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Type 2 Diabetes Risk Assessment in Health Care workers at Rashid Hospital - Dubai: A Cross-Sectional Study

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Abstract

Background: Type 2 diabetes is a common and costly chronic disease in general as well as in the working population and its prevalence is increasing at an alarming rate. There are approximately 3000 healthcare professionals working in Rashid Hospital in different specialties. **Objective:** This study aimed to determine the prevalence of Type 2 Diabetes risk among health care workers at Rashid Hospital. **Methodology:** A cross sectional study including a convenience sample was selected by using Open Epi software from the projected population size of 3000. Data collected by using a standardized diabetes risk assessment tool (FINDRISC tool, Finnish Diabetes Risk Score) for a period of one year. **Results:** The study revealed that 45.1% of the participants were at low diabetes risk, 35.3% were at slightly elevated risk, 12.2% at moderate risk, 6.9% at high risk, and 0.5% at very high risk. Age, body mass index, waist circumference, daily physical activity, daily consumption of fruits, berries or vegetables, history in intake of antihypertensive medications, history of high blood glucose during illness or pregnancy and family history of diabetes had a great impact. Up on analysis Nurses are at high risk of contracting the disease shortly if you consider the combined value of high risk and very high-risk category (9.5%) as opposed to Doctors (1.8% +0.9%=2.6%) and other health care staff (4.5+1.5=6%). **Conclusion:** The modifiable factors like body weight, physical activities and food habit can decrease the risk of developing type 2 diabetes among Rashid Hospital healthcare professionals. Health promotion and education can decrease the diabetes risk and occupational health facility can support the follow up.

Key Words: Diabetes risk · Risk factors ·Type 2 Diabetes mellitus.

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1. INTRODUCTION

Diabetes has emerged as one of the world's biggest health problems and its prevalence is increasing at an alarming rate. It is a common disease and globally an estimated 425 million have diabetes. By 2045, the number of diabetics is going to increase 629 million. Figures from the International Diabetes Federation revealed that, in 2019, I in 11 adults between the age group of 20 to 79 years have diabetes. 1 in 2 adults with diabetes are undiagnosed. 10% of global health expenditure spent on diabetes. 1 in 5 people with diabetes are above 65 years old. Almost two /thirds (63%) of people with diabetes are of working age (under 60 years). Expected to increase the number to 700 million by year 2045. Estimation of global prevalence of diabetes in the 20 to 79-year age group is 463 million in 2019(1).

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The global prevalence (age-standardized) of diabetes has nearly doubled since 1980, rising from 4.7% to 8.5% in the adult population. This reflects an increase in associated risk factors such as being overweight or obese. Over the past decade, diabetes prevalence has risen faster in low- and middle-income countries than in high-income countries. Diabetes caused 1.5 million deaths in 2012. Higher-than-optimal blood glucose caused an additional 2.2 million deaths, by increasing the risks of cardiovascular and other diseases. Forty-three percent of these 3.7 million deaths occur before the age of 70 years. The percentage of deaths attributable to high blood glucose or diabetes that occurs prior to age 70 is higher in low- and middle-income countries than in high-income countries. Worldwide statistic shows Diabetes among 1 in 2 remains undiagnosed (2).

A study done to identify the association between shift work and diabetes among 19873 Danish female nurse in 2013 by The Danish National Diabetes Register (NDR) and found statistically significantly increased risk of diabetes in nurses who worked at night or evening shifts when compared with regular morning shift in the fully adjusted models including BMI (3). Another study done in India to identify the prevalence of diabetes, hypertension and obesity among doctors and nurses in Tamilnadu, shows prevalence of Diabetes mellitus to be 25.4% among doctors and 5.6% among nurses (4) .

Based on a study conducted in Nigerian tertiary hospital to identify the risk of developing Diabetes mellitus among healthcare workers, one hundred and six (106) healthcare workers participated in the study; 62(58%) were males and 44 (42%) were female (male: female ratio of about 1.5:1.0). The majority (71%) were aged below 40 years, while there was no participant over 65 years. Thirty eight (36%) were medical doctors and 26 (24%) were nurses. The others were Healthcare assistants (13%), pharmacists (11%), laboratory scientists (8%), and physiotherapists (7%). Forty seven (44%) had an elevated risk of developing type 2 diabetes within 10 years. However, only 36% of those with an elevated risk were in the 'moderate' to 'very high' risk groups. The risk of developing type 2 diabetes was higher in females (27/62 or 46%) than in males (20/44 or 43%). (5).

The aim of the study is to identify the prevalence of Type2 Diabetes risk among health care workers at Rashid Hospital. In addition, to find out the risk factors associated with type2 diabetes risk status and to identify the efficacy of lifestyle health promotion intended to improve health risk factors, such as weight, body mass index (BMI), physical activity, and lifestyle that may lead to type2 diabetes affecting the health of healthcare workers and their work performance. Also, it is testing the hypothesis that practicing a non-healthy lifestyle would be a risk factor for developing type 2 Diabetes Mellitus.

