



Research Article

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## *Diabetic Retinopathy Knowledge, Awareness and Practices of Physicians in Primary Health Care Centers*

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### ABSTRACT

**Purpose:** Diabetes retinopathy (DR) is one of the fatal causes of permanent and irreversible blindness infection that is prevalent making individuals suffer from diabetic conditions; however, annual medical examination is a critical interventional approach that not only limits the extent of infection but aids in timely formulation of relevant mitigation strategies and control of DR. Common to other healthcare systems in advance economies, the primary care physicians (PCP) are the immediate providers of primary care for diabetes across the kingdom of Saudi Arabia (KSA). The aim of the present research paper is to assess the current awareness, practices, and knowledge of PCP on DR. **Method:** The present research adopted a cross-sectional design that covered three cities in Saudi Arabia. A self-administered questionnaire with three different parts was submitted to physicians in the healthcare facilities across the three cities. In addition, the research adopted a convenience sampling method during which the designated regions were selected due to convenience in proximity as well as accessibility. **Results:** The research paper considered a sample size of 710 participants. An in-depth and compressive analysis of the results elucidated underlying defects as well as shortfalls on the physicians' awareness, knowledge, and practices on DR. The results demonstrated defects in screening methods as well as referral procedures among physicians. **Conclusion:** Overall, the extent of knowledge, practices, and awareness among the PCP in the three cities were satisfactory. Hence, it is highly recommended that future awareness campaigns should focus on timely and detailed screening approaches in order to manage diabetic conditions among patients.

**Key words:** *Screening Guideline, Primary Care, Diabetes, Diabetic Retinopathy*

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### INTRODUCTION

Even though there has been a gradual increase in the number of chronic illnesses affecting people in recent decades, perhaps diabetes has emerged as a major threat given the health and economic challenges required in the interventional approach. Even though there are different complications of diabetes, the public healthcare systems, as well as the population have borne the brunt of diabetes retinopathy. According to the world health organization, the Kingdom of Saudi Arabia (KSA) ranks second among the countries ravaged by diabetes retinopathy in the Middle East [1]. Such a ranking is not only pointing to the devastating scope of the condition in the KSA but also the overall economic borne that the disease has imposed on the kingdom's healthcare system. Because of the unprecedented surge in the diabetes retinopathy in KSA, there is a high likelihood of an overall increase in early mortality, disability, as well as significant morbidity as more complications of the disease emerge to be more evident not only in KSA but also the entire Middle East [2].

Diabetes retinopathy refers to a medical condition which damages the retina as a result of diabetes. Al Rasheed opines that diabetic retinopathy affects almost 80 percent of all diabetic patients [1]. Given the complications of the infections, diabetes retinopathy culminates into almost irreversible blindness in most instances. Since the prevalence of diabetes is generally high in KSA, diabetes retinopathy is also widespread in the kingdom, an incidence that has led to blindness among individuals suffering from the condition. For instance, research by Al Rasheed determined that the prevalence of DR in KSA is 31.3 percent [1]. Notably, the prevalence of DR was relatively high among populations in the urban regions and major cities across the kingdom.

Despite the ravaging effects of diabetes retinopathy, a proper blood glucose control is imperative in delaying the advance of the devastating effects of diabetic retinopathy [2]. Indeed, a plethora of research studies has pointed to the effectiveness of controlling diabetes mellitus and delaying its chronic effects such as blindness. For instance, proper regulation of the blood sugar level is a concerted approach of delaying the overall impact of diabetes mellitus and subsequently limiting the chronic effects such as DR. Besides, effective maintenance of the lipids (triglyceride) blood cholesterol within the normal ranges is the concerted approach of managing diabetes retinopathy. Lastly, efficient regulation of blood pressure, as well as limitation of the development of diabetes-related health issues, are other proper approaches of limiting the chronic effects of diabetes retinopathy, hence reducing the probability of culminating into DR [2].

Despite the numerous interventional approaches and regulatory efforts of managing diabetes, the silent nature of diabetic retinopathy has emerged as an almost insurmountable component since a significant number of patients only realize the chronic effects of the disease at an advanced stage.

In particular, a substantial population of diabetic patients tends to infer it to other illnesses such as heart failure and hypertension. Furthermore, the realization of diabetes retinopathy at an advance stage of DR is a clear pointer to the imperative aspect of timely screening as a vital approach in the management, control, and interventional procedures. Therefore, regular screening is not only essential in the early detection of the possible existence of the condition but also imperative in determining the most appropriate approach of the intervention [2]. Hence, the importance of physicians' awareness, knowledge, and practice in the fight against diabetes is essential in the advance screening, formulation of effective interventional approaches, and proper regulation against the condition [5]. In addition, physician awareness, knowledge, and practice are core to adoption and implementation of evidence-based approaches in tackling the condition.

