

Determinants Delaying the Early Detection of Diabetic Retinopathy

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Abstract: Regular eye examinations help in early detection and enhance timely treatment for diabetic retinopathy (DR). *The aim of the present study:* Was to identify determinants delaying the early detection of diabetic retinopathy. **Design:** Descriptive exploratory design was utilized. **Setting:** The study was conducted in ophthalmology outpatient clinic at Sohag University Hospital. **Sample:** Convenient sample of 120 adult male and female patients diagnosed with diabetic retinopathy was included as a study sample. **Data collection tools:** Two tools were used in data collection, the first tool: Structured Interview Questionnaire for demographic and medical data and the second tool: questionnaire for determinants delaying the early detection of diabetic retinopathy. **Results:** The main findings revealed that lack of patients' knowledge; the financial cost and hospital services were the most prominent determinants delaying early detection of diabetic retinopathy. **Conclusion:** Determinants delaying the early detection of diabetic retinopathy are lack of knowledge, financial factors and hospital services determinants. **Recommendations:** Increasing patients' awareness about diabetes complications also regarding importance of regular eye checkup through the different mass media as well as apply developed program in the study setting.

Keywords: Determinants, Delaying, Detection, Diabetic retinopathy, Nursing instructions.

1. INTRODUCTION

Diabetes mellitus (DM) is the most common endocrine disorder. It is a chronic condition that occurs when there are elevated levels of glucose in the blood because the body cannot produce any or enough of the insulin hormone or use insulin effectively (World Health Organization, 2018). There are two major types of diabetes: type 1 diabetes (T1DM) and type 2 diabetes (T2DM). The difference between the two types has historically been established on age at onset, degree of loss of β cell function, degree of insulin resistance, presence of diabetes-associated autoantibodies, and requirement for insulin treatment for survival (Leslie, Palmer, Schloot & Lernmark, 2016).

Diabetes mellitus is a multisystem disease which if left uncontrolled it results in multi organ damage (Bodunde, Odusan, Ogunsemi, Ajibode & Raimi, 2014). Diabetes has intense effects on the structure and function of many tissues and organs in the body. It leads to a variety of complications grouped into macrovascular (large blood vessel) complications, such as cardiovascular disease and stroke, and microvascular (small blood vessel) complications, such as kidney disease and diabetic retinopathy (Diabetes Atlas, 2017 ; Tuttolomondo, Maida & Pinto, 2015).

Diabetic retinopathy is limited to people with diabetes as a result of chronic high levels of glucose in the bloodstream, which lead to damage in the small blood vessels of the retina in the eye (Hill & Makaroff, 2016). Diabetic retinopathy is defined as a disorder of the retinal circulation (microvascular abnormality) that reduces the delivery of oxygen and nutrients to the retina, thus being unable to meet the requirements of its high metabolic demands (Cunha-Vaz, Ribeiro & Lobo, 2014). It is characterized by gradual progressive retinal vasculopathy, endothelial cell dysfunction, breakdown of the blood-retinal barrier, ischemia-induced retinal neovascularization, and expansion of the extracellular matrix, resulting in the outgrowth of fibrovascular tissue at the vitreoretinal interface (Shin, Sorenson & Sheibani, 2014).

Unfortunately the majority of patients with DR did not recognize that they have diabetic retinopathy until the condition has progressed and often only when their vision starts to be affected and when they present late with irreversible advanced stages (Nentwich & Ulbig, 2015). Diabetic retinopathy and sight threatening diabetic retinopathy (STDR) are asymptomatic and it can progress to blindness if not treated early (International Council of Ophthalmology, 2017). It is essential for annual eye examination of the retina through a dilated pupil and fundus examination in order to help in identify patients with DR who are at risk of developing STDR and needing treatment (American Diabetes Association, 2017; Hill, 2016).

Several determinants certainly affect the underlying causes of unwillingness to have diabetic eye care; resulting in delaying early detection of diabetic retinopathy. However is important to increase awareness as well as reduce barriers regarding diabetic retinopathy to encourage patients with diabetes to receive early regular eye screening to reserve patients vision, improving patient screening compliance and diabetes outcomes.

Significance of the study

As a result of increasing number of patients with diabetes and DR, International Agency for the Prevention of Blindness (IAPB) and the World Health Organization (WHO) established a global program "VISION 2020: The Right to Sight " that signifying the importance of the joint goal to eliminate avoidable blindness by 2020 (Lansingh, Eckert & Phil, 2013).

