Barriers in the Implementation of Clinical Guidelines in Diabetes Management: Physicians' Experiences in Bisha, Saudi Arabia

ABDULLAH M AL-SHAHRANI

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ABSTRACT

Introduction: Currently, the number of people living with diabetes in Saudi Arabia is less than one in every ten individuals and this number is expected to double in the next 20 years, which entails frequent and thorough investigation of implementation and effectiveness of the disease management guidelines.

Aim: To explore the knowledge and barriers in implementation of the clinical guidelines in diabetes management among the physicians in Bisha, Saudi Arabia.

Materials and Methods: In this cross-sectional study, data were collected using structured questionnaire, from a convenient sample of 149 physicians working at several health centres in Bisha, Saudi Arabia from May 2021 to July 2021. The implementation of clinical guidelines according to physician's gender, years of experience, speciality, workplace, and professional status was statistically assessed using Mann-Whitney test, Chi-square test, Kruskal-Wallis test and Spearman test. The data was imported to an Excel sheet, coded and analysed using Statistical Package for Social Sciences (SPSS) (IBM version 20).

Results: The results showed no significant relationship between guideline use and assessed variables except for years of experience, indicating that work experience influences practitioners' impressions and attitudes towards clinical guidelines (0.001). The study also disclosed some barriers to implementing the clinical guidelines, including lack of familiarity (mean=3.483; median=4) and awareness (mean=3.637; median=4). The results also showed that the minor challenges included a lack of confidence in guideline developers (mean=2.557; median=2), lack of outcome expectancy in patient care (mean=2.7114; median=2) and a lack of agreement with guidelines because they were not up to date (mean=2.591; median=2).

Conclusion: The findings concluded that physicians were well aware of the American Diabetes Association standards, demonstrating their popularity and ease of use in Saudi Arabia.

INTRODUCTION

Diabetes Mellitus (DM) is a worldwide chronic disease. The number of people with diabetes has dramatically increased over the last few decades. The World Health Organisation (WHO) estimated that 171 million patients were diagnosed with diabetes in 2000 [1]. This number increased to 366 million in 2011 and is expected to reach 552 million by 2030 [1]. In 2013, a study reported that 382 million patients were diagnosed globally with diabetes [2]. The number is expected to reach 592,000,000 by 2035 [2]. The Kingdom of Saudi Arabia (KSA) has the second highest rate of diabetes mellitus in the Middle East and the seventh highest in the world [3]. A recent study conducted in Bisha, a city located in the Southern region of KSA, identified a low rate of diabetes mellitus (18.2%), and the highest rate in KSA was in the Northern region (27.9%), followed by the Eastern (26.4%), Western (24.7%), and Central (23.7%) regions [4].

In order to reduce the negative outcomes of the disease, physicians who treat patients with type 2 diabetes must follow the guidelines. Observing treatment guidelines reduces the adverse outcomes associated with inadequate healthcare. Clinical guidelines aim to help physicians eliminate unnecessary variations in their clinical practice [5]. If physicians do not follow the clinical practice guidelines for type 2 diabetes mellitus, patients may experience suboptimal glycaemic control, high blood pressure, and abnormal lipid levels [6].

In a study, the attitudes and practices of physicians concerning clinical practice guidelines were investigated using a cross-sectional, self-reported questionnaire with 2225 respondents who worked at King Khalid University Hospital. The focus was on clinical practice guidelines in general. The respondents ranged from physicians to technicians working in hospitals. The study found that the respondents used, and had positive attitudes toward the clinical practice guidelines [7]. Another study found that physicians generally do not believe in the utility of clinical practice guidelines [8]. Lack of familiarity, knowledge, and awareness of the latest guidelines [8-10], as well as the absence of training on guidelines were salient barriers to implementation [8,11]. Lack of knowledge about recent diabetes guidelines may negatively affect the outcomes of diabetes treatment [12].

Therefore, the study at hand aimed to explore the extent to which the physicians implement the clinical guidelines in diabetes management and the barriers that impede the proper implementation of those guidelines. By identifying the physicians' knowledge about the use of guidelines in the management of diabetes, it was possible to touch on the barriers to the implementation of clinical guidelines in diabetes management in the local context. To our knowledge this is the first study to investigate the knowledge and barriers in the implementation of the clinical guidelines in diabetes management among the physicians in Bisha, Saudi Arabia.

