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PRIMARY CARE PHYSICIANS' UTILIZATION OF TYPE 2 DIABETES SCREENING GUIDELINES IN SAUDI ARABIA

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Abstract:

Study aim: *This study aims to assess primary care physicians' utilization of type 2 diabetes screening guidelines and referrals to behavioural interventions in Al-Jouf, KSA.* ***Methods:*** *This study adopted a retrospective longitudinal survey-based study design. In this study, the setting is primary health care setting in Al-Jouf, Saudi Arabia. We included primary healthcare physicians. A pre-designed questionnaire was used for data collection and data was managed and analysed using the Statistical Package for Social Sciences (SPSS) version 26.* ***Results:*** *The study included 395 physician whose age ranged from 25 to 58 years. Of all, 39% of physicians prefer using HbA1C and fasting blood glucose for screening pre-diabetes. The majority (80.3%) of physicians' screening decisions are influenced by the screening guidelines. ADA (46.3%), and both USPSTF and ADA (46.6%) were the physicians' most common preferences for diabetes screening. Nearly half of respondents (50.9%) use screening guidelines in 70-90% of their diabetes screening encounters. However, 39% and 37.7% reported utilizing USPSTF and ADA screening guidelines in 70-90% of their encounters, respectively.* ***Conclusion:*** *Our study shows that the majority of primary healthcare physicians are adherent to the diabetes screening guidelines in their practice. However, older doctors, males, those working in rural areas and those receiving highest and lowest number of visits per week require further awareness in order to increase their adherence to diabetes screening guidelines.*

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BACKGROUND:

According to the International Diabetes Federation (IDF), 382 million people worldwide have diabetes, with an adult prevalence of 8.3 percent (1). The epidemiological change of health risks towards current dangers such as sedentary lifestyles and unhealthy eating, rather than health risks linked with communicable illnesses, has resulted in a significant increase in the incidence of diabetes, particularly in developing nations. Improved longevity and aging of people, as well as improved illness detection and diagnosis, might all contribute to the rise in diabetes prevalence.

Noncommunicable diseases, such as diabetes, are the major cause of mortality throughout the world. According to WHO estimates, diabetes claimed the lives of 1.5 million people in 2012, accounting for 2.7 percent of all fatalities (2). The majority of diabetes deaths occurred in low- and middle-income nations, where over 80% of persons with diabetes reside.

The global burden of diabetes is certainly underestimated, since data reveal that over half of all diabetes cases go untreated (the IDF estimates there are approximately 175 million undiagnosed cases) (1). Late diagnosis is a serious problem since it diminishes the chances of avoiding long-term diabetic problems. Furthermore, mortality is less measured since diabetes is not reported as the cause of death in a significant number of instances, but rather as a result of its complications, which resulted in death (3). Ischemic heart disease, for example, is the biggest cause of mortality globally (7.4 million deaths in 2012) and a common diabetic consequence.

Chronic Kidney Disease (CKD), adult onset blindness, and non-traumatic lower limb amputation are all caused by diabetes (4-6). It's also a key contributor to stroke and ischemic heart disease.

Diabetes is a multisystem disease that requires a multidimensional, systematic therapy based on clinical recommendations. Major organizational entities such as the World Health Organization (WHO), the International Diabetes Federation (IDF), and the American Diabetes Association (ADA) publish periodic guidelines on diabetes treatment (7,8). According to prior guidelines, diabetes therapy should not be limited to decreasing blood glucose levels alone, but should also include lifestyle changes and minimizing the risk of acquiring diabetic complications. It also stresses patient education on self-monitoring and management. In 2013, the International Diabetes Federation (IDF) released recommendations for the management of type 2 diabetes in the elderly (9). The guidelines addressed a variety of issues related to the care of diabetes in the elderly, with a particular focus on long-term diabetic consequences. The recommendations also covered issues like as pain management and end-of-life care that are less typically addressed. Up to our knowledge, only few studies assessed the utilization of diabetes screening guidelines among physicians (9-20).

Study aim

This study aims to assess primary care physicians' utilization of type 2 diabetes screening guidelines and referrals to behavioural interventions in Al-Jouf, KSA.

General objective

The general objective of this study is to assess the primary care physicians' utilization of type 2 diabetes screening guidelines and referrals to behavioral interventions, and determine factors associated with better adherence to guidelines.

METHODOLOGY:

Study design

Retrospective longitudinal survey-based study design.

Study Setting

In this research, the setting is primary health care setting in Al-Jouf, Saudi Arabia.

Study population

The study included physicians working in primary healthcare centers in Al-Jouf, Saudi Arabia.

