Original Research Article

ASSESSMENT OF AWARENESS, KNOWLEDGE AND SKILLS TOWARDS DIABETES MELLITUS AND ITS COMPLICATIONS IN COASTAL SOUTH INDIAN DIABETIC POPULATION: A CROSS SECTIONAL STUDY.

ABSTRACT

Background*: Diabetes mellitus (DM), a major chronic disease presents with an escalating health problem in India. Diabetes is a growing health concern in India, with half of the population at risk of developing the disease at certain stages of life. Awareness and knowledge towards diabetes mellitus and its complication is the key to better treatment and control.*

Objective: *The aim of this study was to assess the awareness, knowledge and skills (meaning?) towards diabetes mellitus and its complications in coastal south Indian diabetic population.*

Materials and Methods: *A hospital based cross-sectional study was conducted among 336 subjects. A structured questionnaire was prepared and filed by diabetic patients to assess their knowledge, awareness and skill (what skill). The contents of this questionnaire included general ideas about DM, the importance of Glycemic control, general awareness of diabetes complications, knowledge about insulin and insulin injection techniques, target blood sugar levels, glycemic control in pregnancy, the importance of a diet/diet plan, the importance of physical activity and significance of physician follow up, these were read to the participants in their language of preference and were marked as either "aware" or "unaware".*

Results*: Nearly half of the population (42%) had poor knowledge, awareness and skill and only 8% of the population had excellent knowledge and awareness toward diabetes mellitus and its complications. Among the study group, 70% of the males had poor knowledge/awareness, 90% were illiterate and 84%, were unemployed had poor knowledge/awareness of diabetics, and among patients with a history of alcohol 88% of the males had poor knowledge/awareness.*

Conclusion: *The findings from this study revealed a poor knowledge level, awareness and skills towards diabetes mellitus and its complications among the respondents, thus emphasizing the need for awareness among diabetic subjects for better control of diabetes mellitus.*

*Keywords****:*** *Diabetes mellitus, Awareness, Knowledge, Skill.*

INTRODUCTION :

Diabetes mellitus (DM), a significant and devastating (not always devastating) chronic disease is an escalating health problem in India [1]. In India, a country with a 1.39 billion (139 cores) population, the estimated number of diabetes patients is 74.2 million in 2021, for the 20-79 years age group and is predicted to increase to 134 million in 2045. According to estimations, approximately 422 million adults live with diabetes mellitus globally [2] and suggested, in 2040 the global prevalence of diabetes mellitus will be 642 million due to sedentary lifestyles, rapidly growing urbanization, and modified diets.[3]

Diabetes, a metabolic disorder, is the most common cause of non-traumatic lower-limb amputations and cardiovascular diseases [4] thus increasing the risk of various micro-vascular and macro-vascular diseases such as coronary artery disease, blindness, stroke, kidney failure, foot amputation leading to

increased morbidity [5,6]. Thus diabetes is a growing health concern in India, with half the population at risk of developing the condition at certain stages of life.

Awareness and knowledge of diabetes mellitus and its complication is the key to better treatment and control. Studies have revealed that the proportion of good knowledge regarding diabetes mellitus is 49.9% in India [7] and 28.2% in Indian rural states [7] .Low levels of knowledge were associated with poor diabetes management and its risk factors [8]. The level of literacy, availability of information and training received is directly related to the level of knowledge on diabetes [9] but in India, there is a shortage of trained personnel to provide education about diabetes and its associated complications [10].Thus a new survey on knowledge, attitudes, and skill about diabetes mellitus is badly (wrong word) needed. This study was designed to assess the awareness, knowledge, and skill toward diabetes mellitus and its complication which may promote early detection and management of diabetes mellitus.

The aim of this study was to assess the awareness knowledge and skills of diabetes mellitus and its complications in the coastal south Indian diabetic population.