Based on extensive reading of literature review and researches in addition to the investigator's clinical experience patients who admitted to the ophthalmology outpatient clinic at Sohag University Hospital; suffered from DR which increased dramatically and they had undetected advanced diabetic retinopathy, if DR had been detected earlier for these patients, irreversible visual impairment could prevented. So, the investigator hopes that the findings of this study could provide valuable insight on identifying these determinants.

Aim of the study

The current study was aimed to identify determinants delaying the early detection of diabetic retinopathy.

Research Question

The current study was carried out to answer the following question:

What are the determinants delaying early detection of diabetic retinopathy at Sohag university hospital?

2. SUBJECTS AND METHODS

Research Design

Descriptive exploratory design was used to carry out the present study.

Setting

The study was conducted in conducted at ophthalmology outpatient clinic at Sohag University Hospital, it consists of one room located at the sixth floor and it receives patients for retina examination on Saturday every week.

Sample

Convenient sample of (120) adult male and female patients diagnosed with diabetic retinopathy who are able to communicate and accept to participate was included in this study. Patients with any vascular disease causing retinopathy as (retinal vein occlusion, ocular ischemic syndrome.....etc) in one or both eyes were excluded from the study.

Tools of Data Collection

There are two tools developed by the investigators after extensive review of literature /researches:

I- Structured Interview Questionnaire, it consists of two parts: **First Part:** includes demographic data which collect data pertinent to the study such as age ,gender, level of education, place of residence, occupation .

Second part: includes data related to medical background such as type of diabetes mellitus and duration of diabetes. **II-** Determinants delaying early detection of diabetic retinopathy questionnaire: it includes determinants related to patients' knowledge, patients' attitude, patients' beliefs, health care services, occupational, financial and social determinants.

The developed tools were examined for content validity by submitting it to a panel of five nursing experts; three of them are professors in medical-surgical nursing, Faculty of nursing, Cairo University; and two are professors in ophthalmology medicine. Modifications were carried out according to the experts' recommendations. Reliability was tested α coefficient reliability for the determinants were 0.814.

Ethical consideration

Initial approval was obtained from the scientific research ethics committee in the Faculty of Nursing, Cairo University before starting the study and an official permission was obtained from the director of sohag university hospital to conduct the study. Explaining the purpose, nature of the study and its significance were assured. All participants were informed that their participation in the study is completely voluntary and they have the right to withdraw from the study at any time without explanation of the cause and without any penalty. Confidentiality was assured as the information was coded using numbers and will not be accessed by anyone or used for any research purposes without taking permission of the participants. Patients who met the criteria of selection and accepted to participate were asked to sign a written consent form.

Procedure

Data were carried out through two phase:

I-Preparatory phase: After extensive review of literature /researches, the investigators start to collect data for determinants delaying early detection of diabetic retinopathy and develop tools for data collection.

II-Implementation phase: the study participants were approached individually by the investigator to explain the purpose and the nature of the study, patients who approve to participate in the study were asked to sign the written consent form, after that the investigators proceed to collect demographic, medical background data sheet and determinants delaying early detection of diabetic retinopathy questionnaires, this step will take about 30-45 minutes for each patient.

Pilot study

A pilot study conducted on 10 % of total selected patients in the study setting. The involved participants in the pilot study were included in the research sample because no modification was done on the tools.

Statistical Analysis

Data was coded and analyzed using SPSS version 20. Descriptive statistics, percentage distribution and standard deviation were used.

3. RESULTS

Table (1): Frequency distribution of the study sample demographic characteristics (n= 120)

Variables	Values	No.	%
Age	<30 years	6	5.0
	30 -39	7	5.8
	40 – 49	17	14.2
	50 – >60	90	75.0
	\bar{x} & SD = 55.51±11.34		

Gender	Male	53	44.2
	Female	67	55.8
Educational Level	Cannot read and write	51	42.5
	Primary	22	18.3
	Preparatory	16	13.3
	Secondary	16	13.3
	University	15	12.5
Occupation	Governmental	29	24.2
	Private work	40	33.3
	Housewife	35	29.2
	Retired	16	13.3
Marital Status	Single	8	6.7
	Married	73	60.8
	Widow	32	26.7
	Divorced	7	5.8

Table (1) shows that patients' age ranged from less than 30 to above 60 years. The highest percentage (75.0%) was that for the age group from 50 to more than 60 years. The mean age of the study sample is Mean \pm SD 55.51 \pm 11.34. More than half of patients were females (55.8%). As regards to their level of education (42.5%) can't read and write, (18.3%) primary education, and (12.5%) university. Regarding the occupation (29.2 %) were housewife and (33.3%) working in private work and (24.2%) in governmental work. Most of the sample (60.8%) was married, while (26.7%) were widow.

