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Research Article

KNOWLEDGE, ATTITUDES, AND PRACTICES OF PRIMARY HEALTH CARE PHYSICIANS REGARDING PRE-TRAVEL COUNSELLING FOR PATIENTS WITH TYPE 2 DIABETES IN TAIF, SAUDI ARABIA, 2022

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Introduction: Travelers with diabetes mellitus can encounter challenges during their travels, particularly during international travels that crosses multiple time zones. Scheduling an appointment with a diabetes healthcare physician is a crucial step to ensure that diabetes is adequately controlled amidst challenges that may arise during the departure, travel and arrival phases of the travel.

Aims: To evaluate the knowledge, attitudes and practices of primary health care physicians in Taif city, Saudi Arabia regarding pre-travel counselling for patients with diabetes

Methodology: This cross-sectional study was conducted among all primary health care physicians (150) who work in PHC centers in Taif city. The physicians who were contacted through social media or by personally visiting the PHC centers. The first section of the questionnaire contains demographic characteristics, the second section assesses the physicians' knowledge about pre-travel counselling, the third section assesses the attitudes towards pre-travel counselling and the fourth section assesses the practices of physicians regarding pre-travel counselling. Chi-square test was used to compare the knowledge status of the physicians, while Kruskal-Wallis and Mann-Whitney U tests were used to compare the attitude scores of the physicians. P - value ≤ 0.05 will be considered as significant.

Results: The study included 79 (52.7%) resident doctors, 51 (34%) general practitioners, 13 (8.7%) registrars and 7 (4.7%) consultants. 38% of primary healthcare physicians were considered to have good knowledge about pre-travel counselling, while 62% of them were considered to have poor knowledge. The following characteristics have statistically significant association with the knowledge of pre-travel counselling: age, degree of education, and years of practice. The mean attitude score of the participants was 23 ± 4.0 points (out of 30 points). The time needed to complete pre-travel counselling about diabetes was 5 to 15 minutes in 40.0% of cases, and less than 5 minutes in 30% of cases. 61.3% said that they are aware of travel safety recommendations for patients with diabetes, however, only 25.5% feel confident about how to adjust insulin dose for patients who travel across several time zones.

Conclusion: The primary healthcare physicians should be encouraged to participate in events related to diabetes management during international travels. The government efforts should seek raising community awareness of diabetic patients to seek pre-travel consultations at primary healthcare levels via established centers and travel medicine clinics.

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INTRODUCTION:

Due to the increasing rate in the travel and knowledge of travel medicine over the past 30 years, pretravel counselling has become an essential part of family medicine. Effective counselling services begin with the development of evidence based decision-making tools and resources to assess the individual and travel risks. Over the past few decades, the number of international passengers has increased, and the incidence of travel-related illnesses is likely to increase proportionally with the planned increase in the number of international passengers crossing international flights with an unprecedented 1 billion passengers worldwide crossing international boundaries in 2012 (1–3).

In Saudi Arabia, travel become one of the important parts in the life of Saudi Arabian citizens either for pleasure, or for business where millions of Saudis travel abroad every year. Traveling abroad particularly to developing countries poses significant health challenge and according to many previous surveys, more than half of all travellers had faced health problems during and after their trips. Travel puts them in an unfamiliar environment, which can be especially challenging for people with chronic illnesses such as diabetes (4,5).

Travel medicine is an ever-changing specialty. Travel-related health risks should be weighed against the potential benefits related with regional travel. The ultimate goal of travel health is to protect travellers from accidents, disease and death. Travel-related illnesses are important for public health. In fact, travel therapy, according to the American Infectious Diseases Association, provides health care to travellers traveling abroad to prevent communicable diseases – such as malaria, traveller's diarrhea, and yellow fever. But they (Communicable disease) are not the main cause of death for travellers. In the United States, the study found that infectious diseases accounted for only 1% of deaths, while cardiovascular disease and trauma accounting for 49 and 25 percent of deaths, respectively (6–9).

Many previous studies showed that among diabetes patients, their use of insulin may affect their choices of travel destination and some of these patients may avoid long international travel because of their medical conditions (10,11).