Sample size

There are over 450 eligible physician in the area. We distributed the data collection form among all of those who were present during data collection period and only those who agree to participate and filled the form completely were finally included in the study. The total sample size is 395.

Data collection techniques and tools

We used a pre-designed questionnaire for data collection from eligible physicians. In the questionnaire, the study subjects data included questions about their sociodemographic data, attended health care facility, methods of diagnosis of T2DM, and laboratory results that aided diagnosis, as well as history of referrals to behavioural interventions. The investigators themselves are the ones who distributed the data collection forms.

Data Processing and Analysis

Quantitative data was analyzed using the statistical package for social sciences (SPSS) version 26. Data from questionnaires were coded before entry and checked before analysis. For categorical variables, description, frequency, and percentage tables were used. Chi-square test was used for inferential analysis.

Ethical Considerations

Before the study's implementation begins, approval from the relevant Institutional Review Board (IRB) were obtained. Moreover, consent form was attached and filled by all the respondents who filled the questionnaire. The collected information was kept confidential at all times. The actual names and addresses of the participants were not divulged.

RESULTS:

Table 1 shows the sociodemographic data of participants. Participants' age ranged from 25 to 58 years, of whom 51.1% are males. Married participants constituted 61% of the sample. Over half of the respondents (63.5%) had 3-10 years of experience after graduation. Of all, 69.9% of physicians get more than 20 visitor per week to their PHCC.

Table 2 shows that 39% of physicians prefer using HbA1C and fasting blood glucose for screening pre-diabetes. The majority (80.3%) of physicians' screening decisions are influenced by the screening guidelines. ADA (46.3%), and both USPSTF and ADA (46.6%) were the physicians' most common preferences for diabetes screening. Nearly half of respondents (50.9%) use screening guidelines in 70-90% of their diabetes screening encounters. However, 39% and 37.7% reported utilizing USPSTF and ADA screening guidelines in 70-90% of their encounters, respectively.

Table 3 shows the association between sociodemographic factors and physicians' use of screening guidelines. Younger doctors utilized screening guidelines more than older doctors (p=0.001) as 84.9% of older physicians aged 31 to 58 years utilize the screening guidelines more than 70% of their encounters.

Female physicians were significantly more adherent to diabetes screening guidelines than male physicians (p=0.047). Of all, 85.5% of female physicians utilize diabetes screening guidelines in more than 70% of their encounters. Physicians with diploma or master degree were more commonly (88.2%) utilizing the diabetes screening guidelines (>70% of encounters) (p=0.006). Working in an urban region (p=0.030), and having an average of 10 to 20 visiting patients per week (p=0.022) were associated with higher adherence to screening guidelines.

Table 4 shows the association between sociodemographic factors and the preferred diabetes screening guidelines for use. Marital status (p=0.032), qualification (p=0.000), years of experience (p=0.010), job title (p=0.000), and average number of visiting patients per week (p=0.000).

Specialists were more adherent to ADA (51.2%) and both, USPSTF and ADA, guidelines (43.8%) than consultants (37.5%). Similarly, physicians with master and bachelor degree were more adherent to screening guidelines than those with board or PhD.

Table 1: Sociodemographic characters of participating physicians (n=395).

Parameter		Frequency (%)
Age, y	**25 to 30**	263 (66.6%)
	31 to 58	132 (33.4%)
Gender	**Female**	193 (48.9%)
	Male	202 (51.1%)
Nationality	**Non-Saudi**	19 (4.8%)
	Saudi	376 (95.2%)
Marital status	**Divorced**	10 (2.5%)
	Married	241 (61%)
	Single	144 (36.5%)
Medical qualifications of physician	**Bachelor (MBBCh)**	204 (51.6%)
	Diploma or Master	22 (5.6%)
	Board or PhD	169 (42.8%)
Years of experience after graduation	**< 2 years**	112 (28.4%)
	3 - 10 years	251 (63.5%)
	> 10 years	32 (8.1%)
Job title of physician according to Saudi council	**Consultant**	16 (4.1%)
	Resident	299 (75.7%)
	Specialist	80 (20.3%)
Average number of visiting patients per week	**Less than 10**	24 (6.1%)
	10-20	95 (24.1%)
	More than 20	276 (69.9%)
Work place	**Rural area (village or bedouin)**	26 (6.6%)
	Urban area (city)	369 (93.4%)
Average monthly incoming (SR)	**< 10k**	10 (2.5%)
	10k-14k	24 (6.1%)
	15k-19k	229 (58%)
	20k-29k	124 (31.4%)
	> 30k	8 (2%)

Table 2: Practice of physicians towards diabetes screening guidelines (n=395).

