistical significance of the differences in procedure rates. 75 participants had done mammograms, 51 people had done colonoscopy, 65 participants had done fecal occult blood and 37 participants had done Prostate-specific antigen procedure with p-value <0.001.

Table 2: Preventive Measurement – Procedures

Procedures		Participants n (%)	p-value
Mammogram (Female age 40 or Older)	N/A	288 (46.22)	<0.001
	Not done	260 (41.73)	
	Yes	75 (12.03)	
Colonoscopy	N/A	75 (12.03)	<0.001
	Not done	497 (79.77)	
	Yes	51 (8.18)	
Fecal Occult Blood (Age 50 or Older)	N/A	100 (16.05)	<0.001
	Not done	458 (73.51)	
	Yes	65 (10.43)	
Prostate Specific Antigen (Male age 40 or Older)	N/A	276 (44.30)	<0.001
	Not done	310 (49.75)	
	Yes	37 (5.93)	

For the question "Are you aware of Diabetic Self-Management Education and Support (DSMES)?" 367 (58.91%) participants answered yes and 256 (41.09%) participants answered no with p-value <0.001 (Table 3).

Table 3: Knowledge about Diabetic Self-Management Education and Support

		Participants n (%)	p-value
Are you aware of Diabetic Self-Management Education and Support (DSMES)?	No	256 (41.09)	<0.001
	Yes	367 (58.91)	

Table 4 presents the occurrence rates of specific medical complications among participants, along with the corresponding p-values to assess the statistical significance of the differences in complication rates in participants. Out of 623 participants, 133 had diabetic retinopathy, 47 had hypertensive retinopathy, 37 had diabetic neuropathy, 13 had hypertensive neuropathy, 7 had renal failure, 32 had peripheral nervous system complications, 92 had peripheral neuropathy, 18 had peripheral vascular disease, 29 had diabetic foot, 50 had ischemic heart disease, 32 had cardiovascular complications, 9 had Transient Ischemic Attacks and 11 had cerebrovascular accidents. Only renal failure and peripheral vascular disease had a p-value greater than 0.05 which was non-significant. Significant association was found in other complications with p-value <0.05.

Complications		Participants n (%)	p-value
Diabetic Retinopathy	No complication	383 (61.47)	<0.001
	Unknown not assess	107 (17.17)	
	Yes	133 (21.34)	
Hypertensive Retinopathy	No complication	447 (71.74)	<0.001
	Unknown not assess	129 (20.70)	
	Yes	47 (7.54)	
Diabetic Nephropathy	No complication	468 (75.12)	0.001
	Unknown not assess	118 (18.94)	
	Yes	37 (5.93)	
Hypertensive Nephropathy	No complication	482 (77.36)	0.007
	Unknown not assess	128 (20.54)	
	Yes	13 (2.08)	
Renal Failure	No complication	515 (82.66)	0.224
	Unknown not assess	101 (16.21)	
	Yes	7 (1.12)	
Peripheral Nervous System	No complication	491 (78.81)	0.010
	Unknown not assess	100 (16.05)	
	Yes	32 (5.136)	
Peripheral Neuropathy	No complication	454 (72.87)	<0.001
	Unknown not assess	77 (12.35)	
	Yes	92 (14.76)	
Peripheral Vascular Disease	No complication	509 (81.70)	0.117
	Unknown not assess	96 (15.40)	
	Yes	18 (2.88)	
Diabetic Foot	No complication	510 (81.86)	0.003
	Unknown not assess	84 (13.48)	
	Yes	29 (4.65)	
Ischemic Heart Disease	No complication	489 (78.49)	<0.001
	Unknown not assess	84 (13.48)	
	Yes	50 (8.02)	
Cardiovascular Complications or Heart Failure	No complication	504 (80.89)	0.001
	Unknown not assess	87 (13.96)	
	Yes	32 (5.136)	
Transient Ischemic Attacks	No complication	536 (86.03)	0.030
	Unknown not assess	78 (12.52)	
	Yes	9 (1.44)	
Cerebrovascular Accidents	No complication	528 (84.75)	0.021
	Unknown not assess	84 (13.48)	
	Yes	11 (1.76)	

Risk factors accessed by physicians of PHCs are mentioned in Table 5. Hypertension was present in the majority of participants accessed by physicians. p-value for all risk factors assessed was <0.001 which was significant.