Empirical findings from previous research studies have pointed to suboptimal trends in which just a minimum percentage of the population was involved in annual screening as well as yearly eye examination. The situation would be better when physicians could be equipped with comprehensive knowledge, awareness, and practice regarding diabetes retinopathy and subsequent DR. Mainly, the lack of a detailed and satisfactory awareness and practice with the diabetic retinopathy could be responsible to the delay in the decisions to refer diabetic patients to other specialists equipped with adequate expertise in handling other complications that accompany the advance stages of diabetes retinopathy. In the case of DR, lack of awareness, knowledge, and practice in diabetes retinopathy by physicians could be responsible for the gradual increase in prevalence of DR. To illustrate, while 72% of physicians undertake timely referrals of patients to specialists in Pennsylvania, a proportion of less than 50 percent is aware and adequately equipped with sufficient knowledge of timely referring patients in southern India.

Typically, primary care physicians are responsible for the initial care for diabetic patients. In connection to this, there is an imperative need to examine their awareness, knowledge, and practice regarding diabetic retinopathy and subsequent DR. To illustrate, Al Zerea opines that primary care physicians (PCP) are mainly responsible for diabetic [2]. Nonetheless, empirical data from previous research has ascertained the suboptimal awareness, knowledge, and understanding that such PCP has on diabetes retinopathy. As a result, the prevalence rate of diabetes has been increased by almost 35% in Iran, with over 4.5 million infections from 2005 to 2011. Such an unprecedented increase in the prevalence rate of diabetes could be attributed to the lack of adequate awareness, knowledge, and understanding among primary physicians in Iran.

Apart from Iran, previous research studies have pointed to the importance of primary care physicians in the management of diabetes and related complications among patients. To illustrate, the proper administration of insulin among diabetic patients is an imperative approach of the management and interventional approach that PCP in Turkey undertakes. In this regard, proper and adequate awareness, knowledge, and practice are necessary among the primary care physicians is indispensable in the effective management of diabetic retinopathy.

Given the inconsistency in empirical data regarding trends in awareness, knowledge, and practice among PCP in KSA, the present research paper will rely on quantitative data in elucidating the importance of PCPs' role in the management and intervention against DR. Hence, the objective of the present research paper is to evaluate current awareness, knowledge, and understanding of PCP in DR. The findings from the current research paper will be instrumental in the comprehensive mapping of areas that are bearing the brunt of DR as a result of inadequacy in the PCPs understanding, awareness, knowledge, and practice in DR [4, 5]. Consequently, such a detailed and in-depth mapping will form the foundational basis of reformulating an interventional approach that will deliver standard care to DR patients.

## MATERIALS AND METHODS

In order to address the pertinent issues within the research question and accomplish the designated objectives, we set out to collect data in a broader approach. Particularly, a more comprehensive approach of data collection was not only imperative in depicting the overall perspectives of PCPs' awareness, knowledge, and practice, but also reflective of the trend of DR in KSA. During the data collection process, we focused on 109 healthcare institutions across KSA. Primarily, the data collection process focused on cities and urban centers in the kingdom. The primary healthcare centers under focus were situated in Dammam, Jeddah, and Riyadh. Because the paper adopted a cross-sectional design of the study, data collection would accomplish to collect data from a representative sample or a subset of the entire field of study. Such an approach was essential in collecting data that is not only representative of the whole population but an accurate reflection through the selected subset.

In addition to the cross-sectional design of the study, the research paper relied on a self-administered questionnaire with three major parts. Specifically, the first part of the questionnaire focused on the socio-demographic details of the respondents. In addition, the second section relied on the respondents' knowledge and questions relating to diabetic retinopathy. Lastly, the third section majored on the practice questions of the respondents towards DR. The depth and comprehensive nature of the questionnaire were adapted from a previous research study, albeit with significant modification. Such an approach was necessary for ensuring that the data collection process accomplished the designated objectives. With a broadly distributed setting in which three different cities were at the center of the data collection, the decision to adopt a cross-sectional study in three different cities was reflective and representative of the urban KSA. In order to avoid unnecessary bias, the process of data collection also adopted convenience sampling. Basically, this refers to a non-probability sampling in which the representative population is selected through the convenience of proximity as well as accessibility by the researcher. In other words, the three respective cities in the three different districts were the most convenient with regards to proximity and accessibility by the researcher.