Parameter		Frequency (%)
Preferred screening method for pre-diabetes/diabetes	**Fasting plasma glucose test**	85 (21.5%)
	HbA1c test	131 (33.2%)
	Oral glucose tolerance test	12 (3%)
	Random plasma glucose test	13 (3.3%)
	HbA1C and fasting blood glucose	154 (39%)
Factors that influence decision to screen for diabetes	**Personal clinical experience**	42 (10.6%)
	Prompts from electronic medical record system	22 (5.6%)
	Screening guidelines	317 (80.3%)
	Other	14 (3.5%)
Physician preference for screening guidelines	**ADA**	183 (46.3%)
	USPSTF	16 (4.1%)
	USPSTF and ADA	184 (46.6%)
	Not sure	6 (1.5%)
	Other	6 (1.5%)
Physician's use of screening guidelines (% of times)	**<50%**	20 (5.1%)
	50-70%	54 (13.7%)
	70-90%	201 (50.9%)
	90-100%	120 (30.4%)
Utilization of the USPSTF guidelines (% of times)	**<50%**	88 (22.3%)
	50-70%	84 (21.3%)
	70-90%	154 (39%)
	90-100%	69 (17.5%)
Utilization of the ADA guidelines (% of times)	**<50%**	11 (2.8%)
	50-70%	50 (12.7%)
	70-90%	149 (37.7%)
	90-100%	185 (46.8%)

Table 3: Sociodemographic factors in association with physicians' use of diabetes screening guidelines (n=395).

Parameter		Physician's use of screening guidelines				P-value
		<50%	50-70%	70-90%	90-100%	
Age, y	**25 to 30**	18 (6.8%)	36 (13.7%)	144 (54.8%)	65 (24.7%)	**0.001**
	31 to 58	2 (1.5%)	18 (13.6%)	57 (43.2%)	55 (41.7%)	
Gender	**Female**	6 (3.1%)	22 (11.4%)	96 (49.7%)	69 (35.8%)	**0.047**
	Male	14 (6.9%)	32 (15.8%)	105 (52%)	51 (25.2%)	
Marital status	**Single**	0 (0%)	2 (20%)	4 (40%)	4 (40%)	0.121
	Married	14 (5.8%)	40 (16.6%)	111 (46.1%)	76 (31.5%)	
	Divorced	6 (4.2%)	12 (8.3%)	86 (59.7%)	40 (27.8%)	
Medical qualifications of physician	**Bachelor (MBBCh)**	16 (7.8%)	30 (14.7%)	106 (52%)	52 (25.5%)	**0.006**
	Diploma or Master	2 (1.2%)	18 (10.7%)	88 (52.1%)	61 (36.1%)	
	Board or PhD	2 (9.1%)	6 (27.3%)	7 (31.8%)	7 (31.8%)	
Years of experience after graduation	**< 2 years**	12 (10.7%)	10 (8.9%)	54 (48.2%)	36 (32.1%)	**0.031**
	3 - 10 years	0 (0%)	4 (12.5%)	17 (53.1%)	11 (34.4%)	
	> 10 years	8 (3.2%)	40 (15.9%)	130 (51.8%)	73 (29.1%)	
Job title of physician according to Saudi council	**Consultant**	0 (0%)	2 (12.5%)	8 (50%)	6 (37.5%)	0.141
	Resident	20 (6.7%)	44 (14.7%)	151 (50.5%)	84 (28.1%)	
	Specialist	0 (0%)	8 (10%)	42 (52.5%)	30 (37.5%)	
Average number of visiting patients per week	**Less than 10**	4 (4.2%)	12 (12.6%)	56 (58.9%)	23 (24.2%)	**0.022**
	10-20	4 (16.7%)	0 (0%)	10 (41.7%)	10 (41.7%)	
	More than 20	12 (4.3%)	42 (15.2%)	135 (48.9%)	87 (31.5%)	
Work place	**Rural area (village or Bedouin)**	0 (0%)	8 (30.8%)	9 (34.6%)	9 (34.6%)	**0.030**
	Urban area (city)	20 (5.4%)	46 (12.5%)	192 (52%)	111 (30.1%)	

Table 4: Sociodemographic factors in association with physicians' preferences for diabetes screening guidelines (n=395).