MATERIALS AND METHODS :

This hospital-based cross-sectional study was conducted among three hundred thirty-six subjects aged 18 years and above and of any gender (there are only two gender), who were visiting for consultation at the Diabetic OPD (OPD in full). The survey was conducted from January 2021 to June 2021. Those diabetic patients who were critically ill during the data collection period were excluded from the study. A data collection tool was designed based on the study objective. A structured questionnaire was prepared and filled out by diabetic patients to assess their knowledge, awareness, and skill. The contents of this questionnaire included general ideas about DM, the importance of Glycemic control, general awareness of diabetes complications, knowledge about insulin and insulin injection techniques, target blood sugar levels, glycemic control in pregnancy, the importance of a diet/diet plan, the importance of physical activity and significance of physician follow up, these were read to the participants in their language of preference and were marked as "aware" or "unaware". The socio-demographic information included age, sex, marital status, education level, occupation, family history of DM, and history of smoking.

The questionnaire was validated for content and reliability by adopting a systematic, seven-step process[11]. A diabetes awareness questionnaire was validated by three diabetologists and suggestions were incorporated.

1. Conduct a literature review- to ensure that the construct definition aligns with relevant prior research and theory and to identify existing questionnaires or items that might be used or adapted.2. Conduct interviews and/or focus groups- to learn how the population of interest conceptualizes and describes the construct of interest.3. Synthesize the literature review and interviews/focus groups- to ensure that the conceptualization of the construct makes theoretical sense to scholars in the field and uses language that the population of interest understands.4. Develop items/questionnaires - to ensure items are clear, understandable, and written in accordance with current best practices in survey design.5. Conduct expert validation - to assess how clear and relevant the items are with respect to the construct of interest. 6. Conduct cognitive interviews- to ensure that respondents interpret items in the manner that the survey designer intends.7. Conduct pilot testing - to check for adequate item variance, reliability, and convergent/ discriminate validity with respect to other measures.

STATISTICAL ANALYSIS:

Data analysis was performed using the statistical package for social science (SPSS) version 23.0. Respondent's socio-demographic characteristics were stated using descriptive statistics. Frequency and percentage were used for the categorical variables.

RESULT:

Among 336 diabetic patients enrolled, 196(58.3%) were males and 140 (41.7%) were females with a mean age of 55 ± 10 years. Among the participants, 24 (7.1%) were illiterate, 330 (98.2%) were married; 68 (20.2%) were unemployed and half of the participants (58.6%) were private employers. 210 (62.5%) of the patients had a positive family history of diabetes; nearly half of the male patients (47.6%) had a history of smoking and 41.07% of them had a history of alcohol use. 58.9% had 5-10 years of diabetes duration. Participants' sociodemographic characteristics are shown in table1.

While assessing the awareness about diabetes mellitus and complications, more than half of the patients lack knowledge on general ideas of DM, the importance of glycemic control, general awareness of diabetes complications, knowledge about insulin and insulin injection techniques, target blood sugar level, glycemic control in pregnancy, the importance of diet/diet plan, the importance of physical activity and significance of physician follow up. Participant's awareness of diabetes mellitus and complications are shown in table 2 and in figure1.

Among the study group, 70% of the males had poor knowledge/awareness, 90% were illiterate and 84%, were unemployed had poor knowledge/awareness of diabetics, and among patients with a history of alcohol 88% of the males had poor knowledge/awareness. Knowledge/ awareness of diabetes mellitus in the study population is tabulated in table 3. It is clear that the majority of the population lack knowledge, awareness, and skill regarding diabetes mellitus, figure 2; nearly half of the population (42%) had poor knowledge, awareness, and skill and only 8% of the population had excellent knowledge and awareness toward diabetes mellitus and its complications.

Table 1: Sociodemographic characteristics of Diabetic Population.