2. METHODOLOGY

Hospital healthcare workers based, cross-sectional study carried out in Rashid Hospital, Dubai Health Corporation. Rashid hospital is a tertiary hospital serving the people of UAE with around 3000 healthcare workers. Increasing, the prevalence of type 2 diabetes among the people is a warning signal for increase in prevalence of diabetes among healthcare workers too. Early identification of risk in the healthcare workers will help to prevent diabetes by early modification of lifestyle which intern improves the health and economy.

To identify the prevalence of type 2 diabetes risk in Healthcare workers conducted since January 2020 in Rashid Hospital. The source population are Multidiscipline aged 18years and above directly under employment of Rashid Hospital, Dubai Health Corporation. The subjects involved are 50% nursing staff, 30% doctors and 20% other health care workers. A convenience sample was selected by using Open Epi software from the projected population size of 3000, confidence level of 95%, marginal error 5% and the z- score 1.96% and sample size 583. The research team members collected the data based on FINDRISC screening tool. The inclusion criteria of the subjects were staff in Rashid Hospital, both sex, age above 18 years and all nationalities. The exclusion criteria of the participants were pregnant women, people with known diabetes, age below 18 and above 65years.

The Finnish Diabetes Risk Score (FINDRISC) questionnaire designed by Finnish diabetes association is an open resource which is a useful and validated risk assessment tool to identify unknown T2DM and estimate the probability of a person to develop diabetes within the next 10 yrs. It comprises of eight variables associated with anthropometric parameters and lifestyle factors. The maximum value of the FINDRISC score is 26. FINDRISC score lower than 7 is considered to denote in very low diabetes risk, 7–11 in low risk, 12–14 in moderate risk, 15–20 in high risk and 21 or more in very high risk. The validity, of the FINDRISC tool is assessed in Botswana, to identify undiagnosed T2DM among people in a general hospital outpatient unit and is modestly effective in detecting undiagnosed T2DM in this population; its overall accuracy is not so different from similar studies in other populations. It can still play a useful role in diabetes screening strategy due to its simplicity, reliability and moderate accuracy. (6).

This research does not have any risk to the subjects. The data were coded, entry and data analysis made by using SPSS 22 software version. The data tested at a level of significance of 95%. Data

Variables	Group		n	%
Age	years 45>		461	79.1
	years 54–45		107	18.4
	years 64–55		14	2.4
	Over 64 years		1	0.2
BMI	kg/m2 25>		234	40.1
	kg/m2 30–25		272	46.7
	kg/m2 30<		77	13.2
Waist circumference	Men	Women		
	80>	94>	292	50.1
	to 102	80 to 88 94	176	30.2
	88<	102<	115	19.7
Exercise	Yes		450	77.2
	No		133	22.8
Healthy diet	Everyday		411	70.5
	Not every day		172	29.5
Regular BP medications	No		523	89.7
	Yes		60	10.3
High blood sugar/GDM	No		497	85.2
	Yes		86	14.8
Family history of diabetes	No		187	32.1
	Yes (grandparent, aunt, (uncle or first cousin		124	21.3
	Yes (parent, brother, or (own child		272	46.7

Table 1: Demographic data for participants

presentation was done by descriptive statistics in the form of percentages and frequencies for qualitative variables.

3. RESULTS

In the study 79.1% of the participants were under 45 years, 18.4% were between 45 to 54 years, 2.4% were between 55 to 64 years and on the extreme only 0.2% were above 64 years. BMI among 40.1% of the participants were <25kg/M2, 46.7% were between 25-30 kg / m2 and 13.2% were above 30kg/m2 . Waist Circumference of the 50.1% of the participants had the least meanwhile 19.7% had high score.77.2% of the participants had daily physical activity while 22.8% were not moreover 70.5% of the subjects had a healthy eating pattern and 29.5% were not.The data shows 89.7% were not taking anti-hypertensive medications on regular basis and 10.1% were on blood pressure medications. 85.1% were in significantly higher group who were not had any history of gestational diabetes or high blood sugar. 14.8% had history of gestational diabetes or high blood sugar. Examines the prevalence of family history. 46.7% had significant history of Type 2 diabetes mellitus in immediate family members. 21.3% have history in grandparents, uncle and first cousin. Whereas 32.1% had no family history.

The study revealed that among the participants 45.1% of the them were at low diabetes risk, 35.3% were at slightly elevated risk, 12.2% at moderate risk, 6.9% at high risk, and 0.5% at very high risk.