MATERIALS AND METHODS

The present cross-sectional study was carried out in Bisha Governorate, Saudi Arabia, during the period from May 2021 to July 2021, in accordance with the declaration of Helsinki and under an ethical approval obtained from the Institutional Review Board of College of Medicine, University of Bisha (UBCOM/H-06-BH-087).

Using convenient sampling, 149 participants were recruited from all health centres affiliate to Bisha health affairs. The sample consisted

of 82 male and 67 female physicians. All participants provided informed consent.

Sample size calculation: The sample size was estimated using the following equation: $n=(Z\alpha)^2.P.(1-P)/d^2$, with a degree of precision (d) of 0.05 at 95% level of confidence (Z=1.96) [13] and the resultant sample size n=149.

Inclusion and Exclusion criteria: All physicians from both sexes and any number of years of experience were included, while physicians not related to diabetes treatment or management, and those without prior knowledge of the guidelines were excluded. The relevant data were obtained using self-administered questionnaire.

Study Procedure

A questionnaire, distributed to the participants as a Google form, was used as the primary instrument for data collection. It was divided into three sections. The first section collected the demographic information of the participants. The second section asked about the participants' awareness of the guidelines. This section also measured the frequency of use of clinical guidelines by the participants and their impressions of using clinical guidelines to manage diabetes. The third section was based on a questionnaire developed by Kunz A and Gusy B, which collected data about the challenges and barriers that mitigate the use of clinical guidelines in the management of diabetes [14]. The scores were based on a 5-point likert scale, in which the participants were asked to choose only one option on the scale (i.e., strongly agree, agree, neutral, disagree, and strongly disagree). The initial version of the questionnaire was piloted on a group of respondents (50 respondents) similar to the target population. This piloting enabled the researcher to modify the questions and make a final version with no obvious glitches.

After the questionnaire was designed, it was checked for validity and reliability by a statistician and data analysis specialist. The data was analysed using Cronbach's alpha, a coefficient of 0.917 was obtained and indicated that the data were highly reliable. After some modifications, it was sent to healthcare centres in Bisha to be distributed among the physicians (participants) in May 2021-a period during which the entire world was under the influence of the Coronavirus Disease-2019 (COVID-19). To comply with ethical standards, the questionnaire included an introductory note stating the purpose of the questionnaire and assured the participants that the results would not be used beyond the research purposes. Participant consent was obtained from the questionnaire.

STATISTICAL ANALYSIS

After the data were collected from the participants, the dataset was imported into an Excel sheet, coded, and analysed using SPSS (IBM version 20). The following statistical tests were used according to the number of groups, and the Mann-Whitney test was used to determine the differences between genders and work places in participants' knowledge of and impressions about the clinical guidelines as well as attitudes toward the challenges and barriers to the implementation of clinical guidelines in diabetes management. The Chi-square test was used to determine the differences between other groups (speciality, professional status, and years of work experience) for the same variables. A statistical significance was set at p≤0.05 (2-tailed test). For significant differences between the groups in any of the variables (knowledge, impression, and attitudes), the mean value was analysed using the Kruskal-Wallis test. Bivariate correlations were assessed using the Spearman test to identify the correlations between the physicians' years of experience and their impressions about using the clinical guidelines or their attitudes towards the challenges and barriers to use the guidelines.

RESULTS

The study group, shown in [Table/Fig-1], comprised of 67 specialists in family medicine, five in internal medicine, and 77 in other specialities. Overall, 79 participants worked in villages, and 70 worked in cities. Only three participants had two or fewer years of work experience. [Table/Fig-2] shows the frequencies and percentages of the guidelines used for the management of diabetes that the respondents were aware of. The respondents who were aware of American Diabetes Association, National Institute of healthcare and Excellence (NICE) guidelines, European guidelines and others were 91 (61.1%), 39 (26.2%), 2 (1.3%) and 17 (11.4%), respectively.

Parameters		Number	%
Gender	Male	82	55
	Female	67	45
Nationality	Saudi	5	3.4
	Non Saudi	144	96.6
Speciality	Family Medicine	67	45
	Internal Medicine	5	3.4
	Others	77	51.6
Professional status	Resident	122	82
	Specialist	21	14
	Consultant	6	4
Place of work	Village	79	53
	City	70	47
Years of experience	0-2 years	3	2
	3-5 years	27	18.1
	6-10 years	43	28.9
	More than 10 years	76	51

[Table/Fig-1]: Demographic information.

