

# Gender differences in awareness of diabetes mellitus among the rural population



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Submitted: 13-12-2016

Revised: 20-01-2017

Published: 01-03-2017

## ABSTRACT

**Background:** Diabetes Mellitus is a chronic disorder, which is becoming rapidly epidemic in India. There are many complications occur due to uncontrolled diabetes mellitus. The outcome of diabetes depends mainly on the patient's self-management like health-related behavior, which is based on his or her knowledge. Awareness on diabetes mellitus is still a lacunae among the Indian population. **Aims and Objective:** To determine the knowledge regarding awareness of diabetes like the risk factors, symptoms, complications and the management among the males and females in rural population. **Materials and Methods:** It is a cross sectional study conducted at the tertiary care center in rural Bangalore. A structured questionnaire was used and 300 adults were assessed on their knowledge regarding the awareness of diabetes. **Result:** Out of 300 adults, 159 adults (53%) had a history of diabetes. There was no gender difference observed regarding the awareness, nor the education played a role. There was significant difference observed in knowledge of diabetes Mellitus among the diabetics with respect to renal complications ( $p < 0.013$ ), symptoms like blurring of vision ( $p < 0.043$ ) and burning feet ( $p < 0.009$ ). **Conclusion:** Both the diabetic and non-diabetic groups had very low awareness regarding diabetes and associated risk factors. Both Males and females awareness levels were poor. Proper Diabetic education programme will help in raising public awareness of the disease.

**Keywords:** Diabetes Mellitus, Awareness, Health education, Knowledge, Complications

### Access this article online

**Website:**

<http://nepjol.info/index.php/AJMS>

**DOI:** 10.3126/ajms.v8i2.16182

**E-ISSN:** 2091-0576

**P-ISSN:** 2467-9100

## INTRODUCTION

It was around 1500 B.C., when Diabetes Mellitus was recognized for the first time, by the Egyptians. They defined it as a condition in which a person urinates excessively and loses weight.<sup>1</sup> Diabetes mellitus is a chronic non-communicable disease resulting in increased blood glucose levels, due to Insulin deficiency.<sup>2</sup>

Worldwide according to International Diabetes Federation, about 415 million people are suffering from diabetes and the number is expected to rise in the forthcoming years. In India, currently more than 62 million diabetic cases are diagnosed and it is fastly gaining the status of a potential epidemic. Maximum diabetes cases are recorded in India in the world followed by China and USA. There is a marked increase in the number of people affected with diabetes and this trend

is scheduled to grow in geometric proportions in the next couple of decades. By the year 2030, number of individuals affected by diabetes in India would raise up to 79 million.<sup>3,4</sup>

Unfortunately, the brunt of this increase will be borne by the developing countries. These countries will see more increase in the number of diabetics, whilst the developed countries will have a relatively meager increase in numbers of around 45%.

India currently faces an uncertain future in relation to the potential burden that diabetes may impose upon the country. Many influences affect the prevalence of disease throughout a country, and identification of those factors is necessary to facilitate change when facing health challenges. The overall direct healthcare costs of diabetes mellitus ranges from 2.5–15 per cent of annual health care budgets.

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This burden is likely to only increase with the projected increase in the numbers of people with diabetes.<sup>5</sup>

As per the Chennai-based Diabetes Research Centre, over about 30 per cent in urban areas go undiagnosed and 50 per cent of diabetes cases in rural India. In another study, screening has shown that the unknown to- known diabetes ratio is about 1.8:1 in urban areas, whilst it is as high as 3.3:1 in rural places.<sup>2</sup>

The crude prevalence rate of diabetes in urban areas is about 9% and that the prevalence in rural areas has also increased to around 3% of the total population. If one takes into consideration that the total population of India is more than 1000 million then one can understand the sheer numbers involved. Taking a urban-rural population distribution of 70:30 and an overall crude prevalence rate of around 4%, at a conservative estimate, India is home to around 40 million diabetics and this number is thought to give India the dubious distinction of being home to the largest number of diabetics in any one country. Usually, the importance of diabetes prevention is not realized by patients until they suffer from it.<sup>6</sup>