Variables	***Category***	***N=336***	***Percentage %***
Age (mean ± SD)			*55 ± 10years*
Sex	*Male*	*196*	*58.3%*
	Female	*140*	*41.7%*
Educational status	*Illiterate*	*24*	*7.1%*
	Primary school	*30*	*8.9%*
	Secondary school	*30*	*8.9%*
	Pre-university	*60*	*17.8%*
	Undergraduate	*152*	*45%*
	Post graduate	*40*	*11.9%*
Marital status	*Married*	*330*	*98.2%*
	Single	*6*	*1.78%*
Occupation	*Unemployment*	*68*	*20.2%*

	Housewife		*36*	*10.7%*
	Government employer		*35*	*10.4%*
	Private employer		*197*	*58.6%*
Family history of dm	*Yes*		*210*	*62.5%*
	No		*126*	*37.5%*
History of smoking	*Male*	*Yes*	*160*	*47.6%*
		No	*36*	*10.7%*
	Female	*Yes*	*0*	*0%*
		No	*140*	*41.6%*
History of alcohol	*Male*	*Yes*	*138*	*41.07%*
		No	*58*	*17.26%*
	Female	*Yes*	*0*	*0%*
		No	*14*	*41.6%*
Duration of diabetes	*1-5 year*		*86*	*25.59%*
	5-10 year		*198*	*58.9%*
	10-15 year		*52*	*15.4%*

Table 2: Participants awareness about diabetes mellitus and complication.

Variables	***Aware***	***Unaware***
General ideas of DM	*116*	*220*
	(34.5%)	*(65.47%)*
Importance of glycemic control	*104*	*232*
	(30.9%)	*(69.04%)*
General awareness of diabetes complication	*126*	*210*
	(37.5%)	*(62.5%)*
Knowledge about insulin and	*96*	*240*

insulin injection techniques .	*(28.57%)*	*(71.42%)*
Target blood sugar levels	*62*	*274*
	(18.45%)	*(81.54%)*
Glycemic control in pregnancy	*126*	*210*
	(37.5%)	*(62.5%)*
Importance of diet/diet plan	*157*	*185*
	(46.7%)	*(55.05%)*
Importance of physical activity	*144*	*192*
	(42.8%)	*(57.14%)*
Significance of physician follow up	*117*	*219*
	(34.8%)	*(57.14%)*

Table 3: Knowledge/awareness of Diabetes Mellitus in study population.

Variables	***Category***	***Knowledge/awareness***	
		Good knowledge	***Poor Knowledge***
Sex	*Male*	*30%*	*70%*
	Female	*40%*	*60%*
Educational status	*Illiterate*	*10%*	*90%*
	Primary school	*20%*	*80%*
	Secondary school	*25%*	*75%*
	Pre-university	*30%*	*70%*
	Undergraduate	*36%*	*64%%*
	Post graduate	*60%*	*40%*
Marital status	*Married*	*24%*	*76%*
	Single	*28%*	*72%*

Occupation	*Unemployment*		*16%*	*84%*
	Housewife		*22%*	*78%*
	Government employer		*25%*	*75%*
	Private employer		*30%*	*70%*
Family history of DM	*Yes*		*60%*	*40%*
	No		*22%*	*78%*
History of smoking	*Male*	*Yes*	*18%*	*82%*
		No	*16%*	*84%*
	Female	*Yes*	*20%*	*80%*
		No	*22%*	*78%*
History of alcohol	*Male*	*Yes*	*12%*	*88%*
		No	*14%*	*86%*
	Female	*Yes*	*18%*	*82%*
		No	*20%*	*80%*
Duration of diabetes	*1-5 year*		*18%*	*82%*
	5-10 year		*24%*	*76%*
	10-15 year		*27%*	*78%*