Diabetes mellitus (DM) is one of the most growing global health concerns. By the year 2000, prevalence of diabetes was estimated to be 171 million worldwide. This prevalence was increased to over 366 million in 2011 and is expected to exceed 552

million by 2030. Diabetes mellitus is a metabolic condition which is characterized by hyperglycaemia which is caused by multiple etiologies including deficiency in insulin secretion or reduction in insulin action or both etiologies together and this deficiency is associated with disorders of carbohydrate, lipid, and protein metabolism. The three most common types of diabetes are type 1 diabetes mellitus (T1DM), type 2 diabetes mellitus (T2DM) and gestational diabetes mellitus (GDM) (12–14).

Overall, the prevalence of diabetes in Middle East and north of Africa is high due to rapid economic development, urbanization, and lifestyle changes in the MENA region (12). Saudi Arabia is not exception to this global epidemic and diabetes is the country's biggest health problem (15,16).

According to the Saudi Ministry of Health, about 0.9 million people were diagnosed with diabetes in 1992, but that number rose to 2.5 million in 2010, a 2.7-fold increase in less than two decades. In 2015, 4,660 diabetics were admitted to family clinics and medical clinics throughout Saudi Arabia. The increasing burden of diabetes is due to a variety of factors, including obesity and aging (17,18).

General practitioners are the first health providing line to evaluate and manage their patients' basic medical conditions and immunization status. They also, could provide their patients with appropriate advice about travel health. However, most travellers do not seek for health advice. According to a recent Geo-Sentinel surveillance network study, only 40.5% of travellers who return with medical conditions had pre-travel medical visits (19). According to another survey conducted in airports, only 52.1 % of the travellers reported taking health advice before departure where primary care Doctors (57.4%), Travel medicine Clinics (TMC) (35.3%), Other sources including Websites, Friends, Travel Agents, Books & Newspapers were the main sources of information about travel medicine (20). Moreover, another study conducted in Australia, showed that only one third of the travellers took health advice mainly from physician of Primary care and only 12% from a traveling medicine physician (21).

There is some information on health advice for travellers with health problems before travel. Along the way, people with diabetes face many challenges that can affect blood sugar control, including changes in diet and exercise, daily adjustments to insulin levels and time off after several hours, and infections especially when traveling to developing countries (11,22). According to one study, 15% of insulin-

needed diabetics reported that the usage insulin has a significant impact in determining their travel destinations in terms of avoiding health risks and traveling long distances (10). However, patients with type 1 or type 2 diabetes can proceed safely with proper self-management and appropriate preparation. Several professional organizations have issued guidance on traveling with diabetes (23).

Literature review:

In a study conducted by Alduraibi R, et al., 2020, the authors found that more than half of the PHC physicians had poor or inadequate level of knowledge considering counselling of patients with DM who tended to travel. Many factors were found to be associated with poor knowledge including being younger in age, being male, being Saudi, being a general practitioner in addition to having limited experience of less than 5 years. Moreover, almost half of the participants disagreed with the importance of pre-travel counselling among diabetic patients and this disagreement attitude was significantly related with being older and having more years of experience. Considering practices, 62.6 % of the participants had poor practice scores which are associated with being younger, being male, being Saudi and being general practitioner (24).

In another study conducted by Macneil G, et.al2015, in order to provide updated information and practical insights about healthcare professionals (HCP) who are counselling patients with diabetes travelling with an insulin pump. The results of the study showed that users of Insulin pump can take pleasure in any type of vacation travel. Certain destinations are demanding more preparation than others but irrespective of the choice of location, preplanning in partnership with a well-informed health care provider can contribute to the successful experience (25).

Kogelman et al2014, compared the knowledge, attitudes and practices of US primary care providers and US travel medicine specialists. They have demonstrated knowledge and practice shortages among practitioners who offer travel medicine advice. Additionally, they showed that the familiarity with travel specific vaccines and knowledge scores based on brief pre-travel scenarios were higher among travel medicine specialists (26).

In another study conducted by Piotter et. al 2013, in order to assess the level of knowledge among PCH providers in eastern France considering their ability to provide patients with health advice, vaccinations and malaria prophylaxis. The authors found that the adequate and good knowledge of the participants in

travel medicine is significantly associated with their motivation to practice in this specialized discipline (2).