The $\chi 2$ test showed that the different categorical variables were based on health professions (Nurses, Doctors, and other health professionals). The test results came out statistically significant ($p < 0.05$). Upon analyzing the results in table II, 9.5% of Nurses had elevated risk, and no one was in the very high category. However, 0.9% of Doctors and 1.5% of other staff were in the high-risk category. Though other health workers had a high percentage of high-risk category in comparison with Doctors and Nurses, it is worth noting that they have 38.8% are in the slightly elevated category, which is higher than nurses (33.6%) and Doctors (49.6%). Out of three groups, Doctors had the lowest risk of contracting diabetes, as almost 50% were in the low-risk category. This is followed by 45.5% of other staff and 43.5% of nurses. Upon further analysis, Nurses are at high risk of contracting the disease shortly if you consider the combined value of high risk and very high-risk category (9.5%) as opposed to Doctors (1.8% +0.9%=2.6%) and other health care staff (4.5+1.5=6%).

The study consists of 583 participants, among them 336 participants were nurses who contribute 57.6%, 113 were doctors who comprise 19.4% and 134 were other health care professionals who contribute 23%.

4. DISCUSSION:

Diabetes mellitus is one of the major public health problems causing significant morbidity and mortality. Foreseeing this, prevention of Type 2 diabetes among the public is a critical public health priority. The FINDRISC can be used as a self-administered test to screen people at high risk for T2DM. It can also be used in the general population and clinical practice to identify undetected T2DM, abnormal glucose tolerance, and metabolic syndrome.

There was a significant association between diabetes status of individuals and their age (> 40 years, $p < 0.001$).Age has a significant impact on diabetes prevalence and incidence. A study by Mohan et al. (7) showed that there is a significant increase in the diabetes prevalence as people advance above 40 years of age.Based on our study which reveals about 21% of the healthcare workers in Rashid hospital are above 45 years .

According to the study done by K.M.V. Narayan et al (8) about the effect of BMI on lifetime risk for diabetes in the U. S. population showed overweight and especially obesity, particularly at younger ages, substantially increases lifetime risk of diagnosed diabetes. Based on this study done in healthcare professionals in Rashid hospital it revealed that BMI among 40.1% of the participants were

normal BMI, 46.7% with overweight and 13.2% are obese. Combined value of overweight and obesity shows 59.9% and they are in the high risk category to contribute DM.

Among the study population 49.9% (391)are having abnormal waist circumference , is a significant value has importance in development of diabetes mellites .

Life style intervention like healthy diet and exercises has significant effect on occurrence of diabetes (9). Unlike in the study by Lindstrom and Tuomilehto [10], both daily intake of vegetables and fruits or berries and physical activity were not statistically significant.In our study (172)29.5 % of healthcare workers are not consuming adequate vegetables and fruits, moreover 22.8 %(133) are leading sendentary life style without physical activites.

As per Wagner et al found that family history is an important risk factor for prediabetes(11), in our study, family history was highly significant about 68 %(396samples) with family history of diabetes .

Cumulative incidence of type 2 diabetes increased markedly in the first 5 years after delivery and appeared to plateau after 10 years .An elevated fasting glucose level during pregnancy was the risk factor most commonly associated with future risk of type 2 diabetes.(12).based on our study 14.8% had history of gestational diabetes or high blood sugar , this shows they are significantly high risk for developing diabetes melites in future.

A study done by Sneha et al to assess the asoociation between Antihypertensive Drug Use and Occurrence of New-onset Diabetes in South Indian Patients,and they found Patients on non-Dihydropyridine calcium channel blockers, diuretics, and combination antihypertensives showed more chances of developing New onset of diabetes(13) .As per our study 10.1%of the study population were on regular antihypertensive medications.

5. CONCLUSION

Prevention of T2DM among Health care workers is crucial for healthy work environment. The study used the FINDRISC method, a self-administered tool to identify the critical variables that could contribute to DM. Age, BMI, Waist circumference, daily consumption of fruits, berries, or vegetables and daily physical activity, history of antihypertensive drug treatment, history of high blood glucose, and family history of diabetes have a significant relationship with the risk of Type 2 Diabetes mellitus. This tool's regular risk assessment is highly recommended to assess the risk status. Since unmodifiable risk factors like age and family history cannot be controlled, maintaining the modifiable factors such as a healthy lifestyle with healthy food and exercise to decrease the risk of developing type 2 diabetes mellitus among the health care workers should be rudimentary. Health promotion and education can directly influence and reduce the risk of developing Type 2 diabetes mellitus. This study was limited to health care professionals in one hospital, and future studies could target new segments in other industries. This study is a novel attempt to gauge an in-depth understanding of the susceptibility of health care workers related to DM. Early intervention in diet coupled with physical activities could help decrease the risk of developing type 2 diabetes mellitus among the health care workers.

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7. STATEMENT OF ETHICS

Ethical approval obtained from the research committee in Rashid Hospital prior to data collection.

8. DISCLOSURE STATEMENT

The authors declare that they have no conflicts of interest.

9. FUNDING SOURCES

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10. AUTHOR CONTRIBUTIONS

Sali George Kurian, was the principal investigator.

Asha Susan Philip; Rasha Talieb Khalied Wahbea; Rexy Powlin Rose Xavier, were the data collector.

Osama Qasim Al Diabat was the supervisor and did the proofreading.

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