According to the Chennai Urban Rural Epidemiology Study (CURES), nearly 25 per cent of the population was unaware of a condition called diabetes. Eleven point nine percent of the study subjects had the knowledge of the risk factors of diabetes. The World Diabetes Day is celebrated every year in order to raise the public awareness of diabetes.<sup>7,8</sup>

To improve the present condition of prevention side, much need to be done. The key issue to be addressed is to generate an awareness regarding risk factors associated with diabetes like lifestyle modification, balanced diet, control for obesity, lower stressful working condition, etc. There is very little data on the level of awareness about diabetes in developing countries like India. This is extremely important to plan the public health polices like national diabetes control programs.<sup>9,10</sup>

Knowledge about the level of awareness about diabetes in population is the first step in formulating a prevention programme for diabetes. The main objective of this study was to evaluate public knowledge, awareness and perceptions about diabetes mellitus among males and females adults in rural population of Bangalore.

## MATERIALS AND METHOD

This was a cross-sectional study conducted among the people attending the tertiary care center (rural Bangalore). Patients without Diabetes and those patients with known

Diabetes and who were willing to be part of the study were included. Informed consent of the patients was taken. The study was approved by the Institutional ethical committee. All the data obtained were kept confidential. The study was carried out for duration of six months.

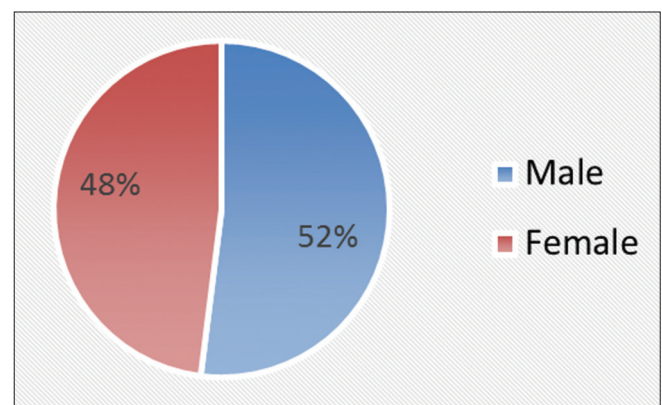
Pre-validated structured questionnaire regarding the cause, symptoms, complications & Management of diabetes was administered to these patients and explained. The participants were required to answer the questionnaire using 'Yes' or 'No'. For those participants who did not know English, the questions were translated to their local Language.

Data was entered into Microsoft excel data sheet and was analyzed using SPSS 22 version software. Categorical data was represented in the form of Frequencies and proportions. Chi-square was used as test of significance. Continuous data was represented as mean and standard deviation. Independent t test was used as test of significance to identify the mean difference between two groups. p value <0.05 was considered as statistically significant.

## RESULTS

A total of 300 patients took part in this study, of which 156 (52%) were males and 144 (48%) were females (Figure 1). Majority of the females in the study population were between 25-50 years and males were 50-75 years of age. The mean age was 49.9 years (Figure 2). A significant proportion of them were 55.4% were married. About 39% of the respondents were illiterates and 59.7% of them were literates (of which 10.3% were graduates) (Figure 3).

Around 53% of the study populations were known diabetics and 18% were known Hypertensives. Majority of the study group were non-smokers (88%). Approximately 29% of the participants knew someone who was diabetic in the family and most participants had a sibling (16.3%),



**Figure 1:** Sex distribution of the study group

mother (28.5%), father (26.7%) or grandparents (28.5%), in the family who were diabetic.

Subjects with past history of diabetes had higher knowledge compared to those without past history. Significant difference in knowledge was observed. Twenty nine point One percent said it could be due to insulin action inadequacy and 34.8% of the respondents said that requirement of Regular Blood sugar testing was necessary (Table 1).