Another study by Al-Hajri et al2011, examined 76 PHC physicians in Qatar. The questionnaire elements included evaluating socio-demographic characteristics and knowledge and practices relating to travel medicine before and after an educational meeting. They have detected significantly increased knowledge on the post-meeting questionnaire for most questions. This shows that the presence of extensive training programs for healthcare providers will increase their understanding and knowledge (7).

Rationale:

A few published health studies have investigated the knowledge and experience of doctors regarding travel and diabetes. To our knowledge, little studies has focused on healthy travel experiences in Saudi Arabia or the Middle East in general. Therefore, our goal is to evaluate the knowledge and attitudes of primary care physicians regarding pre-travel counselling for patients with type 2 diabetes and to examine the relationship between physicians' demographic characteristics, knowledge, and attitudes.

Aims:

Evaluate the knowledge and attitudes of primary health care physicians in Taif city, Saudi Arabia regarding pre-travel counselling for patients with type 2 diabetes.

Objectives:

- Evaluate the knowledge, attitudes, and practice of primary care physicians in Taif region, Saudi Arabia regarding pre-travel counselling for patients with type 2 diabetes.
- Examine the relationship between physicians' demographic characteristics, knowledge, and attitudes.

METHODOLOGY:

Study design:

A cross-sectional study.

Area and setting:

Taif city located in the west of Saudi Arabia. located at an elevation of 1,879 meters above sea level in the slopes of the Hejaz mountains. It is one of the 13 cities of Saudi Arabia. It is one of the most popular cities in Saudi Arabia .it has called the best summer destination. It has a population of 1,700,000 people. It has 19 primary health care centers. All these centers have diabetic cases to deal with it.

Study population:

All the primary health care physicians who work in PHC centers, MOH in Taif city, at the period of the study constitute the target population. The study population involves 150 physicians from the family medicine residency board and physicians working in different PHC centers collected from a directorate of health affairs at Taif.

Inclusion criteria:

- All PHC physicians in the study settings who agreed to take part in the study were included

Exclusion criteria:

- Physicians who were on an extended leave of job.
- Physicians who were not in direct contact with patients with diabetes - Physicians who declined to participate were excluded.

Sample size:

All the physicians working in PHC in Taif city, the total number is 150 physicians.

Sampling technique:

All the primary health care physicians who work in PHC centers, MOH in Taif city, at the period of the study constitute the target population. Their total number was 150 physicians. They were contacted through social media or by personally visiting the PHC centers.

Data Collection Tool:

The study depend on a previous questionnaire that was developed and validated by previous study (24). The questionnaire is divided into four parts with a total of 24 questions. The first section contains demographic characteristics, including age, gender, educational degree, year of practice and nationality. The second section assesses the physicians' knowledge about pre-travel diabetes counselling. The response choices for the knowledge questions include "yes", "no" and "do not know". Correctly answered questions were scored as 1, while incorrectly answered questions and "do not know" were scored as 0. The total knowledge score ranged from 0 to 10. Knowledge levels were classified as follows: from 0 to 5 is poor knowledge, and from 6 to 10 is good knowledge. The third section assesses the attitudes

towards pre-travel counselling for diabetic patients. Five-point scale items were used; strongly agree responses (scored as 5), agree (scored as 4), uncertain (scored as 3), disagree (scored as 2), and strongly disagree (scored as 1). The total attitudes score ranges from 6 to 30, with higher scores indicating a higher degree of agreement. The fourth section assesses the practices of physicians regarding pre-travel counselling.

Data entry and analysis:

Data entry and statistical analysis was performed using the Statistical Package for Social Science (SPSS) software program version 26. Chi-square test was used to compare the knowledge status of the physicians, while Kruskal-Wallis and Mann-Whitney U tests were used to compare the attitude scores of the physicians. P - value ≤ 0.05 will be considered as significant.

Ethical consideration:

This protocol was be approved by research Ethics Committee. Higher authority approval and local or institutional and departmental approval. Every participant was informed about the purpose of the study and written consent to participate in the study was be obtained and confidentiality was assured. No obligation of any kind for participation in the study and the participants is free to withdraw from the study at any time. There is no conflict of interest.