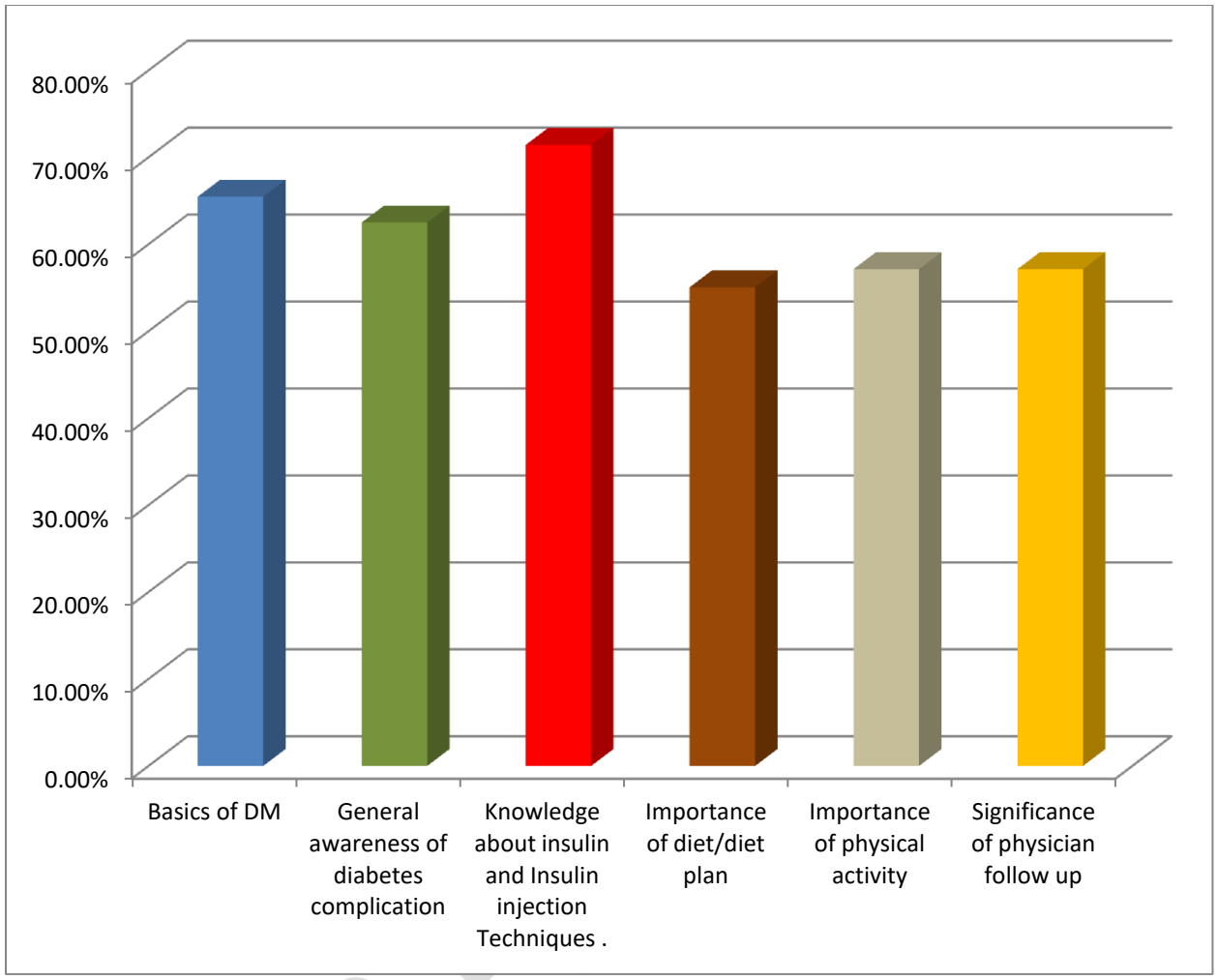

Fig 1: Bar graph showing poor participants awareness about Diabetes Mellitus and complication.

