



Assessing General Dentists' Involvement in the Dental Treatment and Management of Diabetic Patients in the State of Kuwait.

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Abstract:

Diabetes Mellitus (DM) currently affects more than 285 million people worldwide and is expected to affect 438 million by 2030. The dental practice setting offers an important but largely overlooked opportunity to manage diabetic patients. This study focuses on issues related to managing diabetic patients in the primary health care centers dental clinics in the State of Kuwait. We hypothesize that there is a need to increase general dental practitioners' involvement in managing diabetic patients and that such actions can be expected to improve oral and general health outcomes.

Methods: At the time where the data was collected (2010), a total of 331 general dentists were practicing in 75 primary health care centers. A cluster sampling strategy was used to draw a random sample of general dental practitioners in all five governorates. A random sample of primary health care centers in each governorate was chosen. A power analysis test concluded that the target sample size for this study was 150 subjects.

Measures: Scales used in measuring general dentists' management of diabetic patients in the primary health care centers were evaluation of the patient's health, communication skills, and active management scales. Create three different domains: attitude perception, socio-demographics, and working environment and assess how they affect the performance of managing diabetic patients.

Results: Almost all the participants agreed that it is applicable to change/ adjust the treatment plan if a patient is diabetic, and the majority agreed to screen patients for diabetes by using finger-stick tests.

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Socio-demographic, these outcomes clarified that many participants do not update their academic skills and knowledge through attending continuing education courses or participate in study clubs.

Working environment, nearly 15% of the participants reported that they did not have a dental assistant. 50% of the participants reported that they didn't have a secretary/ receptionist in the office to schedule patients and confirm future appointments. 93% of the participants reported that they accept walk-in patients without advance appointments. Management performance results, only 12.7% of the participants scored 60% or less in communication management. In the active management domain, only 4% of the participants scored 81% or higher.

Conclusion: The study suggests that in order to improve the management/treatment levels of diabetic patients, multiple disciplinary areas must collaborate.

Introduction

Diabetes Mellitus (DM) currently affects more than 366 million people worldwide and is expected to affect 552 million by 2030 (International Diabetes Federation, 2011; World Health Organization, 2012). A major health problem worldwide with prevalence rapidly increasing, especially in the developing countries, DM is largely due to genetics, life style, and dietary habits. The complications of DM include coronary artery disease, peripheral vascular disease, stroke, renal failure, retinopathy, and periodontal diseases (Moore et. al., 2000, Garcia et. al.,2001). These complications increase morbidity and shorten life expectancy.

The dental practice setting offers an important but largely overlooked opportunity to manage diabetic patients. Periodontal diseases can contribute to the development and progression of several systemic conditions including atherosclerosis, nosocomial pneumonia, adverse pregnancy outcomes such as low birth weight and preterm birth. It has been established that poor glycemic control increases the risk of developing periodontal diseases (Newman et. Al., 2003; Taylor & Borgnakke, 2008). Individuals with

diabetes are typically found to have higher rates of periodontal problems than non-diabetic individuals. Increased periodontal risk is often related to the abnormal metabolic control of blood sugar (Vergnes, 2008; Lamster& Lalla, 2001; Kunzel, et. Al.; Tsai et. al., 2002).

This study focuses on issues related to managing diabetic patients, both diagnosed and undiagnosed, in the dental departments of the primary health care centers in the State of Kuwait. As of 2010, the population was 2.985 million (World Health Organization, 2011). Approximately 1.054 million of the total population is Kuwaiti citizens. The socioeconomic development during the 1960's was accompanied by the emergence and growth of health problems such as DM, hypertension, cardiovascular diseases, and obesity. The prevalence of diabetes in Kuwait is among the highest in the Arab peninsula. Kuwait ranks among the top ten countries in the Middle East and Northern Africa with respect to diabetes prevalence. The prevalence is expected to increase to 16.4% by 2025 (International Diabetes Federation, 2011).

The World Health Organization's (WHO) statistics on the prevalence of diabetes in the Eastern Mediterranean region in the year 2000 revealed that the number of diabetic patients in Kuwait was approximately 104,000 and this number was forecasted to increase to 319,000 patients by 2030 (World Health Organization Diabetes Factsheet, 2011). The annual percentage growth equals 6.89%, which is equivalent to 7,170 diabetic patients per year (Shaw, 2008). In a study by M.M. Al-Kalaf et al. aimed at developing a method to identify individuals at high risk for undiagnosed diabetes in the Kuwaiti adult population, the crude prevalence of total diabetic patients was found to be 21.4% where one-fifth of the cases were previously undiagnosed (Alkhalaf et. al., 2010).

The striking rise in the prevalence of diabetes led the Ministry of Health to launch the Kuwait Diabetes Care Program (KDCP) in 1999 to improve the quality of care provided to diabetic patients. The KDCP is located within

the public primary health care centers in all five governorates (Al-Adsani et al., 2008). In addition to KDCP, the late Prince of Kuwait, His Highness Sheik Jaber Al-Ahmad Al-Sabah founded the Dasman Center for Research and Treatment of Diabetes. The Dasman center was officially opened to the public in June 2006. The center dedicates 40% of its effort towards diabetes research, 30% towards providing training and education for healthcare professionals and community members, and 30% toward providing clinical services (Dasman Diabetes Institute, 2010).

The primary health care centers in the State of Kuwait contain medical and dental facilities that have a major role in providing the medical and dental care to large portion of the population. As of the time of this study, no published data were available on the prevalence of periodontal disease in diabetic patients in Kuwait.