Budget, fund or grant:

Self-funded

RESULTS:

A total of 150 primary healthcare physicians completed the questionnaire. Out of them 40% were males and 60% were females. The majority were in the age group of ≤ 35 years (78.7%) and are Saudi nationals (76.0%). The study included 79 (52.7%) resident doctors, 51 (34%) general practitioners, 13 (8.7%) registrars and 7 (4.7%) consultants. Regarding years of experience, 54.7% had 0 to 5 years of experience, 30.7% had 6 to 10 years of experience, 12% had 11 to 15 years of experience and 2.7% had more than 15 years of experience. The sociodemographic characteristics of the physicians are provided in Table 1.

Table 1: Sociodemographic characteristic of the primary healthcare physicians. N = 150

Sociodemographic factor	Frequency	Percentage
Age group		
≤ 35 years	118	78.7%
> 35 years	32	21.3%
Gender		
Male	60	40.0%
Female	90	60.0%
Nationality		
Saudi	114	76.0%
Non-Saudi	36	24.0%
Degree of education		
Resident	79	52.7%
Registrar	13	8.7%
General practitioner	51	34.0%
Consultant	7	4.7%
Years of practice		
0 – 5 years	82	54.7%
6 – 10 years	46	30.7%
11 – 15 years	18	12.0%
> 15 years	4	2.7%

Knowledge of pre-travel counselling:

As shown in Table 2, the highest level of knowledge was recorded for the following questions: diabetic patients should be advised to carry medicines and carbohydrate-rich snacks in easily accessible bags while traveling (97.3%), pre-travel vaccination is important for diabetic patients (95.3%), and diabetic patients need to carry ID that says they have diabetes while traveling abroad (89.3%). In contrast, less than 10% of participants knew that patients with diabetes who are traveling to East region may need to increase the insulin dose, and diabetic patients who are traveling to West region may need to decrease the insulin dose. More information about the knowledge is provided in Table 2.

Table 2: Knowledge of primary healthcare physicians about pre-travel counselling of diabetes. N = 150

Question	N of correct answers	% of correct answers
1- Patients with diabetes should be advised to carry medicines and carbohydrate-rich snacks in easily accessible bags while traveling	146	97.3%
2- Insulin cannot be stored in checked luggage.	42	28.0%
3- In air travel, patients with diabetes are advised to not inject insulin at take-off.	58	38.7%
4- Traveling across more than five time zones requires insulin dose and frequency adjustment.	63	42.0%
5- Traveling across more than five time zones does not require oral anti-hypoglycaemic dose adjustment.	56	37.3%
6- Patients with diabetes who are traveling to East region may need to increase the insulin dose.	13	08.7%
7- Patients with diabetes who are traveling to West region may need to decrease the insulin dose.	13	08.7%
8- Extremes of hot or cold climate can affect how insulin and blood glucose monitor in patients with diabetes while traveling.	71	47.3%
9- Pre-travel vaccination important for patients with diabetes	143	95.3%
10- Patients with diabetes need to carry ID that says they have diabetes while traveling abroad.	134	89.3%

Out of a maximum of 10 points, 38% of primary healthcare physicians scored 6 or more in the knowledge questions and were subsequently considered to have good knowledge about pre-travel counselling, while 62% of them scored less than 6 points and were considered to have poor knowledge (Figure 1). The following characteristics have statistically significant association with the knowledge of pre-travel counselling: age, degree of education, and years of practice. Participants younger than 35 years of age and those with fewer years of practice have more poor level of knowledge compared to other participants ($P < 0.05$). In addition, consultants and registrars have statistically significant higher level of good knowledge compared to other groups (residents and general practitioners) ($p < 0.05$). Table 3 summarizes these results.