Table (2): Frequency and percentage distribution of medical data of the study sample

Variables	Values	No.	%
Type of Diabetes Mellitus	Type I	13	10.8
	Type II	107	89.2
Duration of diabetes mellitus	<10 years	27	22.5
	10 < 15 years	60	50.0
	15 <20 years	21	17.5
	>20years	12	10.0
Other health problems	Hypertension	55	45.8
	Heart disease	15	12.5
	Liver cirrhosis	20	16.7
	Cancer	3	2.5
	Renal failure	13	10.8
Source of information	Physician	40	33.3
	Other patients	35	29.6
	Nurses	28	23.3
	Media	7	5.8
	Reading books	10	8.3

Table (2) shows that (89.2%) of the patients had type 2 DM and (10.8%) had type 1 DM. Regarding the duration of diabetes half of the patients' (50%) had diabetes from 10 to less than 15 years and (22.5 %) had diabetes less than 10 years and (17.5 %) from 15 to less than 20 years . Regarding other medical conditions (45.8%) had hypertension and (16.7%) had liver cirrhosis and (12.5%) had heart disease. Regarding source of information about diabetes and diabetic retinopathy (33.3%) of the study sample reported that they had information from physician followed by other patients (29.9%) and only (23.3%) of the sample had information from the nurses.

Figure (1): Percentage distribution of the total study sample knowledge about diabetes and diabetic retinopathy (N=120).

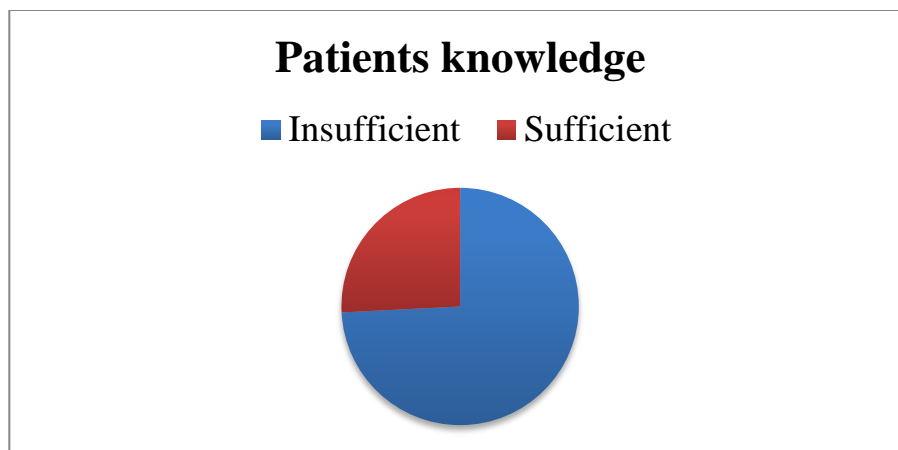


Figure (1) show that only 26% of the study sample had sufficient knowledge about diabetes and diabetic retinopathy and the majority of the study sample 74% had insufficient knowledge about diabetes and diabetic retinopathy

Table (3): Percentage Distribution of Determinants related to Financial Cost (N=120).

Determinants	Yes		No	
	No	%	No	%
Unavailability of medical insurance	74	46	46	38.3
Fear of expensive cost for eye checkup	76	63.3	44	36.7
Poor awareness of availability of free eye checkup	74	61.7	46	38.3
Salary is only covering basic life	90	75	30	25
Commitment to another financial priority.	85	70.8	35	29.2
Lend from other to cover cost of eye checkup	72	60.0	48	40.0

Table (3) Determinants related to financial factors show that about more than half of the study sample (61.7%) delay eye checkup due to unavailability of medical insurance, while (63.3%) because of fear of expensive cost of eye checkup, also (61.7%) had poor awareness about free eye checkup, (75%) their salary only covering basic life, (70.8%) were committed for another financial priority and (60.0%) lend money to cover cost of eye checkup.

Table (4): Percentage distribution of the Determinants related to Social Determinants (N=120)

Determinants	Yes		No	
	No	%	No	%
Lack of time for regular checkup	70	58.3	50	41.7
Difficulty to leave home alone.	60	50.0	60	50.0
Lack of escort to accompany me to the hospital	69	57.5	51	42.5
No family support.	46	38.5	74	61.7

Table (4) determinants related to Social factors show that (58.3%) of the study sample delay eye checkup as they don't have enough time. While (50.0%) report difficulty to leave home alone, another (57.5%) mention that lack of escort to accompany them to the hospital and (38.3%) had no family support for regular eye checkup.