Diabetes in Kuwait

DM prevalence in the State of Kuwait is considered to be one of the highest in the Middle East (Moussa, et. al., 2005). The high prevalence of diabetes is largely the result of the interaction between genetic and environmental factors. Genetic risks developed mostly due to inter-family marriages and marriages within the same ethnic background. These factors have resulted in an increase in genetically inherited diseases such as DM, Alzheimer's disease, cancer, and cystic fibrosis (Barroso, et. al., 2003). Environmental factors that can accelerate or in some cases initiate diabetes, including a lack of physical activities and a traditional Kuwaiti diet supplemented by fast food (Serour, 2007; Moussa et. al., 2005), are considered common factors leading not only to DM, but also to hypertension and obesity (Ng et. al., 2010).

The burden associated with DM in the State of Kuwait is substantial. DM is considered one of the leading causes of death in the State of Kuwait. According to the International Diabetes Federation's Diabetes Atlas, DM was a contributing

factor in approximately 4.6 million deaths in 2011. DM was directly responsible for 5% of annual deaths in Kuwait and indirectly contributed to an additional 35% of annual deaths through ischaemic heart disease [18%], hypertensive heart disease [11%], cerebrovascular disease [4%], and nephritis and nephrosis [2%]) (World Health Organization Diabetes Factsheet, 2011).

Diabetes and dentistry in Kuwait

An extensive Medline literature search for articles pertaining to general medical problems and DM was performed. That there are a very limited number of published articles about oral health and DM in Kuwait.

According to the statistics reported by the WHO, the health work force for dental personnel in the State of Kuwait between the year 2000 and 2009 was 810 dentists, or an average of 3 dentists per 10,000 patients (World Health Organization, 2011), suggesting a shortage in the number of general dental practitioners in the primary health care centers. With the increasing number of diabetic patients, dental practitioners need to be familiar with methods of diagnosing, treating and preventing oral complications. Collaboration between dental and medical teams is required for optimal management of diabetic patients. Dentists and physicians functioning as a healthcare team must have clear guidelines for the duties of each member of the team (Sanz et. al., 2008; Glick, 2005). The need to update the medical history as a part of the routine dental visits is of a vital importance and should be understood by dentists and physicians (Robertson et. al., 2003).

We hypothesize a need to increase general dental practitioners' involvement in managing diabetic patients and that such actions are likely to contribute to improved oral and general health outcomes. The goal of this study is to focus attention upon the role of general dental practitioners in raising awareness among their patients about DM, and identifying, monitoring, and actively managing patients with DM.

This study employed the Theory of Planned Behavior (TPB) as a theoretical framework. Briefly, TPB considers behavioral intention as the proximal determinant of behavior (Schifter & Ajzen, 1985). TPB facilitates the understanding of certain behavior modification especially among healthcare providers. As a general rule, if attitudes and subjective norms are more favorable, or if perceived control is greater, the person's intention to perform a certain behavior in question is predicted to be stronger (Christian et. al., 2007).

Purpose of the study

This study conducted a national survey, using a representative sample of general dentists practicing in Ministry of Health clinics in Kuwait, in order to 1.) assess the extent to which dentists are involved in the management of diabetic patients; and 2.) identify potentially influential factors believed to hinder the proper management of diabetic patients by dentists. In particular, this study assessed general dentists' behavior with respect to being active in managing, evaluating, and communicating with the diabetic patient. Attention is given to the extent of the communication between the dental and the medical teams, and to the dental treatment and referral of diabetic patients.

Research aims

The research aim is focused on investigating three issues related to the management behavior of general dental practitioners when evaluating diabetic patients in the primary health care centers:

first, investigating levels of performance in three areas of behavioral management: evaluation, communication, and active management.

second, determining the extent to which levels of performance in one management area are associated with levels of performance in another area,

third, investigating the strength of the associations between general dental practitioners' attitudes, socio-demographic characteristics and working environment characteristics, and their active management of diabetic patients;

Methods

A list of all general dental practitioners and the number of primary health care centers was obtained from the office of planning and resource development-dental sector, Ministry of Health, State of Kuwait. Data drawn from all five-health governorates indicated that the number of full time general dentists, at the time of data collection, was 331 and the number of primary health care centers was 75.

Power analysis concluded that the target sample size for this study was 150 subjects. The acceptance rate was predicted to be 80%. A cluster sampling strategy was used to draw a random sample of general dental practitioners in all five governorates. First, a random sample of primary health care centers in each governorate was chosen. The total number of primary health care centers required for the sample was determined by dividing the total number of dentists needed to achieve the desired sample size by four (the number of general dental practitioners estimated to practice at each of the primary health care centers).

Proportional coverage of all five governorates was assured by randomly selecting approximately half of the centers within each governorate in order to provide the 37 centers required for an adequate sample size. As shown in Table 1, in Alasimah governorate, 9 out of 20 centers were randomly selected; in Hawalli governorate, 7 of 14 were selected; in Alfarwaniya governorate, 8 of 17 centers were chosen; in Alahmadi governorate, 9 out of 17 primary health care centers were selected and in Aljahra governorate, 4 of 7 centers were randomly selected.

Table 1
Sample overview

	Governorate	No. of Clinics	No. of Clinics Sample	No. of public health center dentists	No. of questionnaires Distributed	No. of questionnaires Returned (%)
1	Alasimah	20	9	71	40	32 (80%)
2	Hawalli	14	7	80	45	36 (80%)
3	Alfarwaniya	17	8	71	40	32 (80%)
4	Alahmadi	17	9	67	38	30 (79%)
5	Aljahra	7	4	42	24	20 (83%)
	Total	75	37	331	187	150 (80%)

The investigator personally approached all 187 general dental practitioners and invited them to participate in the study. Work sessions in the primary care centers are divided into morning and evening sessions; the investigator visited the selected centers during both sessions. During the field visits, 4 to 6 general dentists (on average two dentists per session) were approached in each center.