FIGURE 1: KNOWLEDGE OF PRE-TRAVEL COUNSELLING ABOUT DIABETES:



Table 3: Factors associated with Knowledge of pre-travel counselling about diabetes. N = 150

Studied group	Knowledge of pre-travel counselling				<i>p</i> -value*	
	Poor		Good			
	N	%	N	%		
Age group						
≤ 35 years	80	67.8%	38	32.2%	0.005	
> 35 years	13	40.6%	19	59.4%		
Gender						
Male	37	61.7%	23	38.3%	0.945	
Female	56	62.2%	34	37.8%		
Nationality						
Saudi	76	66.7%	38	33.3%	0.058	
Non-Saudi	17	47.2%	19	52.8%		
Degree of education						
Consultant	0	0.0%	7	100%	0.000	
Registrar	3	23.1%	10	76.9%		
General practitioner	33	64.7%	18	35.3%		
Resident	57	72.2%	22	27.8%		
Years of practice						
0 – 5 years	61	74.4%	21	25.6%	0.002	
6 – 10 years	25	54.3%	21	45.7%		
11 – 15 years	6	33.3%	12	66.7%		
> 15 years	1	25.0%	3	75.0%		

Attitudes towards pre-travel counselling about diabetes:

Table 4 and Table 5 summarize the attitude of participants toward pre-travel counselling. The mean attitude score of the participants was 23 ± 4.0 points (out of 30 points). For each attitude statement, out of a maximum score of 5, the highest mean attitude scores were recorded for the following statements: patients who seek medical advice before travelling will have lower chances of getting sick during their trip (mean = 4.2 ± 0.7), our society lacks knowledge of the importance of travel medicine (mean = 4.03 ± 1.0), and pre-travel counselling for patients with diabetes is important (mean = 4.01 ± 0.7). On the other side, the following statements received a lower mean attitude scores: the availability of an Arabic resource to increase patients' awareness of health practices before, during and after the trip is needed (mean = 3.61 ± 1.13), if there is a trusted Arabic resource to increase patients' awareness of health practices before, during and after the trip, I will advise my patient to visit it (mean = 3.61 ± 1.12), and in Saudi Arabia, we lack the practice of travel medicine (mean = 3.75 ± 1.06). (Table 4)

Table 4: Attitudes towards pre-travel counselling about diabetes. N = 150

Question	Attitudes toward pre-travel counselling N (%)				
	1	2	3	4	5
1- Pre-travel counselling for patients with diabetes is important.	1 (0.7%)	14 (9.3%)	11 (7.3%)	80 (53.3%)	44 (29.3%)
2- The availability of an Arabic resource to increase patients' awareness of health practices before, during and after the trip is needed.	7 (4.7%)	22 (14.7%)	28 (18.7%)	58 (38.7%)	35 (23.3%)
3- If there is a trusted Arabic resource to increase patients' awareness of health practices before, during and after the trip, I will advise my patient to visit it.	6 (4.0%)	23 (15.3%)	30 (20.0%)	55 (36.7%)	36 (24.0%)
4- Patients who seek medical advice before travelling will have lower chances of getting sick during their trip.	0 (0.0%)	3 (2.0%)	20 (13.3%)	69 (46.0%)	58 (38.7%)
5- In Saudi Arabia, we lack the practice of travel medicine.	4 (2.7%)	18 (12.0%)	30 (20.0%)	58 (38.7%)	40 (26.7%)
6- Our society lacks knowledge of the importance of travel medicine.	3 (2.0%)	9 (6.0%)	28 (18.7%)	50 (33.3%)	60 (40.0%)
1 = Strongly disagree 2 = Disagree 3 = Uncertain 4 = Agree 5 = Strongly agree					

The comparison between the attitude scores and the sociodemographic characteristic of the participants is shown in Table 5. Kruskal Wallis tests Mann-Whitney U tests did not reveal any statistically significant associations between attitude and sociodemographic characteristics.