4. DISCUSSION

Diabetic retinopathy is the leading cause of new cases of blindness. Routine dilated inclusive eye examination has a critical role for prevention of diabetes complication and to help in early detection and treatment of diabetic retinopathy. So that the present study aims to identify determinants delaying the early detection of diabetic retinopathy

As regards medical data of the current study, the findings showed that the numbers of female patients are more than male patients as well as the age of the majority of the study sample were ranged from 50 to more than 60 years. These findings are consistent with **Chan & Yap (2016)** who reported that more than half of the study sample were females with age group between 50 – 59 years. In contrast, these results aren't in the same line with study of factors determining uptake of diabetic retinopathy screening in Oxford which was done by **Moreton, Stratton, Chave, Lipinski & Scanlon (2017)**, who reported that majority of the study sample were male, these differences may be due to females are more susceptible for obesity as well as lack of exercise and a special diet that lead to increase risk factors for diabetes mellitus.

Regarding level of education high percent of the study sample can't read and write, and about eighteen percent had primary level of education. This result matched with **Srinivasan (2017)** ; **Islam, Kawasaki & Finger (2018)** who mentioned that the majority of the sample was illiterate. In relation to type and duration of diabetes; the results of the present study revealed that the majority of the study sample had type II diabetes and half of them had diabetes from 10 to less than 15 years, these results agree with study done by **Konstantinidis, (2017); Ibrahim, Foster & Oluleye (2015)** who indicated that the majority of the sample reported type 2 diabetes and they had duration of 10 years or more.

Regarding other medical condition, the present study reported that majority of the study sample had complained from hypertension, these results agree with **Alrashedi (2019)** who mentioned that half of the patients suffer from high blood pressure and the most common medication used was tablets, these results may be due to hypertension is considered one of the risk factors that increase frequency of diabetic retinopathy.

As regard source of information about diabetes and diabetic retinopathy, in this study the majority of the patients receive information from physician, other patients, and nurses respectively, these findings agree with **Bakkar, Haddad, Gammoh (2017)** who reported that approximately half of the study sample receives information from doctors. In contrast, these results aren't in the same line with study of Awareness of diabetes and diabetic retinopathy among a group of diabetic patients that done by **Hamzeh, et al (2019)** who reported that the most common sources of information were patients with diabetes, physician and followed by the media.

Regarding patient's knowledge the current study mentioned that the majority of patient's had an unsatisfactory level of knowledge about diabetes and diabetic retinopathy. The finding of this study was in the same line with **Ibrahim, Foster (2015)** to assess Barriers to an Effective Diabetic Retinopathy Services in Ibadan, Nigeria and study in Bangladesh by **Islam (2018)** to Assess Factors Associated With Participation In a Diabetic Retinopathy Screening Program who reported that decrease in level of knowledge among patients with diabetic retinopathy. However the previous results is contraindicated with the study done by **Almalki, Almalki & Alswat (2018)** who reported that about two third of screened patients were considered to have good knowledge about DR. These conflicts may be due to differences in the patient's age, majority of study sample were illiterate and female patients also may be due to decrease in socioeconomic status of the present studied sample.

Regarding financial determinant the results of the present study reported that approximately three quarter of the study sample reported that their salary only covering basic life and they were commitment to another financial priority, this result is in agreement with **Vengadesan et.,al (2016)** ; **Chan (2016)** who mentioned that financial cost "is the most predominant cause for delayed regular eye checkup.

Regarding social determinants, results of this study showed that the major social determinants are lack of time for regular screening, lack of escort study respectively. These results agree with the results done by **Bakkar (2017)** who reported that the commonest social determinants are that approximately two third of the study sample mention that they lack of time for screening. Also, half of the study sample reported that the second commonest social determinants that delay early detection of diabetic retinopathy was Lack of escort (relatives) to accompany them to the hospital, these findings supported by **Droege, et al, (2013)** and **Thompson (2015)** who reported that the major reason for noncompliance for regular eye checkup was "no one to accompany me to the hospital for regular eye checkup".

5. CONCLUSION

The current study concluded that lack of patients' knowledge about diabetes complication and importance of regular eye checkup for early detection of diabetic retinopathy, financial cost were the major determinants in delaying the early detection of diabetic retinopathy.

6. RECOMMENDATIONS

Based upon the findings, the study suggested the following implications and nursing instructions:

- Apply developed program in the study setting for diabetic patients regarding diabetes complications to raise importance of regular eye checkup.
- Growing patients' health literacy regarding eye diseases including DR or general diabetes-related health literacy is required at all socioeconomic levels to improve comprehensive attendance level.
- Using different mass media to increase public and diabetic patients about diabetes mellitus and its complications.

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