A detailed and comprehensive illustration of the questionnaire used in the data collection process points to intrinsic details that were both informative and essential in accomplishing the fundamental objectives of the research study. Specifically, the first part of the questionnaire with demographic information collected details about the respondents' medical specialty, nationality, gender, year of practice, as well as the city of employment. Evidently, the demographic data was essential in illustrating underlying factors such as the distribution of physicians in different districts, specialization, and experiences. In addition, the second part contained questions pertaining to DR., for example, and the section collected details such as the type of diagnosis carried out on patients, PCPs' professional opinion on the appropriate time upon which a patient should visit ophthalmologist, as well as the frequencies of such visits. Particularly, the second section asked a similar question regarding type 1 and 2 diabetes while focusing on varying responses from the participants. In addition, the questionnaire assessed and evaluated the knowledge and awareness of the representative PCPs on DR. The third and last section focused on collecting data on the participants' knowledge and awareness on DR. such questions included professional use of ophthalmoscope, the professional ability to carry out diabetic examination among patients, involvement in public awareness and sensitization in DM.

Subsequently, the collected data were coded in Microsoft Excel. It is also important to bear in mind that all conventional and standard practices were followed during the process of data collection. This implies that the data collection process respected the right of privacy and accorded every participant a voluntary participation as well as the willingness to abandon the means at their own pleasure. In addition, data collected were treated with the utmost confidentiality, and none was shared with a third party.

After the in-depth data collection, a statistical analysis was carried out using Microsoft excel during which specific variables were determined. Particularly, the statistical analysis determined the standard deviation and mean.

## RESULTS

A total of 709 physicians completed the questionnaire, where 416 of them were male, and 293 were female. The participants were of two nationalities: Saudi Arabia, which was comprised of 39.4% (279 physicians) of the participants and Non-Saudi Arabia which was also comprised of 60.6% (430 physicians) of the participants. In the medical specialty, there were 294 family medicine; 277 general practitioners, and on the other fields, there were 138 respondents. The summary of the background characteristics is as shown in Table 1.

**Table 1:** The socio-statistic data of the respondents (n = 710)

Description	Data
Gender	
Male	416
Female	293
Nationality	
Saudi	279
Non - Saudi	430
Medical Specialty	
Family medicine	294
General practitioner	277
Other	138
Years in Practice	
11 – 15 years	155
16 – 20 years	122
16 – 10 years	127
Less than 5 years	154
More than 21 years	151
City of work	
Dammam	138
Jeddah	304
Riyadh	267

The respondents were examined about their mentality towards diabetes. This determined whether they are in a situation to decide the different choices taken for the most part by the diabetes patients. The main explanation they were approached to give their perspectives on was: "A type 1 diabetic patient should visit an ophthalmologist following diagnosis." Indeed, 276 out of 709, which is 38.9% said no, and 433 of 709, which are 61.1%, said yes. The subsequent explanation asked was: "How soon after type 1 diabetes diagnosis should a patient visit an ophthalmologist." Respectively, 18.6% (132) said that the patients should visit five years later while 1.3% (151) responded that they were unaware of how soon the patients should visit an ophthalmologist. In addition, 19.7% (140 physicians) said that the patients are supposed to visit immediately after diagnosis, while 19.7% (140) asserted that the patients should visit one year after diagnosis. Furthermore, 20.6% (146) said that the patients should visit two years after diagnosis. Another statement the physicians were asked to approve was, "A type 1 diabetic patient should visit an ophthalmologist on a regular basis." According to the results, 18.8% (133) were unaware of the accurate answer, 37.7% (267) said no, while 21.7% (154) said that the patients should visit only when there are visual signs or symptoms, regardless of time of diagnosis, and 20.5% (145) said yes, the patients should visit the ophthalmologist regularly. Also, the interview investigated "how soon after type 2 diabetes diagnosis should a patient visit an ophthalmologist?" 147 physicians said the patients should visit after five years. 162 said that they don't know the time duration the patients are required to visit the ophthalmologist. 137 say the patients should visit immediately after diagnosis, 143 say that the patients should visit after one year, and 120 said

that the patients should visit after two years. The summary of the results collected about the physicians' knowledge about diabetes is as shown in Table 2.

**Table 2:** Reaction for training questions identifying with diabetic retinopathy

Description	Data
A type 1 diabetic patient should visit an ophthalmologist following diagnosis	
No	276
Yes	433
How soon after type 1 diabetes diagnosis should a patient visit an ophthalmologist	
Five years after diagnosis	132
I don't know	151
Immediately after diagnosis	140
One year after diagnosis	140
Two years after diagnosis	146
A type 1 diabetic patient should visit an ophthalmologist on a regular basis	
Don't know	133
No	267
Only when there are visual signs or symptoms, regardless of the time of diagnosis	154
Yes	145

## DISCUSSION

The main objective of the study was to assess the physicians' knowledge and awareness regarding Diabetic Retinopathy (DR). Hence, the design of the study was to depict the prevailing trends in knowledge, awareness, and practices of PCPs with regards to DR. As previously highlighted in the introduction and background section, the quantitative empirical findings through data analysis ascertained a number of issues formerly highlighted [1]. To illustrate, the analyzed results elucidated multiple shortfalls, especially in areas of screening tools, approaches, modalities of intervention, as well as screening guidelines by primary care providers in Jeddah, Dammam, and Riyadh. In line with the questionnaire initially deployed in the process of data collection, the discussion section will interpret the results and compare them with the theoretical underpinnings explained within the introduction section.