Parameter		Physician preference for screening guidelines					P-value
		ADA	USPSTF	USPSTF and ADA	Not sure	Other	
Age, y	**25 to 30**	118 (44.9%)	12 (4.6%)	129 (49%)	2 (0.8%)	2 (0.8%)	0.097
	31 to 58	65 (49.2%)	4 (3%)	55 (41.7%)	4 (3%)	4 (3%)	
Gender	**Female**	89 (46.1%)	6 (3.1%)	92 (47.7%)	4 (2.1%)	2 (1%)	0.687
	Male	94 (46.5%)	10 (5%)	92 (45.5%)	2 (1%)	4 (2%)	
Marital status	**Single**	0 (0%)	2 (20%)	8 (80%)	0 (0%)	0 (0%)	**0.032**
	Married	113 (46.9%)	10 (4.1%)	112 (46.5%)	2 (0.8%)	4 (1.7%)	
	Divorced	70 (48.6%)	4 (2.8%)	64 (44.4%)	4 (2.8%)	2 (1.4%)	
Medical qualifications of physician	**Bachelor (MBBCh)**	98 (48%)	12 (5.9%)	88 (43.1%)	2 (1%)	4 (2%)	**0.000**
	Diploma or Master	78 (46.2%)	0 (0%)	87 (51.5%)	2 (1.2%)	2 (1.2%)	
	Board or PhD	7 (31.8%)	4 (18.2%)	9 (40.9%)	2 (9.1%)	0 (0%)	
Years of experience after graduation	**< 2 years**	52 (46.4%)	4 (3.6%)	52 (46.4%)	4 (3.6%)	0 (0%)	**0.010**
	3 - 10 years	13 (40.6%)	0 (0%)	15 (46.9%)	2 (6.3%)	2 (6.3%)	
	> 10 years	118 (47%)	12 (4.8%)	117 (46.6%)	0 (0%)	4 (1.6%)	
Job title of physician according to Saudi council	**Consultant**	6 (37.5%)	0 (0%)	6 (37.5%)	2 (12.5%)	2 (12.5%)	**0.000**
	Resident	136 (45.5%)	12 (4%)	143 (47.8%)	4 (1.3%)	4 (1.3%)	
	Specialist	41 (51.2%)	4 (5%)	35 (43.8%)	0 (0%)	0 (0%)	
Average number of visiting patients per week	**Less than 10**	48 (50.5%)	2 (2.1%)	45 (47.4%)	0 (0%)	0 (0%)	**0.000**
	10-20	10 (41.7%)	6 (25%)	6 (25%)	2 (8.3%)	0 (0%)	
	More than 20	125 (45.3%)	8 (2.9%)	133 (48.2%)	4 (1.4%)	6 (2.2%)	
Work place	**Rural area (village or Bedouin)**	14 (53.8%)	2 (7.7%)	10 (38.5%)	0 (0%)	0 (0%)	0.646
	Urban area (city)	169 (45.8%)	14 (3.8%)	174 (47.2%)	6 (1.6%)	6 (1.6%)	

DISCUSSION:

Several nationwide efforts are currently aiming to identify and connect more people with these diseases to evidence-based therapies. The US Centers for Disease Control and Prevention (CDC) and the American Medical Association (AMA) announced "Prevent Diabetes STAT: Screen/ Test/ Act Today" in 2015, a collaborative project that emphasizes diabetes prevention via T2DM screening and referral to a Diabetes Prevention Program (DPP) (21). In 2015, the US Preventive Services Task Force (USPSTF) amended its guideline for adult T2DM screening to include behavioral counseling treatments for individuals who had abnormal findings (22). The Centers for Medicare and Medicaid Services recently announced that Medicare would cover the DPP for prediabetes patients, joining a growing number of commercial insurers who have previously done so (23).

The potential of these national programs to enhance population health is predicated on early detection and treatment of T2DM and prediabetes, which commonly starts in primary care offices with T2DM screening tests and patient communication of test findings. As a result, primary care doctors' choices on who to screen for T2DM, how to interpret screening test findings, and how to communicate these results to patients might have significant consequences.

According to our study, 39 percent of doctors prefer to test for pre-diabetes using HbA1C and fasting blood glucose. The screening recommendations impact the majority of clinicians' screening choices (80.3%). Physicians preferred the ADA (46.3 percent) and both the USPSTF and the ADA (46.6 percent) for diabetes screening. In 70-90 percent of their diabetes screening interactions, over half of the responders (50.9 percent) utilize screening criteria. However, in 70-90 percent of

their visits, 39 percent and 37.7%, respectively, said they used USPSTF and ADA screening standards.

Despite evidence that screening and diagnosing diabetes in the pre-diabetes stage can prevent a significant number of cases (17), the likely absence of Type 2 diabetes guideline adoption is a more widespread concern. Examining the challenges and facilitators to the application of abnormal blood glucose recommendations in a health system might potentially illuminate insufficient guideline implementation for other illnesses (18).