Table 5: Factors associated with attitude toward pre-travel counselling about diabetes. (N = 150, IQR = interquartile range)

Factors	Attitudes toward pre-travel counselling (Score range: 5 – 30)			p-value
	Median	IQR	Mean rank	
Age group				0.678*
≤ 35 years	24	21 – 25	76.26	
Gender				0.225*
Male	23.5	20 – 25	70.27	
Nationality				0.413*
Saudi	24.0	20 – 25	73.88	
Degree of education				0.222**
Consultant	21.0	19 – 24	49.07	
Registrar	24.0	20 – 25	70.00	
General practitioner	24.0	22 – 27	82.82	
Resident	24.0	21 – 25	74.02	
Years of practice				0.556**
0 – 5 years	24.0	21 – 25	76.12	
6 – 10 years	24.0	21 – 25	75.92	
11 – 15 years	24.0	21 – 25	78.36	
> 15 years	21.0	18 – 23.5	45.13	

* Mann-Whitney U test ** Kruskal Wallis test

Practice of primary care physicians regarding pre-travel counselling about diabetes:

As shown in Table 6, most of the primary healthcare physicians (56.7%) reported being visited by 20 to 40 diabetic patients per week; and 64% said that 1 to 10 diabetic patients usually seek their advice before his/ her trip per months. The time needed to complete pre-travel counselling about diabetes was 5 to 15 minutes in 40.0% of cases, and less than 5 minutes in 30% of cases. Nearly two-thirds of the primary care physicians (67.3%) said that they advise and counsel their diabetic patients regarding the importance of the recommended vaccines before travel, however, only 26% said that they face diabetic patients who are trying to avoid travel because of their illness. Furthermore, 61.3% said that they are aware of travel safety recommendations for patients with diabetes, however, only 25.5% feel confident about how to adjust insulin dose for patients who travel across several time zones. Patient usually asks their physicians regarding: prescription (86.7%), vaccination (72.0%) and medication adjustment (79.3%), but they rarely ask about diabetic ID and a letter (23.3%). (Table 6)

Table 6: Practice of primary care physicians regarding pre-travel counselling about diabetes. (N = 150)

Question	N	%
The estimated number of patients with diabetes that visit your clinic per week for any reason		
Less than 20	20	13.3%
20 – 40	85	56.7%
More than 40	45	30.0%
The number of patients with diabetes that ask for advice before his/her trip per month		
0	54	36.0%
1 - 10	96	64.0%
Time needed to counsel a patient with diabetes before travel		
Less than 5 minutes	45	30.0%
5 – 15 minutes	60	40.0%
More than 15	3	2.0%
I do not recall	42	28.0%
Do you advise and counsel your patient with diabetes regarding the importance of the recommended vaccines before travel?		
Yes	101	67.3%
No	49	32.7%
Do you face patients with diabetes who are trying to avoid travel because of their illness?		
Yes	39	26.0%
No	111	74.0%
Are you aware of travel safety recommendations for patients with diabetes?		
Yes	92	61.3%
No	58	38.7%
Do you feel confident about how to adjust insulin dose for patients who travel across several time zones?		
Yes	38	25.3%
No	112	74.7%
Patient mostly ask you about:		
Medication adjustment	119	79.3%
Vaccination	108	72.0%
Prescription	130	86.7%
Diabetes ID and a letter	35	23.3%

DISCUSSION:

Travelers with diabetes mellitus can encounter challenges during their travels, particularly during international travels that crosses multiple time zones. Scheduling an appointment with a diabetes healthcare physician is a crucial step to ensure that diabetes is adequately controlled amidst challenges that may arise during the departure, travel and arrival phases of the travel. Diabetic patients should meet with their primary healthcare physicians at least one month prior to their travel date to allow for appropriate time for the physicians to formulate a diabetes travel letter or ID, and for the traveller to obtain adjusted prescription for needed medications, equipment and supplies (23).

Many travellers with diabetes mellitus are not aware of the risk of diabetes during international trips. This highlights the importance of pre-travel counselling provided by primary healthcare physicians in maintaining travellers' health during their trips. In this study, we explored Knowledge, attitudes, and practices of primary health care physicians regarding pre-travel counselling of patients with diabetes in Taif region, Saudi Arabia. We also explored some factors that may affect physicians' knowledge and attitude regarding pre-travel counselling. There have been few studies in the literature that addressed this topic among the healthcare physicians in Saudi Arabia (24).

Only 38% of the primary healthcare physicians in this study have good knowledge about pre-travel advice for diabetic patient as evident by correctly answering 6 or more of the knowledge questions, and 68% had been found to have poor knowledge. Alduraibi et al., which conducted a similar study in Riyadh, Saudi Arabia reached a similar finding and reported poor level of knowledge in 57.9% of primary care physicians in Riyadh (24).