### Knowledge:

Apart from professional expertise that PCP usually acquires during training, there is an imperative need for an in-depth and comprehensive approach that will instill knowledge, regardless of the years of experience. Only a dismal scope of PCP is in apposition to deploy advanced medical tools such as ophthalmoscope while undertaking in-depth and detailed screening [2]. Consequently, this points to the scope of accuracy that is attainable by such PCP during screening. Subsequently, failure to understand the proper deployment of ophthalmoscope illustrates the high probability of inaccurate screening by PCP at the detriment of the patients [7]. In addition, responses regarding the actual time when a patient should seek medical intervention from ophthalmologists also point to a fundamental propel with the extent of knowledge among a majority of the PCP. Therefore, it is imperative that a concerted effort focuses on improving the understanding and knowledge if the PCP in understanding the underlying issues such as the accurate time when the patients should visit ophthalmologists. Such an approach will play a remarkable role in enhancing the accuracy of screening as well as a timely referral for effective management of DR [6]. Furthermore, such approaches will limit the likelihood of visits to ophthalmologists when the DR is in advanced stages. Instead, a timely recommendation for visits to the ophthalmologist will bolster the management strategies of DR.

### Awareness:

Awareness is a fundamental component in the healthcare system since it informs the capacity of physicians to arrive at certain decisions. Consequently, such decisions determine the ability of the patient to recover. In the case of DR, there is an imperative need for the patient to understand the underlying factors that exacerbate the condition

as well as those that mitigate the imminent risks. Indeed, screening approaches and subsequent referral to an ophthalmologist is a core component in the treatment and management of DR. It is glaringly evident that a significant number of the PCP who participated in the research were unaware of the exact time during which a patient should visit an ophthalmologist. Given the high population within the three different cities, there is an imperative need to tackle the trend in the scope of unawareness. Such an approach is necessary given the high number of diabetic patients that such PCP may be handling, given the high population concentration in such urban settings. Furthermore, as illustrated by the result section, the assertion that a patient should visit an ophthalmologist is indicative of an underlying challenge that may be troubling the healthcare systems in the three different cities given the scope of awareness [1]. However, with a strategic approach through workshops, seminars, and sensitization approaches, a concerted effort to educate the PCP on the fundamental details of DR will improve their awareness and play an instrumental role in ensuring professionalism and optimal outcome among patients undergoing diabetic treatment programs [1]. In particular, such an approach will not only inform the screening approaches but also enhance the scope of accuracy as well as the subsequent management approaches.

#### **Practices:**

In addition to knowledge and awareness among PCP, perhaps practice is an additional integral component which is essential in ensuring proper management as well as interventional approaches among patients with DR. From the result section, it is glaringly evident that a significant majority of the PCP have a significant duration of the experience. Such an approach should play an instrumental role in augmenting the overall responses as well as interventional strategies against DR [1, 2, 3]. Particularly, over 400 PCPs have been in practice for at least 5 years. Such a scope of experience should not only be optimized in improving the healthcare delivery processes by the PCP but also to incorporate expertise that will culminate in optimal patient outcomes.

Taking into consideration the empirical data, it is glaringly evident that the knowledge, awareness, and practice by the PCP in Jeddah, Dammam, and Riyadh are inadequate in handling the unprecedented surge of DR within the respective districts. Therefore, there is an imperative need to formulate a strategic approach that will improve the scope of knowledge and awareness of the PCP. Such a concerted effort will enhance patient outcomes, leading to improved outcomes among patients with DR conditions.

### **CONCLUSION AND RECOMMENDATIONS**

The research study elucidated specific defectives as well as shortfalls in the current state of awareness, knowledge, and practices among PCP in Jeddah, Dammam, and Riyadh/ Saudi Arabia. Multiple issues such as inadequate understanding of screening processes and tools, lack of knowledge regarding timely referral of patients, and professional use of critical devices such as ophthalmoscope were identified. Despite the above instances, the overall trend in the scope of awareness, knowledge and practice was satisfactory, hence pointing towards the ability of PCP in managing DR. Nonetheless, workshops, sensitization programs, and public health campaigns focus on improving the PCPs understanding of emerging complications of DR. Such a process will complement the current system and improve the management of DR.

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