Guidelines	Frequency	%
NICE guidelines	39	26.2
American Diabetes Association	91	61.1
European guidelines	2	1.3
Others	17	11.4

[Table/Fig-2]: The guidelines used for the management of diabetes that the respondents were aware of.

About 77 (51.7%) of the physicians used clinical guidelines regularly to manage diabetes, and 66 (44.3%) often used these guidelines. Only 6 (4%) of the respondents sometimes used the guidelines as shown in [Table/Fig-3].

Frequency	Number	Percent
Sometimes	6	4.0
Often	66	44.3
Very often	77	51.7
Total	149	100.0

[Table/Fig-3]: Frequency of using the guidelines for the management of diabetes.

As shown in [Table/Fig-4], respondents mentioned that the barriers impeded the use of clinical guidelines in the management of diabetes (mean=2.999). The physicians agreed that these barriers stemmed from many causes, like lack of awareness (mean=3.637 and median=4) and lack of familiarity (mean=3.483 and median=4). The major barriers included a lack of confidence in guideline developers (mean=2.557 and median=2), lack of outcome expectancy in patient care (mean=2.7114 and median=2) and a lack of agreement with guidelines because they were not up to date (mean=2.590 and median=2).

Barrier	Mean	SD	Median
Lack of awareness	3.6376	0.960	4.000
Lack of familiarity	3.4832	0.997	4.000
Inertia of previous practice (no interest to change the previous practice)	3.2013	1.033	3.000
Lack of self-efficacy	3.1208	1.179	3.000
Lack of agreement regarding content	3.1678	1.111	3.000
Lack of agreement because guidelines were not up to date	2.5906	1.026	2.000
Lack of confidence in guidelines developers	2.5570	1.009	2.000
Lack of outcome expectancy in patient care	2.7114	1.060	2.000
Inability to reconcile with patient preferences	3.1074	0.960	3.000
Lack of applicability to practice population	3.0268	1.026	3.000
Lack of accessibility	2.8456	1.025	3.000
Lack of usability	2.8255	0.971	3.000
Presence of contradictory guidelines	2.8255	1.031	3.000
Lack of time	2.8792	1.179	3.000
Total	2.999	1.040	

[Table/Fig-4]: Statistics on barriers to guideline use in diabetes management.
SD: Standard deviation

Gender and use of clinical guidelines: Analysis of gender differences [Table/Fig-5] revealed no significant differences between genders in terms of knowledge (p=1.00), impressions about the use of guidelines (p=0.667), and attitudes towards the barriers against the use of guidelines (p=0.688).

Analysis	Knowledge about guidelines	Impression about the use of guidelines	Attitudes toward the barriers against the use of guidelines
Mann-Whitney U	2765.000	2656.000	2659.500
Wilcoxon W	5925.000	5816.000	5144.500
Z	0.001	-0.430-	-0.402-
Asymp. sig. (2-tailed)	1.000	0.667	0.688

[Table/Fig-5]: Differences between gender groups in guideline variables.
p<0.05; Asymp. Sig.: Asymptotic significance

Speciality and the use of clinical guidelines: As shown in [Table/Fig-6], no significant differences existed between the specialities in terms of knowledge (p=1.00) or impressions (p=0.96) regarding the use of the clinical guidelines or attitudes toward the barriers and challenges of guideline use (p=0.589).

Analysis	Knowledge about guidelines	Impression about the use of guidelines	Attitudes toward the barriers against the use of guidelines
Chi-squared	0.001	0.070	1.057
df	2	2	2
Asymp. Sig.	1.000	0.966	0.589

[Table/Fig-6]: Differences between speciality groups in guidelines variables.
p<0.05; df: Degree of freedom

Professional status and the use of clinical guidelines: No significant difference existed between the professional status groups [Table/Fig-7] in terms of their knowledge (p=1.00) and impressions (p=0.144) regarding the use of guidelines for the management of diabetes. However, a significant difference was found in their attitudes toward barriers to using the guidelines for diabetes management (p=0.001). [Table/Fig-8] shows that as compared to other groups, consultants reported a higher mean rank with regards to the existence of barriers against the use of guidelines in diabetes management, while the specialists reported a lower value and the residents reported a much lower value, (125.42, 98.76, and 68.43, respectively).