Measures

Scales used in measuring general dentists' management of diabetic patients in the primary health care centers were as follows: evaluation of the patient's health, communication skills, and active management of the patient.

- The evaluation management scale was intended to capture dentists' intention to obtain from patients their medical history, e.g., medical problems, type of diabetes if already diagnosed, medications, and family history.

- The communication management scale was constructed to capture the general dentists' willingness to discuss the medical status of the patient and to explain the complications of diabetes, the importance of controlling diabetes, and the periodontal problems that may result as a consequence of uncontrolled diabetes.
- The active management scale was developed to detect specific actions taken by dentists, such as checking blood glucose level, referring patients for further tests, consulting with patients' physicians, and adjusting the treatment protocols for diabetic patients.

Measurement of the three management levels

For each scale, Likert-type questionnaire items were utilized. In the following sections, a complete list of the detailed survey questions, grouped according to the behavioral management of the diabetic patient scale, is presented.

The study's research instrument assigned values to the responses given for the individual items making up each scale. In order to obtain a percentage value, the summation of the respondent's individual scores was divided by the total sum possible. This value indicated the level of activity in each area of patient management. This percentage value was multiplied by 100 to obtain a performance score ranging from 0 to 100 for each type of patient management.

The investigator dichotomized the overall performance score into low-high behavioral categories for each patient management scale based on the scores for each scale. A single cutoff point was used to identify dichotomous high and low performance categories. The 50 % level was used as the cutoff for determining low vs. high performance categories for each behavioral management scale.

Sample description

Assuming a response rate of approximately 80%, it was determined that one hundred and eighty eight (n=188) participants in the primary health centers needed to be approached in order to reach an adequate sample size. The total number of dentists who agreed to participate in the study reached one hundred and fifty (n=150) participants. The general dental practitioners in the sample were distributed across the five governorates of the State of Kuwait. The highest response rate was in Aljahra governorate and the lowest response rate was in Alahmadi governorate. Table 2 describes the characteristics of study participants.

Sample socio demographic characteristics

The study population was comprised of 83 female participants (55.3% of the total) and 67 male participants (44.7% of the total). The age distribution of the study population was: 94 participants (62.7%) were between 25 and 30 years of age, while 56 participants (37.3%) were older than 30 years of age.

The general dental practitioners in Kuwait graduated from dental schools located in four major geographic regions: the United States and Canada, Europe, the Middle East and the Far East. The majority of the participants (104, 73.3%) in this study graduated from dental schools in the Middle East and nearby regions, while the numbers and percentages of participants graduating from dental schools in Europe, and in the United States or Canada, were 20 (13%) and 15 (10%), respectively. Among the male participants, 61% graduated from Middle Eastern dental schools, while 32% graduated from North American or European schools. Among female participants 76% graduated from the Middle Eastern schools, while 16% graduated from North American or European dental schools.

Similarly, participants could be placed into one of three groups based on the number of continuing education (CE) points earned in the previous year: more than 50, 25 to 50, and less than 25 CE points. Approximately 40% of the participants earned less than 25 CE points per annum and 35% earned between 25 and 50 CE points per annum. Twenty-four percent of the dentists earned more than 50 points.

Frequencies were calculated describing the following occupational characteristics of the respondents: years of clinical experience, job title, number of working hours per week, number of patients seen per week, and governorate. Slightly less than two-thirds of the respondents (61.3%) had up to five years of clinical experience and 18% of the respondents had between 5 to 10 years of working experience. Approximately twenty percent (20.7%) of participants had more than 10 years of clinical experience. With regards to job titles, nearly three-quarters of the sample (72.7%) were residents and assistant registrars, while more than a quarter of the participants (27.3%) held the titles of registrar, senior registrar, and specialists. When relating job title to annual continuing education points earned, 87% of the assistant registrars, 83% of the residents, 57% of the senior registrars, and 48% of the registrars earned up to 50 CE points.

With respect to number of working hours per week, the largest group of respondents (49.3%) reported working between 30 to 36 hours per week; while others (32%) worked less than 30 hours per week. Approximately 19% of the participants worked more than 36 hours per week. Sixty percent of the respondents saw less than 100 patients per week.

General practitioners who participated in this study represented the five governorates of the State of Kuwait in the following proportions: 24% percent of the participants were working in Hawalli, while participants from Alasimah, Alfarwaniya, and Alahmadi comprised approximately 20% each. Thirteen percent of study participants were from Aljahra. Table 2 provides the full data set obtained for sample characterization.

Table 2
Sample Characteristics

(N=150)		Total
Age	N	(%)
25 – 30 years	94	62.7%
30 – 35 years	25	16.7%
>35 years	31	20.7%
Year of Experience		
1-5	92	61.3%
6-10	27	18.0%
>11	31	20.7%
Job Title		
Resident	46	30.7%
Assistant registrar	63	42.0%
Registrar	29	19.3%
Senior Registrar/Specialist	12	8.0%
Working Hrs./Week		
<30	48	32.0%
30-36	74	49.3%
>36	28	18.7%
Patient /Week		
<75	47	31.3%
75-100	43	28.7%
101-125	36	24.0%
>125	24	16.0%
No. Of CE points		
<25	61	40.7%
25-50	53	35.3%
>50	36	24.0%
Gender		
Male	67	44.7%
Female	83	55.3%
Governorate		
Alasimah	32	21%
Hawalli	36	24%
Alfarwaniya	32	21%
Alahmadi	30	20%
Aljahra	20	13%
Region of graduation		
United States & Canada	15	10%
Europe	20	13%
Middle East	104	69%
Other	11	7%

Results and Discussion

Several studies have been conducted to assess the performance of dentists in managing diabetic patients. Kunzel and colleagues (Kunzel et. al., 2005) carried out an investigation of the role of the general dental practitioners in smoking-cessation activities and diabetes management and compared the dentists' performances in both of these activities. This study was the first to document the extent of dentists' practice activities with respect to the management of diabetic patients. The study showed that a high percentage of general dentists were more engaged in inquiring about patients' diabetic status and discussing the connection between diabetes and oral health than in smoking cessation activities. However, a considerably lower percentage engaged in more proactive behaviors such as monitoring blood glucose levels and communicating with the patient's physician. The authors concluded that general dentists were more willing to manage diabetic patients on at the level of "assessing/discussing" than at a more active level.