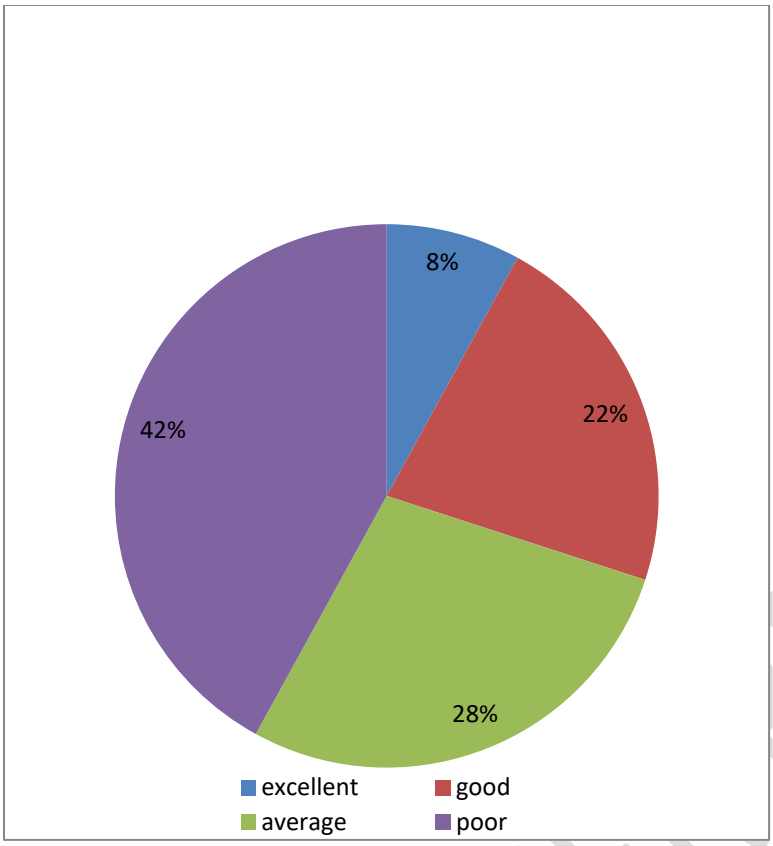

Fig 2: Pie chart showing knowledge, awareness and skill of diabetes mellitus in study population.

DISCUSSION:

Diabetes mellitus is a metabolic disorder that results from an absolute or relative insulin deficiency. Studies from both developed and developing countries have reported that the knowledge about DM is generally poor among diabetic patients [12].(give at least 2 references, one each from developing and developed nation) Awareness, knowledge, and skills regarding diabetes vary depending on socioeconomic conditions, cultural beliefs, and habits. Public knowledge about diabetes helps to combat not only the disease but also its complications, and medical and socioeconomic consequences[13]. The current study showed that 65.47% of the study population was unaware of the general ideas of dm (very poor and unimaginable) and 62.5% lacked knowledge about its complications. This result is similar to a study done by Minhat et al and Hamedon et al who reported, that only 41.9% of the population were aware and 58.1% had a poor level of understanding related to dm, which indicates knowledge and awareness regarding diabetes needs to be improved upon [14].

In our study, 81.54% of diabetic patients lack knowledge about the target blood sugar levels. Studies have consistently shown that complications of DM can be reduced by improved glycemic control[16]. If blood glucose levels are not managed appropriately it could impair cellular function and may be lethal[16].Adopting lifestyle interventions such as diet modifications and physical activity are important to maintain blood glucose levels and reduce long-term problems{17].Regular exercise, limiting alcohol and smoking and healthy eating is the key to managing dm (quite unimaginable) and achieving proper quality of life .55.05% of our diabetic patients were unaware of a diet plan and 57.14% were unaware of the

importance of physical activity. One of the barriers to this is a lack of knowledge and awareness regarding self-care activities[18].

Proper insulin injection and regular blood tests are indispensable for adequate control of diabetes mellitus[19]. More than 3.2 million Indians with diabetes injecting insulin lack knowledge and skill about the insulin injection technique[20].In our study, 71.42% of diabetic patients reported a lack of knowledge about insulin and insulin injection techniques. Studies conducted by sweidan et al., poudel et al., And pozzuoli et al .evaluated the knowledge and skills of diabetic patients regarding insulin technique. Of the examined participants nearly 75% had poor knowledge of the insulin technique [21].43 patients scrutinized showed substantial gaps concerning proper insulin injection technique[22] and among 352 Italian patients with Diabetes Mellitus, a high prevalence of lipodystrophy was reported due to errors in insulin injection technique[23] Ji et al. conducted a national survey in China and highlighted practical errors in insulin injection among diabetic patients, 35.3% had lip hypertrophy, and more than half of the patients 58.7% had injection-related complications such as bleeding and bruising[24]. Studies conducted by Tumminia et al. [25] and Snyder et al. [26] showed that there is a positive correlation between poor insulin injection knowledge and poor glucose control. This indicates there is a high need to enhance the knowledge and skill of insulin injection practices specifically among diabetic patients.