Both at national and regional levels, authors have reported poor level of knowledge regarding travel medicine. A recent study by Sharahili et al., in Saudi Arabia reported low level of knowledge among primary care physicians regarding diseases encoded for travel medicine and explained the reason for that by non-incorporation of travel medicine as separate entity in medical curricula (27). Similarly, in Qatar, Al-Hajri et al., also reported low level of knowledge about different topics in travel medicine which subsequently improved significantly after providing a symposium (7).

Our results shows that less than 10% of participants in this study knew that patients with diabetes who are traveling to East region may need to increase the insulin dose, and diabetic patients who are traveling to West region may need to decrease the insulin dose. This is in concordance with the findings of Alduraibi et al., who reported very similar figures (24). When traveling from west to east it is important to note that diabetic patients should remember that the day shortens compared with when traveling from east to west, when the days become longer, therefore, adjusting the dose of insulin will become necessary (28).

In this study, the highest level of knowledge (> 90%) was recorded for the importance of vaccination and the importance of carrying medicines and carbohydrate-rich snacks in easily accessible bags while traveling. Similarly, Sharahili et al., highlighted that first aid and travel vaccine safety knowledge were the most commonly given information by primary healthcare physicians during pre-travel counselling (27). Furthermore, Food options for diabetic patients may be limited during travel. This is probably most relevant during air travel, so it is important to remind diabetic patients of carrying a quick source of carbohydrates to reduce the risk of hypoglycemia (23).

We also found that age of physician, educational degree, and years of experience have been associated with an increasing level of knowledge regarding pre-travel counselling about diabetes. In USA,

respondents' academic degree and number of travellers seen per year were significantly associated with an increased level of knowledge regarding travel medicine; and it was noted that 65% of primary care physicians in USA have good knowledge about travel medicine topics (26).

Regarding attitude of primary healthcare physicians, the majority agreed that the society in Saudi Arabia lacks knowledge of the importance of travel medicine, and also agreed that pre-travel counselling for patients with diabetes mellitus is important. In Kingdom of Saudi Arabia, there have been a direction to activate clinics of travel medicine to cover various topics, which is valid specifically during seasons of Hajj and Omrah. However, the travellers have often found it difficult to search for qualified professionals to obtain advice and answer questions about pre- and post-travel consultations even about simple topics like diabetes (29). Moreover, Alduraibi et al., reported similar attitude trends among primary care physicians and recommended to promote the implementation of training programmes on the subject of travel medicine to provide sufficient information during pre-travel counselling and to cover deficiencies detected (24).

Regarding practices, 64% of the physicians said that one to ten diabetic patients per months usually seek their professional advice before their trip, and the time needed to complete pre-travel counselling about diabetes was 5 to 15 minutes in 40.0% of cases, and less than 5 minutes in 30% of cases. In Riyadh City, Sharahili et al., reported that the time needed to complete a pre-travel consultation is between 5 and 15 minutes in 50% of cases; and also reported that 60% of physicians in Riyadh see less than ten traveller seeking consultation per week. (27). This is in concordance with our findings in this study.

More of 60% of the primary healthcare physicians in our study said that they are aware of travel safety recommendations and the importance of vaccines for patients with diabetes, however, only 25.5% feel confident about how to adjust insulin dose for patients who travel across several time zones. In highlight an important gap in knowledge that should be targeted in the future healthcare promotion programs.

CONCLUSION:

The primary healthcare physicians should be encouraged to participate in events related to diabetes management during international travels. The government efforts should seek raising community

awareness of diabetic patients to seek pre-travel consultations at primary healthcare levels via established centers and travel medicine clinics. The level of knowledge of our primary care physicians regarding pre-travel counselling about diabetes need to be improved which will reflect on their practices.

List of Abbreviation:

DM	Diabetes mellitus.
T1DM	Diabetes mellitus type 1.
T2DM	Diabetes mellitus type 2.
GDM	Gestational diabetes mellitus.
TMC	Travel medicine Clinics.
HCP	Healthcare professionals.
PHC	Primary health center.
MOH	Ministry of health.

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