Table 5: CVD Risk Factors Assessment

Are the risk factors assessed by the center's physician?		Participants n (%)	p-value
Hypertension	No	125 (20.06)	<0.001
	Unknown	116 (18.61)	
	Yes	382 (61.31)	
Diabetes mellitus	No	73 (11.71)	<0.001
	Unknown	109 (17.49)	
	Yes	441 (70.78)	
	No	133 (21.34)	

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Dyslipidemia	Unknown	134 (21.50)	<0.001
	Yes	356 (57.14)	
Smoking	No	222 (35.63)	<0.001
	Unknown	124 (19.90)	
	Yes	277 (44.46)	
Obesity	No	144 (23.11)	<0.001
	Unknown	135 (21.66)	
	Yes	344 (55.21)	
Physical inactivity (Exercise every day at least 30 min)	No	139 (22.31)	<0.001
	Unknown	134 (21.50)	
	Yes	350 (56.17)	
Family H/O Premature Death (Age >55 For Men >65 For Women)	No	230 (36.91)	<0.001
	Unknown	184 (29.53)	
	Yes	209 (33.54)	
Alcohol	No	337 (54.09)	<0.001
	Unknown	195 (31.30)	
	Yes	91 (14.60)	
Blood Pressure Measurement (SBP - DBP)	No	150 (24.07)	<0.001
	Unknown	126 (20.22)	
	Yes	347 (55.69)	

DISCUSSION

The goal of the study was to find out whether Saudi Arabia's Jeddah diabetic patients were aware of and used preventative procedures, as well as whether there were any complications or risk factors. In light of prior research on connected topics, the findings of this study can be compared and analyzed. According to past studies, preventive care services are essential for managing diabetes and reducing complications. The latest study supports these findings by showing a high correlation between vaccinations, such as those against influenza and pneumococcal viruses, and reduced infection rates and related consequences in people with diabetes. This is in line with past research that demonstrated how effective vaccinations are at preventing infections in diabetic patients [14, 15]. For those who have chronic conditions like diabetes, preventive healthcare is especially crucial for preventing complications and comorbidities. In South Korea, people with diabetes normally see their doctor every three to six months to fill prescriptions and monitor their glucose control. Patients can mistakenly feel that they do not require routine physicals because these blood tests are done by a doctor. Interestingly, compared to the control group, the diabetes group had a higher likelihood of getting screened for colon cancer. Numerous studies linking diabetes to a higher risk of colon cancer have recently been published [16, 17] which may lead persons with diabetes to request colonoscopies more frequently on their initiative or at the advice of their doctors. For this association to be explained, more research is required. Additionally, we discovered that the majority of patients discovered influenza vaccination. Vaccinations against influenza are essential preventive measures for people with chronic conditions, such as diabetes and older persons [18]. In general, patients who are aware of their diabetes can easily get a prescription for influenza vaccination during routine visits to outpatient clinics, which may help to explain why this group has a greater rate of influenza vaccination than other groups. The study investigated whether diabetics also experienced problems. The study found a significant correlation between diabetes and issues like diabetic retinopathy, hypertension retinopathy, diabetic nephropathy, and hypertensive nephropathy. These results are consistent with past studies that demonstrated diabetes individuals had an increased risk of issues [19–21]. However, the p-value for the association between renal failure and peripheral vascular disease was larger than 0.05, indicating no significance. More investigation may be required to comprehend how these effects connect to diabetes. Overall, the study's findings show that diabetic patients in Jeddah, Saudi Arabia, need to be more aware of and more likely to use preventative care. The low rates of vaccines and preventive procedures point to a potential weakness in patient education and healthcare delivery. To effectively manage complications and improve health outcomes for diabetes patients, strategies should be devised to promote patient education and access to preventive care. The study's limitations should also be taken into account. Establishing causal connections between variables is constrained by the cross-sectional approach. Furthermore, as the study was restricted to a certain region, there is a possibility that the results cannot be applied to populations in other areas. Future studies could investigate these elements in a bigger, more varied sample to improve the generalizability of the results.

CONCLUSIONS

Low vaccination and preventative procedure rates were found in the study, raising questions about patient education and healthcare delivery. A sizable portion of the individuals did not obtain vaccinations for diseases such as the flu, pneumococcal, meningococcal, and DTAP. Low rates of preventive procedures such as mammograms, colonoscopies, fecal occult blood tests, and prostate-specific antigen procedures were also seen. These results underline how crucial it is to increase diabetic patients in Jeddah's awareness of and access to preventative care. The study also discovered several other diabetes-related problems, such as diabetic retinopathy, diabetic neuropathy, peripheral neuropathy, cardiovascular issues, and others. Significantly, these consequences were linked to diabetes, highlighting the importance of effective preventative strategies and routine screenings to identify and treat these problems.

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Authors Contribution

Conceptualization: MAM, ZJG
Methodology: MAM, ZJG, AKS, BKS, SH
Formal Analysis: BKS, AKS, FA, HNM
Writing-review and editing: MAM, SH, FA HNM, ZJG

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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