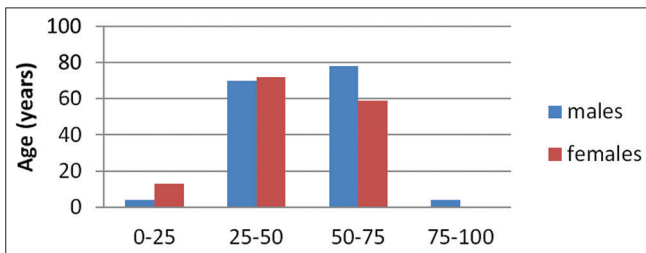


Figure 2: Age distribution of the study group

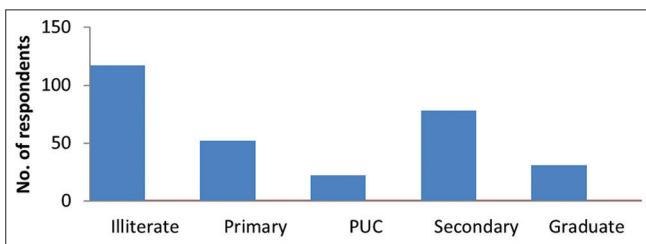


Figure 3: Education levels of the study group

Knowledge of the diabetes symptoms with respect to blurring of vision and burning feet was observed between two groups (Table 2).

Males had a better knowledge when compared to females. Subjects with past history of diabetes had higher knowledge (Figure 4).

Significant difference was observed among males for knowledge regarding risk factors between two groups. However, there was no difference among subjects with and without past history of diabetes (Figure 5).

Males had better knowledge regarding knowledge on complications with respect to diabetic foot and recurrent infections. Knowledge of the macrovascular complications of DM appeared to be somewhat better than the knowledge of microvascular complications.

Subjects with previous history of diabetes had higher knowledge regarding kidney disease complication. For example, 65% knew that DM can result in Kidney Failure, while 56.0% of them knew that DM can be associated with Heart Disorders. Awareness of the Microvascular complications was comparatively lower among both the groups (Figure 6).

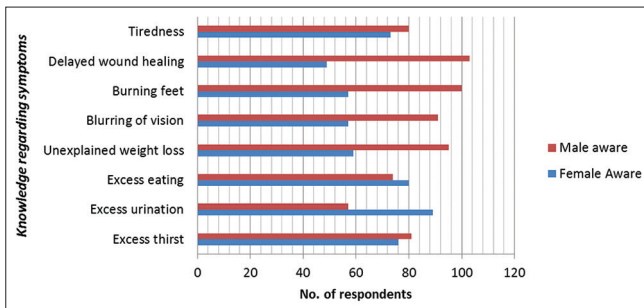
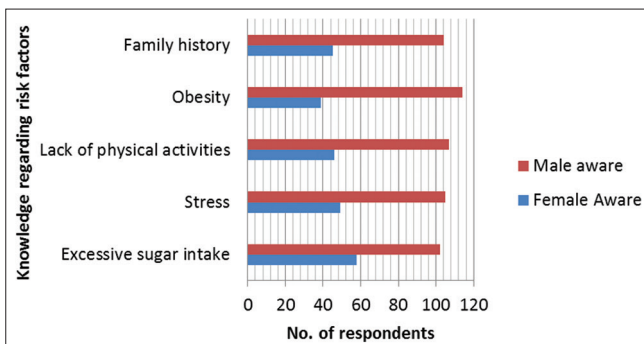
Females had significantly better knowledge in Diabetes Management aspect. Knowledge of the Management