A study by Forbes (Forbes et. al., 2008) compared general dental practitioners in New Zealand and general dental practitioners in Northeast region of the United States with respect to the management of diabetic patients in the dental practice. Compared to dentists in the United States, dental practitioners in New Zealand showed higher participation in the assessment and discussion phases of managing diabetic patients. Nevertheless, the performance of additional active management was significantly lower. On the whole, however, there were only minor differences between New Zealand and northeast United States dental practitioners.

Additional studies by Kunzel, Lalla and others (Kunzel et. al., 2007; Sanz, 2008) have compared periodontists' and general dentists' behaviors and attitudes regarding risk factors (e.g. smoking) and diabetes mellitus and periodontitis. They concluded that periodontists, in general, performed risk identification and management behaviors for diabetic patients/smokers more

frequently than did general dentists. Both groups, periodontists and general dentists, tend to engage in activities such as evaluation and discussion of their patients' status more than in measures to control or manage the risk factors. Proactive management of diabetic patients/smokers was quite low in both groups.

Michael Glick, Barbra Greenberg, et. al.(Greenberg et. al., 2010) in their study, regarding dentists' attitudes toward chairside screening for medical conditions, concluded that dental practitioners considered performing medical screening test important and were willing to incorporate it into their practices. Findings from this study are expected to be reflected in changes in approaches to teaching in dental education in the future. A study conducted by a nursing-dental research team at NYU attempt to detect risk for systemic conditions, such as diabetes, hypertension, and heart disease. The results suggested that dentists can play a crucial role as health care practitioners in identifying systemic disease, which would go undetected in a significant portion of the population (Strauss et. al., 2012).

The Dependent Variables

The Dependent variables for three major types of behavioral management were measured in order to analyze the behaviors or performance level of the subjects. The independent variables were grouped within three domains: attitude, socio demographics, and working environment. The dependent variables were dentists' behaviors in the areas of evaluation management, communication management, and active management. The study measured the relationships between the dependent and independent variables.

Evaluation Management Variables

The study found that approximately one-third of the general dental practitioners did not obtain a medical history from their patients. This finding has a number of implications for the management of patients in general and diabetic patients in particular. Discussion of the patients' medical histories

is considered the window to the patients' health, and ideally it provides the dentists with all the essential information to tailor the treatment modalities. Medical history and general health assessment are the initial and most crucial steps of dental treatment planning and case evaluation. Therefore; taking a comprehensive medical history of a new patient and periodically updating the medical status for a regular patient serve as the foundations for building a proper treatment plan for each patient. Two factors can be cited in an attempt to understand the failure of the dentist to obtain and/or update the patients' medical history: the lack of patients' knowledge about their own medical status, and the short time available for each patient.

The results showed that less than two thirds of the participants reviewed their patient's medical history while the rest either asked the dental assistant or the hygienist to review the medical history or failed to review the medical history at all. This is another crucial step in treating patients, where the standard of care emphasizes that the dentist takes complete responsibility for reviewing and updating the patient's medical history.

Only one third of the participants reported that they ask about their patients' diabetic status and their most recent HbA1c test readings. At the time of the study the HbA1c assay was used as a follow up test, although it has since been approved as a diagnostic test. From these two questions we can surmise that, possibly with the main goal of modifying treatment to avoid any medical emergencies, dental practitioners were more concerned about their patients' current blood sugar readings more than their HbA1c results. Possible explanation may be related to the lack of a proper appointment scheduling system in some clinics, which obstruct proper follow up/recall appointments.

Statistical analysis revealed that most of the participants are well educated about the normal levels of glycosylated hemoglobin and that they were confident/highly confident in screening diabetic patients. This shows that even though the general dental practitioners have the knowledge to

identify and screen diabetic patients using the HbA1c test, their perspective towards diabetes testing is geared toward a short/ temporary perspective of the particular treatment at hand rather than a more appropriate long-term perspective on those patients' general and oral health.

Communication Management Variables

Communication management variables measured the verbal interaction between dentists and their patients. The analysis revealed that the majority of the respondents followed or attempted to follow the prescribed protocol in interviewing patients and in obtaining the necessary information about the medical health status of their patients. This leads to the assumption that the majority of the participants were aware of the importance of obtaining the medical history and having verbal communication with their patients that can establish a good rapport. The data shows that one third of the participants always inquired about diabetic status and always discussed the importance of postoperative medications and infection control with their patients.

Communication between dentists and patients has been encouraged to educate patients and provide valid information about the connection between oral and systemic health. The data showed that approximately 58% of the participants always discuss oral complications of diabetes with their patients, and 70% of the participants' always/almost always discuss periodontal therapy's influence on DM treatment with known diabetic patients.

The results demonstrated that the majority of the participants attempt to discuss the oral complications of diabetes and the positive effects of controlled diabetes on oral health with their patients. Multiple factors are potentially associated with the fact that one third of the participants did not discuss the oral complications of diabetes: dentists' lack of knowledge of the current literature with regards to DM and systemic and oral health; lack of time dedicated to each patient; and dentist/patient attitudes toward health education.

The Active Management Variables

The active management variables focused on the practice approaches taken by general dental practitioners when treating diabetic patients. Study objectives with respect to investigating active management variables were to address the following research questions: 1) do general dentists actively manage diabetic patients at a high level of performance and 2) do any of the independent factors examined have an influence on the level of active management?