Workplace and the use of clinical guidelines: As shown in [Table/Fig-9], no significant difference was observed between

the different workplace groups in terms of participant knowledge (p=1.00), or impressions of the diabetes guidelines (p=0.462), or in their perspectives on the barriers to guideline use (p=0.720).

Analysis	Knowledge about guidelines	Impression about the use of guidelines	Attitudes toward the barriers against the use of guidelines
Chi-squared	0.001	3.879	17.414
df	2	2	2
Asymp. Sig.	1.000	0.144	0.001

[Table/Fig-7]: Differences between professional status groups in the guidelines variables.
p<0.05; df: Degree of freedom

Professional status	N	Mean rank
Resident	122	68.43
Specialist	21	98.76
Consultant	6	125.42
Total	149	

[Table/Fig-8]: Mean ranks of attitudes toward the barriers of guideline use across professional status.

Analysis	Knowledge about guidelines	Impression about the use of guidelines	Attitudes toward the barriers against the use of guidelines
Mann-Whitney U	2765.000	2578.500	2671.000
Wilcoxon W	5250.000	5738.500	5831.000
Z	0.000	-0.736-	-0.358-
Asymp. sig. (2-tailed)	1.000	0.462	0.720

[Table/Fig-9]: Differences between workplace groups in terms of clinical guidelines use in diabetes management.
p<0.05

Experience and the use of clinical guidelines: [Table/Fig-10] shows no significant difference between the groups according to their years of experience in terms of knowledge of the guidelines (p=1.00). However, a significant difference existed between the groups in their impressions of using the guidelines (p=0.026) and their attitudes toward the barriers to using the guidelines (p=0.014). As shown in [Table/Fig-11], the respondents whose work experience ranged from 6-10 years had more positive impressions of the guidelines than the other groups (mean ranks=83.94). A relatively similar impression was shown by those with experience of 2 years and less and those with more than 10 years (mean ranks 77.67 and 77.39, respectively), both groups showed a lower impression than those with 6-10 years of experience, while those with 3-5 years of work experience showed the lowest impression.

Analysis	Knowledge about guidelines	Impression about the use of guidelines	Attitudes toward the barriers against the use of guidelines
Chi-squared	0.001	9.305	10.650
df	3	3	3
Asymp. sig.	1.000	0.026	0.014

[Table/Fig-10]: Group differences in years of experience with clinical guidelines management.
df: Degree of freedom

Years of experience	N	Mean rank of impressions about the use of guidelines	Mean rank of attitudes toward the barriers against the use of guidelines
≤2	3	77.67	135.00
3-5	27	53.72	82.94
6-10	43	83.94	62.26
>10	76	77.39	77.02
Total	149		

[Table/Fig-11]: Mean ranks of impressions of guidelines and attitudes toward the barriers of using guidelines across professional statuses.

Correlation between experience and the use of clinical guidelines: As shown in [Table/Fig-12], the relationship between years of work experience and impression was slightly positive (correlation coefficient=0.126); impressions improved with increasing years of work experience. The relationship between years of work experience and attitudes toward the barriers to using clinical guidelines was negative (correlation coefficient=-0.029), suggesting that the agreement about barriers decreases as years of work experience increases.

Parameters			Mean of impression	Mean of agreement
Spearman's rho	Years of experience	Correlation coefficient	0.126	-0.029-
		Sig. (2-tailed)	0.127	0.723
		N	149	149

[Table/Fig-12]: Correlation of years of experience with clinical guidelines use in diabetes management.

DISCUSSION

This study found that respondents were noticeably aware of the American Diabetes Association (ADA) guidelines (n=91, 61.1%) and less mindful of European guidelines (n=2 respondents, or 1.3%). Some reasons for the high ADA awareness were its popularity in the KSA and ease of use. Compared with the United States (US) Preventive Services Task Force guidelines, the ADA guidelines help screen people and detect many cases of prediabetes and type 2 diabetes [15]. Similarly, Mehta S et al., found that more physicians used ADA guidelines than other guidelines [16].

A salient finding of this study was lack of awareness and lack of familiarity as barriers to using clinical guidelines to manage diabetes. This finding was in line with previous studies that identified barriers such as lack of understanding, lack of knowledge, lack of awareness of the latest guidelines, and absence of training on guidelines [8-11]. Rätsep A et al., also showed that enhancing physicians' knowledge, improving their motivation, and pushing them toward a sense of responsibility could lead to guidelines use, which in turn could improve diabetes care [17].