The risk of long-term complications from diabetes is lowered when blood glucose is managed, whether by lifestyle changes, medication, or a combination of the two, according to research (10,11). As a result, the primary goal of diabetes therapy is to bring blood glucose levels back into the normal range and keep them there. When it comes to glycemic objectives for persons with diabetes, studies have demonstrated that reducing HbA1C to below 7% reduces both micro- and macrovascular problems (13).

To treat type 2 diabetes (14), medical practitioners frequently propose dietary changes, weight loss, and increased physical activity as approaches to reduce HbA1C. (11,15). Additionally, pharmacology, such as hypoglycemic drugs or insulin, may be used to manage Type 2 diabetes in individuals who are at high risk for diabetes-related complications, have highly uncontrolled diabetes, or have been unable to control diabetes with lifestyle changes (10).

Dietary changes can be difficult to implement since diets and the requirements for particular dietary adjustments differ from person to person, necessitating personalized assessments of existing eating habits and food preferences, as well as information on metabolic objectives (11). Multiple appointments with a health care provider, a dietitian, a diabetes educator, or a mix of all three may be required to make these dietary changes. In those with Type 2 diabetes, losing 5-7 percent of their body weight can have therapeutic advantages (11).

Clinicians may fail to identify at-risk patients if they do not appropriately assess T2DM risk factors or interpret screening test findings erroneously. In addition, physicians may fail to convey T2DM screening test findings to patients or give evidence-based treatment recommendations, which might influence patients' risk perceptions and preventive behavior choices. If these flaws are pervasive, they may explain why more than 80 million people with T2DM and prediabetes are unaware that they have the disease (24). Screening recommendations were used more often by younger doctors than by older doctors (p=0.001), with 84.9 percent of older physicians aged 31 to 58 years using them in more than 70% of their contacts. Female doctors were significantly more likely than male physicians to follow diabetes screening standards (p=0.047). Across the board, 85.5 percent of female doctors use diabetes screening recommendations in more than 70% of their interactions. Physicians with a diploma or master's degree used the diabetes screening recommendations more often (88.2 percent) (>70 percent of visits) (p=0.006). Working in a city (p=0.030) and seeing 10 to 20 patients per week on average (p=0.022) were both linked to increased adherence to screening criteria.

Over the last decade, there has been an increase in the number of clinical recommendations published. This rise has been accompanied by a growing focus on evidence-based health treatment (16). Despite the fact that research supports the efficacy of a variety of medical procedures, doctors frequently fail to follow clinical standards to their full potential. In reality, research reveals that half of all patients of general practitioners receive treatments that depart from what is considered optimal practice (16). This emphasizes the need of comprehending how, why, and to what degree therapeutic standards are followed in practice.
Job title (p=0.000), marital status (p=0.032), qualification (p=0.000), years of experience (p=0.010), and average number of visiting patients each week (p=0.000). Specialists were more likely than consultants to follow ADA standards (51.2%) and both USPSTF and ADA recommendations (43.8%). (37.5 percent). Similarly, doctors with a master's or bachelor's degree followed screening standards more closely than those with a board or PhD.

According to study, the American Diabetes Association (ADA) and the United States Preventive Services Task Force (USPSTF) diabetes preventive clinical guidelines are not widely understood or implemented. In a study of 1,248 family doctors who are members of the Council of Academic Family Medicine, researchers discovered that just 52.4 percent of those surveyed said they followed national diabetic guidelines (19).
In a study of 140 physicians in practices connected with an academic medical institution, researchers discovered that 20% of clinicians had no preference for any specific guideline for abnormal blood glucose monitoring. The ADA rules were chosen by 63 percent of the remaining providers, 30 percent by the USPSTF, and 5% by the AACE recommendations (20). Researchers found that less than 20% of family physicians who are members of the Council of

Academic Family Medicine Educational Research Alliance (CERA) (n=1,015) follow screening guidelines, more than 50% do not follow screening guidelines, and the remaining approximately 30% respond "don't know" in a study using an all member survey of family physicians who are members of the Council of Academic Family Medicine Educational Research Alliance (CERA) (n=1,015). These findings point to a lack of awareness of diabetes preventive clinical recommendations as well as a lack of adherence to them.

Conclusion

Our study shows that the majority of primary healthcare physicians are adherent to the diabetes screening guidelines in their practice. However, older doctors, males, those working in rural areas and those receiving highest and lowest number of visits per week require further awareness in order to increase their adherence to diabetes screening guidelines.

Conflict of interest

There is no conflicts of interest in the study.

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