Approximately fifty percent of the respondents answered affirmatively when asked if they checked blood glucose levels of diabetic and suspected diabetic patients. This percent is still considered within the lower range of active management behavior. In another area of active management, gathering and documenting the patients' information, only five percent obtain their patients' medical information in writing. This observation raises a major concern about the entire area of documentation of the medical history and overall health status. The presence of properly written documentation is an important indicator of the level of service and quality of oral healthcare provided to patients. It is crucial to document all the findings in the patients' charts, especially for new patients where the initial documentation can serve as a baseline for future reference.

Active management includes referring suspected diabetic patients for consultation, following up with referred patients, changing or adjusting the frequency of dental visits for diabetic patients as a part of their overall health care plan, and communicating with patients' physicians. The majority of the participants perform the previously mentioned actions when managing their patients; less than one third of the sample rarely communicates with the patients' physicians. This can be attributed to general dental practitioners' lack of familiarity with the referral system, or general lack of communication between the medical and dental sections at the primary health care centers,

along with lack of knowledge recognition from the medical profession about the connection between oral and systemic health. Generally, study findings confirmed that the majority of the participants follow the guidelines for following up with referred patients as well as changing/adjusting their treatment.

Finally, approximately 65% of the participants referred up to 20% of their patients for evaluation of suspected diabetes during one year. On the contrary, only 5% of the participants referred most of their suspected patients for evaluation of suspected DM. The results indicate that the majority of the respondents did not refer suspected diabetic patients for further investigation when needed.

Independent Variables: Three content domains

Perceived Attitudes

The first independent variable domain assesses general dentists' attitudes toward taking more responsibility for managing diabetic patients and being active members of the multi-disciplinary health team. Almost all the participants agreed that it is appropriate practice to change/adjust the treatment plan if a patient is diagnosed with diabetes, and the majority agreed that it would be appropriate practice to screen their patients for diabetes. Questions that focused on the participant's expectations of their co-workers in the working environment indicated that more than half of the respondents believed that their colleagues and patients expected them to take more active role in managing diabetic patients. These results suggest that a large proportion of the respondents have positive attitudes toward treating and managing diabetic patients.

Socio-demographics

The second independent variable domain examines the socio-demographic characteristics of the general dental practitioners investigated age, gender, years of experience, job title and location of the dental school where the dentist received professional training (region of graduation. A large segment of the sample represented graduates from Middle Eastern dental schools,

while one tenth of the respondents graduated from schools in the United States and Canada. Most of the participants in this study had one to five years of clinical experience. Less than fifty percent of the sample held the job title of assistant registrar and thirty percent of participants were dental residents. The majority of the respondents fell in a relatively younger age group.

Responses to questions pertaining to continuing education credits, self-improvement courses, and study clubs indicated that most of the participants did not belong to any study clubs and were not affiliated with any foreign dental societies, and that the cumulative number of continuing education points (CE) earned by the participants trended toward 25 CE points or less. Rather the majority regularly received local dental and/or medical scientific journals. These results indicate that many within the dental profession do not use these standard tools (study clubs and CE courses) to continue their training in order to remain clinically and academically updated.

Working Environment

The third independent variable domain looks at the characteristics of general dental practitioners' working environment in public clinics and their influence on the behavior of the general dental practitioners. Dentists' work load with respect to total working hours per week, patient load, the number of dentists and staff in the clinic, and the scheduling system were assessed. In addition, factors such as lack of materials for patient education, lack of continuing education opportunities, lack of time, and lack of equipment were investigated as possible barriers preventing dentists from taking a more active role in managing diabetic patients.

Staffing of the clinics with dental assistants and secretaries/receptionists was investigated. Nearly 15% of the participants reported that they did not have a dental assistant present in the office. Fifty percent of the participants reported that they didn't have a secretary/receptionist in the office to schedule

patients and confirm future appointments. This shortage of administrative staff undoubtedly contributes to the limited time dentists have available to spend with patients, since the dentist is expected not only to provide treatment and but also to schedule patients for subsequent visits. This also can be linked to the fact that 93% of the participants reported that they accept non-emergency walk-in patients without advance appointments.

This is a multi-variable issue where lack of receptionists, lack of dental assistants, and high patient loads contribute to the inability of the dental practitioners to provide high quality services for their patients. Furthermore, according to the WHO statistics regarding the 2000-2009 dental personnel work force there were only 810 dentists (or 3 dentists per 10,000 patients) in the State of Kuwait. This data indicates that there is a significant shortage of general dental practitioners at Ministry of Health facilities. All of these staffing factors potentially influence the treatment that can be provided, so that even with their best intentions dentists can find it very difficult to provide good quality care for their patients.

Quantitative Findings

Three dependent variable scales were created. The Communication Management Scale (CMS) measures performance of facets of the patient-clinician communication process. Next, building on the communication between dentist and patient, the dentist performs an evaluation of the patient and an assessment of the patient's overall health. The study measured this stage with the Evaluation Management Scale (EMS). When the communication and evaluation stages are completed, management of the diabetic patient starts. This last phase, during which the dentist is engaged in a more active role in managing the diabetic patient, was assessed via the Active Management Scale (AMS). These scales were created as proxy measures of the actual practice behavior of general dental practitioners as illustrated in Figure 1.