The follow-up and treatment of diabetic patients are complex and require cooperation between both patients and health care professionals. In our study 57.14% were unaware of the significance of physician follow up, thus reflecting the poor understanding related to the importance of controlling the blood sugar and a study by W S Shiferew et al. reported, that people have barriers to regular follow up and despite their levels of knowledge and awareness it is important to identify interventions to reduce people's perceived barriers of Diabetes Mellitus[1].

The follow-up and treatment of diabetic patients is complex and requires cooperation between both patient and Health professionals. It is evident from our study that the difference in the knowledge about diabetes mellitus is directly related to the level of literacy and educational status. 90% of the people who had poor knowledge were illiterates and 80% of them had poor knowledge about diabetes mellitus were of primary school education than those whose educational status was college and above. This might reflect that respondents who had higher education would have the chance to obtain different information and is more likely able to communicate with health care professional[1] .Low levels of knowledge were associated with poor diabetes management, as reported by the KAP survey conducted by Islam et al. Among the general population of rural Bangladesh [27]. Thus the higher their knowledge the better their attitude towards diabetes. Another study conducted by Baghianimoghadam and Afkhami-ardekani reported that the face-to-face and group teaching health education intervention performed in their study had remarkably improved the quality of life of diabetic patients [28].
Family history is a predictor of asses susceptibility to disease. An individual with a positive family history of dm???????? is 2.5 times more often at risk than non-diabetic family history[29]. Among 336 diabetic populations enrolled in this study, 210 (62.5%) patients had a family history of dm and 60% had good knowledge of diabetes mellitus, which is similar to findings by Al Shafaee ma et al [30] Asmamaw an et al.[31] and Kassahun t et al [32].In this study, of 58.3% (169) males, 47.6% and 41.07% had a history of smoking and alcohol respectively, whereas among 41.7% (140) female diabetic population enrolled in this study, none of them had a history of smoking and alcohol and thus it was found that smoking is independently associated with diabetes[33] were as in a study conducted by Eric b Rimm et al. Cigarette smoking may be an independent, modifiable risk factor for diabetes mellitus and men who consumed a higher amount of alcohol had a reduced risk of diabetes, compared with men who drank 30.0 – 49.9g of alcohol daily[34].

We found that the awareness and knowledge were low for patients with a history of cigarette smoking and alcohol consumption, this is consistent with a prior cross-sectional study conducted by Chang Wang et al.[35]. Therefore, there is a need for increased public concern regarding diabetes mellitus.

There was no gender gap in knowledge, awareness, and skill toward diabetes mellitus in the study population .where a wide gender gap in knowledge, attitude, and practice regarding diabetes was reported in a study by brown S A et al. [36].In our study, the knowledge levels about diabetes mellitus and its complication are not satisfactory among diabetic patients. This study result emphasizes the need for

better education and awareness even among diabetic patients. This is in line with the findings of m. Deepa et.al [37] and Anjana et.al,[38]. Thus imparting knowledge and awareness about dm to the community is the first step in the prevention and early detection of the disease and its complications[39].

Surveys conducted in Chennai in 2005[40] and 2007[41] reported that only 25% and 10% of the participants respectively were unaware of diabetes mellitus. This higher rate of awareness and knowledge could be due to the prevention, awareness, counseling, and evaluation (pace) diabetes project. Indeed, the pacing project showed the need for replicating such models in other parts of the country as it was possible to increase awareness of diabetes in the whole of large cities like Chennai with a population of nearly 6 million people[42].

Of 336 diabetic patients enrolled in our study, only 8% had excellent knowledge and awareness of DM. Thus it is clear if prevention is to be effective, education about DM must reach those who are not still enrolled in or engaged with a health care center.

CONCLUSION:

The findings from this study revealed a poor knowledge level, awareness, and skills towards diabetes mellitus and its complications among the respondents. This study provides a snapshot of the current knowledge and awareness of the diabetic population in the coastal southern part of India, thus emphasizing the need for awareness among diabetic subjects for better control of diabetes and its complications. The diabetic educators should also be well-trained to ensure effective delivery of information and the programs or else diabetes is unlikely to become feasible in India.

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