In a study conducted in the United States, self-reported commitment to clinical guidelines and actual practices were disconnected. That study investigated knowledge about, and adherence to, the implementation of ADA and US Preventive Services Task Force guidelines. The results showed that physicians relied more on clinical experience than clinical guidelines. In addition, physicians relied on the ADA guidelines more than on the 2008 US Preventive Services Task Force guidelines [16]. Similarly, a study in Indonesia assessed general practitioners' awareness of and adherence to clinical guidelines. The findings showed that high awareness of clinical diabetes guidelines did not necessarily lead to compliance and adoption of guidelines that could lead to good quality healthcare [18]. Another important finding of this study was that there was no significant difference between the groups according to professional status in their knowledge and impressions of using clinical guidelines for diabetes management. However, a significant difference existed between professional status groups regarding their attitudes toward barriers: Compared with the other groups, Consultants reported high mean scores indicating their high perception of the barriers against the use of guidelines in diabetes management, while low mean scores were reported by the specialists and residents, these findings go in concordance with the idea that professional status plays a pivotal role in formulation of the perceptions of the barriers under study. These findings imply that the challenges and barriers are more evident at the bottom of the professional hierarchy.

The workplace was another variable that played no role in the knowledge and impressions of using guidelines or attitudes toward the clinical guideline barriers (no significant differences were found). Thus, the workplace did not positively or negatively influence the responses. The lack of electronic guidelines, improper coordination between healthcare providers, discrepancies between information in the guidelines, and physicians' knowledge were significant barriers to implementing the clinical guidelines [19].

The analysis of the impression of the participants about the use of guideline based on their experience showed inconsistent results, with those less than two years showing similar impression as those with more than 10 years. This can be attributed to the small sample size of the former group. The participants with work experience from 3-5 years showed the lowest mean rank suggesting poor impression towards the use of the guidelines, on the other hand, participants with relatively more work experience 6-10 and more than 10 years showed higher mean ranks, hence better impression about the use of the guidelines. These findings imply that impression about the use of diabetes management guidelines improves as the work experience increases. Conversely, the those with higher work experience showed lower attitude towards the presence of the barriers of the guidelines use and those with lower experience showed higher mean ranks. The atypical results shown by those with experience less than two years can be attributed the extremely small sample size of this group. While the discrepancies in the results of the attitudes towards the barriers of guideline use based on the professional status and years of experience can also be justified by the small number of consultants among the study groups.

More programs, workshops, and training sessions should be organised to enhance knowledge, perceptions, motivation, and attitudes toward using clinical guidelines by practitioners and physicians. These fundamentals are key factors that lead to greater compliance with diabetes care guidelines and clinical decision-making. The implementation of these initiatives could lead to improvements in diabetes care [20,21]. Continuing medical education should focus on changing physicians' attitudes toward and knowledge of clinical guidelines, rather than focusing on adherence to standards of care [22].

Limitation(s)

The main limitation of this study was the relatively small sample size. Future researchers may undertake a similar study with a larger sample that is nationally representative and place the cohort size and characteristics in the context of the number of physicians nationally in Saudi Arabia for general readers. In this study, some physicians knew little about diabetes management guidelines, and further research should investigate the reasons for such scarcity of knowledge.

CONCLUSION(S)

The study found that the most significant impediment to the overall practice of the clinical guidelines for diabetes management included lack of awareness and unfamiliarity. This study also found that physicians preferred ADA guidelines, and the reasons for this result should be inspected in the future. The findings suggested a need for workshops to increase physicians' awareness of guidelines and to promote their familiarity with deliberate guidelines. Training programs should enhance physicians' knowledge of guidelines and improve their attitudes about and motivation toward using the guidelines. Training should be practical and considered one strategy that improves the quality of care for patients with diabetes mellitus. Nevertheless, it should not overestimate the benefits of such guidelines.

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PARTICULARS OF CONTRIBUTORS:
1.   Associate Professor, Department of Family Medicine, College of Medicine, University of Bisha, Bisha, Saudi Arabia.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:
Abdullah M. Al-Shahrani,
Associate Professor, Department of Family Medicine, College of Medicine,
University of Bisha, Bisha-61922, P.O. Box-1290, Saudi Arabia.
E-mail: ab_alshahrani@ub.edu.sa

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