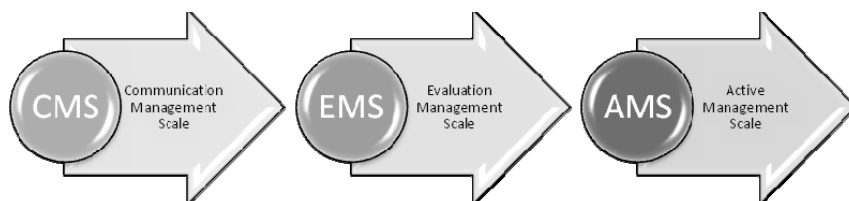


Figure 1 - Types of management of diabetic patients

The study distinguished two types of performances, high and low, in all three scales. The scales are intended to provide benchmarks for measuring dentists' performance with respect to managing diabetic patients.

Discussion of Management Performances

An overview of the levels of performance in different areas of behavioral management of diabetic patients is presented in Table 3 and Figure 2. An overview of the results indicates that most of participants scored more than 60 in both the communication and evaluation domains of management of diabetic patients. Only 12.7% of the participants scored 60 or less in communication management. Similarly only 6.0% of participants scored 60 or less in evaluation management. In summary, most of the participants can be described as performing in the moderate to high level in the management of diabetic patients, for both the communication and evaluation management domains.

Table 3
Diabetic Patient Management Scales

Management Scale (N= 150)			
Scale Score	Communication	Evaluation	Active
0-60	12.7%	6.0%	62.0%
61-80	33.3%	52.7%	34.0%
81-100	54.0%	41.3%	4.0%

In the active management domain, however, 62% of the participants scored 60 or lower and 34% of the participants scored in the moderate level of active management. Only 4% of the participants scored 81 or higher, the range considered high performance. The results demonstrated that general dentists were, overall, engaging in both communication and evaluation management at higher levels of performance and in active management at lower levels of performance.

Table 4 presents the performance level classifications for the three types of patient management. The management scales were divided into low and high scores, with the cut-off point chosen to provide approximately equal numbers in each category. The cut-off point for dichotomizing was lowest in the Active Management domain and higher in the Communication and Evaluation management domains.

Table 4
Performance Categories of the Management Diabetic Patients

Management Scale	Performance Level	Scale	No.	%
Communication	Low Performance	0-80	69	46%
	High Performance	81-100	81	54%
Evaluation	Low Performance	0-76	72	48%
	High Performance	77-100	78	52%
Active	Low Performance	0-57.5	76	51%
	High Performance	57.5-100	74	49%

Table 5 provides a summary of the cross association between the three types of behavioral management. Active Management is utilized as a reference point for comparison between the other two types of patient management, Communication and Evaluation.

Table 5
Cross Classifying the Management of Diabetic Patients

N=150		Active Management	
		Low	High
Communication Management	Low	N=44	N=25
	High	N=32	N=49
Evaluation Management	High	N=23	N=55
	Low	N=53	N=19

First, this approach to viewing participants' performance in active and communication management revealed that one-third of the participants' fall in the low-low low range in both Active and Communication management. In particular, approximately one-third (n=44) was found in the low-low performance category (low in both Active and Communication management) and another third (n=57) was classified within the moderate performance category (defined as low in one type of management and high in the other). The last third (n=49) was classified as high-high performance in managing diabetic patients (high in both Active and Communication management)

When the cross-classification between participants' performance in both Active and Evaluation management of diabetic patients was assessed, almost one-third (n=42) of the participants fell in the moderate performance range in both Active and Evaluation management (low in one type of management and high in the other type management), almost one third of the participants (n=53) fell in the low-low performance category (low in both Active and Evaluation management), while one third fell in the high-high performance category (high in both Active and Evaluation management (n=55). These findings raise concern regarding the quality of care provided to the public in the primary health care centers. Figure 2 summarizes the crosscutting performance areas among the three types of management for diabetic patients.

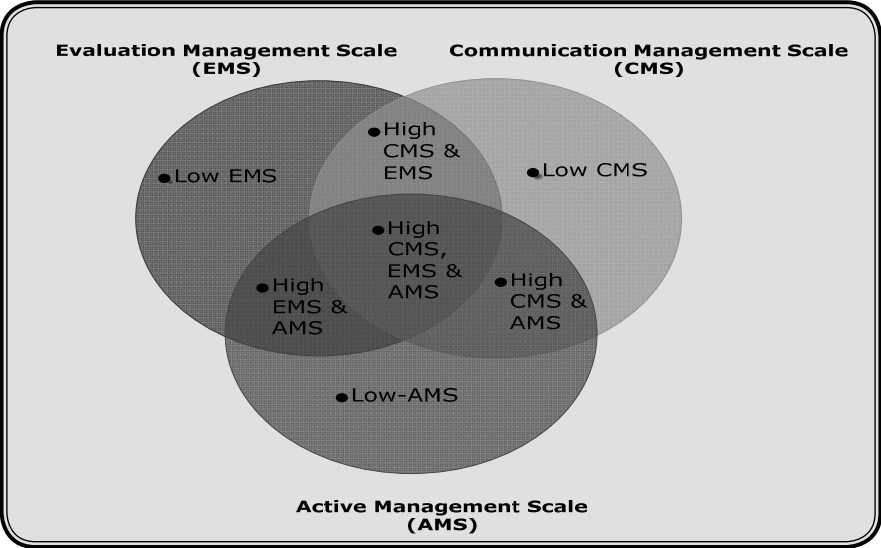


Figure 2 - Concentric view of management of diabetic patients

This figure illustrates the current status of general performance in the Kuwaiti dental clinics in the area of managing diabetic patients. The goal at this point is to raise awareness among the authorities at the Ministry of Health of the current status and the need for interventions to strengthen the quality of dental care. New initiatives are needed to move participants in the LOW group (low-AMS, low-CMS, and low-EMS) to the HIGH group (high- AMS, CMS, and EMS) as in Figure 2.

Discussion of the Independent Factors

Identifying the variables associated with dental practitioners’ behavior in effectively managing diabetic patients is a crucial step. The study grouped these variables into three main domains of independent variables, namely attitude perception, socio-demographic, and working environment.

The variables found to be significantly related to the active management behavior variables and their coefficient correlation values are summarized in Figure 3. The variables in attitude perception address aspects of self-

motivation and the willingness to perform measures necessary to provide a high standard of care to diabetic patients. Creation and implementation of a standard follow up system could both assist in and measure the dental practitioner's engagement in actively managing the diabetic patients. Another significant factor is the collaboration between the dental and the medical sectors. Developing open channels of communication and collaboration between the two sectors is recommended in order to provide better treatment for the patients.

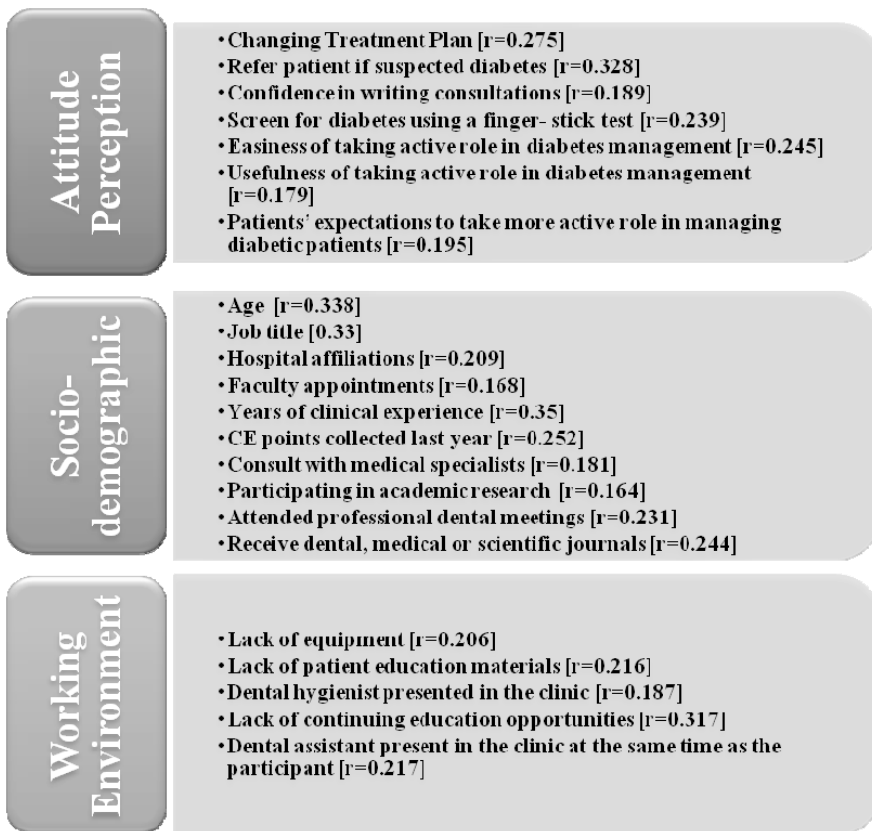


Figure 3 - Variables Influencing the Dentist's Active Management Performance

Regarding the socio-demographic variables, active management of the diabetic patient was correlated with 1) succeeding to a higher job rank, 2) having hospital affiliations, 3) having faculty appointments, and 4) participation in research. All of these variables can be monitored and documented by the Ministry of Health to motivate dental practitioners toward being more active, higher level performers, in managing diabetic patients.

In reference to the group of working-environment characteristics, data presented in Figure 4 suggest that the Ministry of Health ought to move toward providing sufficient numbers of staff working in the dental clinics (receptionist/secretaries, dental assistants, dental hygienists). This will provide more convenient access to dental appointments, facilitate the efficient flow of patients, and increase patients' access to dental care.

Similarly Figure 4 presents the variables associated with performance in the area of communication management. Coefficient correlations are again provided. The first independent variable group, attitude perception, has many elements that relate to communication management. For instance, willingness to adjust the treatment to fit the diabetic patients needs, and confidence to refer patients for consultations and take an active role in treating diabetic patients, are two variables that are associated to varying degrees with the communication management of diabetic patients.

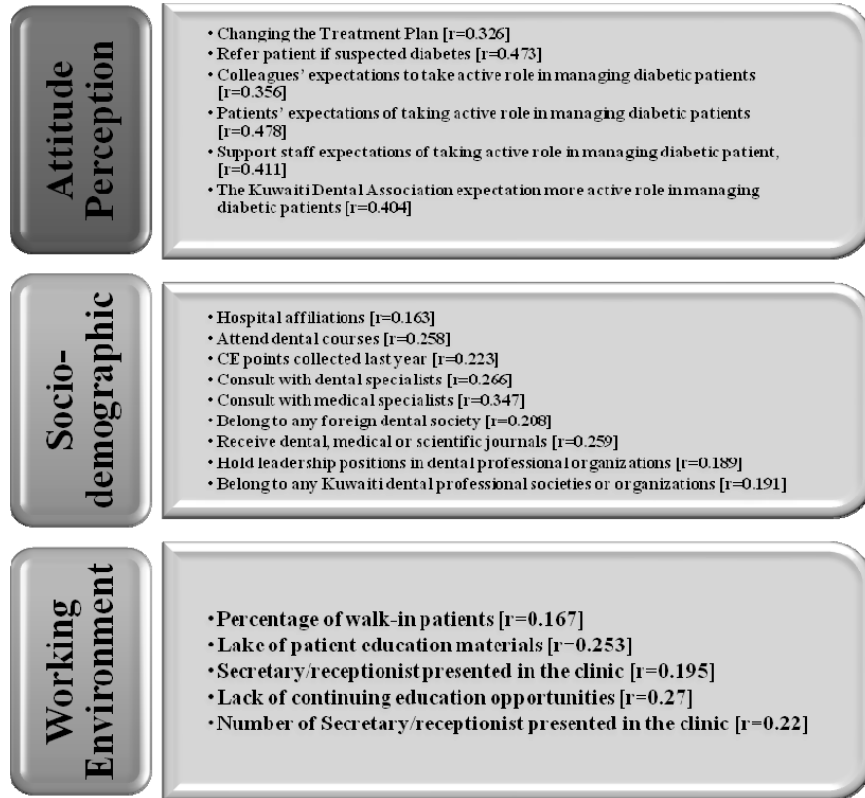


Figure 4 - Variables Influencing the Dentists' Communication Management Performance

With regards to the working environment factors, the data show that a large number of the participants accept walk in patients, which can be linked, counter intuitively, to the shortage of staff in the primary health care centers. In the present situation, the dentist is envisioned to be in charge of not only treating the patients but also making future appointments and organizing the flow of patients. Figure 4 summarizes the expected sets of variables that are associated with the dentist's behavior in this area.

Last, the most variables relating to evaluation management are summarized, and their coefficient correlation values provided, in Figure 5. The attitude perception independent variable group contains elements that may influence the evaluation management of the diabetic patient. Elements such as the willingness to alter the treatment plan for diabetic patients, the confidence to refer patients for consultation, and taking an active role in managing diabetic patients are associated with evaluation management to a varying extent.

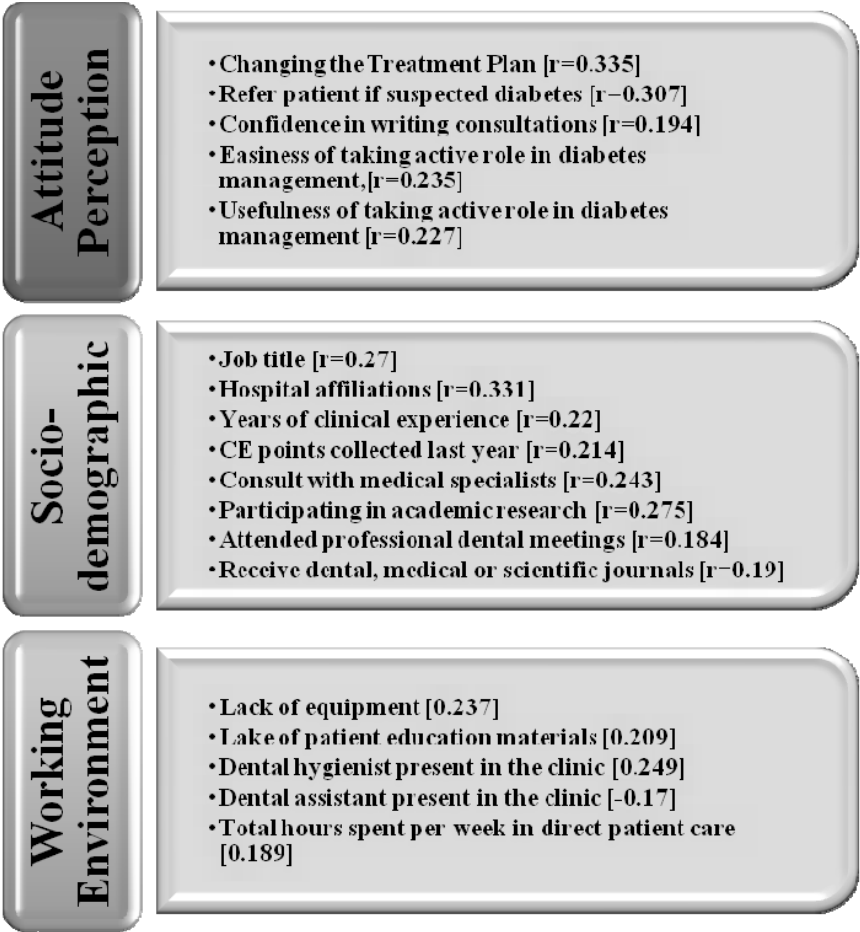


Figure 5 - Variables Related to Dentists' Evaluation Management Performance

In regards to the socio-demographic factors, policy makers can regulate the process of job promotion by connecting it with elements such as hospital affiliation, years of experience, cumulative number of continuing education points earned, consultations with specialists, attendance at professional meetings, being up-to-date with dental journals, and participating in dental research. This connection will motivate the dentists to be more involved in such activities and therefore potentially improve the dentist's performance in evaluation management of their diabetic patients.

Working-environment factors and their impact on evaluation management need to be considered. The process of evaluating the patients' dental and overall health requires focus and time from the dentist; therefore, it is essential to have staff/supporting staff members available to support this process. Other elements such as the availability of the equipment necessary to screen patients, booklets to provide dental educational to patients, and, and dental courses to keep dentists' up to date can potentially lead to improving the performance of evaluation management for diabetic patients.

Limitations

The major limitation of this study is that it predominantly relied on self-reported data, where chances of the under- and the over-reporting of information can impact the validity of the statistical analysis and interpretation. In both cases, the resulting bias in reporting has the potential to weaken the validity of the study.

The study assumes a link between active management behavior and better patient treatment and follow-up. However an investigation of a causal relationship between active management and adjustments in treatment leading to improved comprehensive care of diabetic patients cannot be conducted in this cross-sectional survey study.

Conclusion

The statistical outcomes of the study revealed significant associations between the management of diabetic patients and the variables considered, with different degrees of influence associated with each variable. The outcome of the study suggests that in order to improve the management/treatment levels of diabetic patients, cross-disciplinary collaboration must occur, and multiple institutions with access to differing resources must be involved in order to create new policies to improve the physical and administrative infrastructure of the dental clinics, and to educate both the public as well as health professionals.

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