**Table 1: Comparison of knowledge of diabetes mellitus among subjects with and without past history of diabetes**

	Past H/o diabetes				p value
	Yes		No		
	Count	%	Count	%	
It is a life style related disease					
Yes	38	23.9	27	19.1	0.319
No	121	76.1	114	80.9	
It is a disease of old age					
Yes	49	30.8	35	24.8	0.248
No	110	69.2	106	75.2	
It is contagious					
Yes	34	21.4	28	19.9	0.745
No	125	78.6	113	80.1	
It is curable					
Yes	36	22.6	30	21.3	0.776
No	123	77.4	111	78.7	
It is due to inadequate insulin action					
Yes	64	40.3	41	29.1	0.043*
No	95	59.7	100	70.9	
Regular Blood sugar testing is necessary					
Yes	79	49.7	49	34.8	0.009*
No	80	50.3	92	65.2	
Self-blood glucose monitoring is necessary					
Yes	36	22.6	32	22.7	0.991
No	123	77.4	109	77.3%	

**Table 2: Knowledge of DM by respondents**

	Yes				No			
	Count	%	95% CI		Count	%	95% CI	
			Lower %	Upper %			Lower %	Upper %
Knowledge regarding symptoms								
Excessive thirst	151	50.3	45	56	149	49.7	44	55
Excessive urination	188	62.7	57	68	112	37.3	32	43
Excess eating	162	54.0	48	60	138	46.0	40	52
Unexplained weight loss	120	40.0	34	46	180	60.0	54	66
Blurring of vision	122	40.7	35	46	178	59.3	54	65
Burning feet	113	37.7	32	43	187	62.3	57	68
Delayed wound healing	102	34.0	29	39	198	66.0	61	71
Tiredness	149	49.7	44	55	151	50.3	45	56
Knowledge regarding risk factors								
Excessive intake of sugar	112	37.3	32	43	188	62.7	57	68
Stress	100	33.3	28	39	200	66.7	61	72
Lack of physical activities	95	31.7	26	37	205	68.3	63	74
Obesity	81	27.0	22	32	219	73.0	68	78
Family history	97	32.3	27	38	203	67.7	62	73
Knowledge regarding complications								
Kidney disease	171	57.0	51	63	129	43.0	37	49
Heart disease	155	51.7	46	57	145	48.3	43	54
Eye disease	181	60.3	55	66	119	39.7	34	45
Delayed wound healing	119	39.7	34	45	181	60.3	55	66
Recurrent infections	116	38.7	33	44	184	61.3	56	67
Effect on nerves	139	46.3	41	52	161	53.7	48	59
Knowledge regarding Management								
Diet only	181	60.3	55	66	119	39.7	34	45
Medicines only	230	76.7	72	81	70	23.3	19	28
Exercise only	186	62.0	56	68	114	38.0	32	44
Diet+Medicines+Exercise	178	59.3	54	65	122	40.7	35	46

**Figure 4:** Knowledge regarding symptoms of DM**Figure 5:** Comparison of knowledge regarding risk factors of diabetes mellitus

measures was poor among both the groups, those with and without past history of Diabetes. Significant

proportion of the participants said that diabetes can be managed by medicines alone – 73%, by dietary modifications alone – 59% and by physical activity alone – 62%. However, 58% of them believe that combination of healthy Diet, Medicines and along with the physical activity will help in better Management of DM (Figure 7).

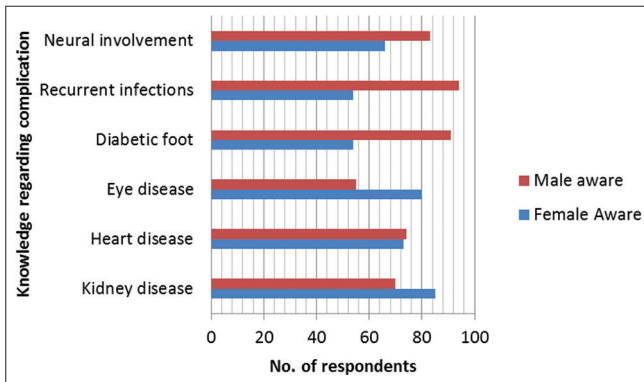
## DISCUSSION

Proper management of Diabetes is a complex and challenging task especially in developing countries like India. The major lacunae is the lack of knowledge about diabetes. Better the knowledge of diabetes, better is the Glycemic control.<sup>11,12</sup>

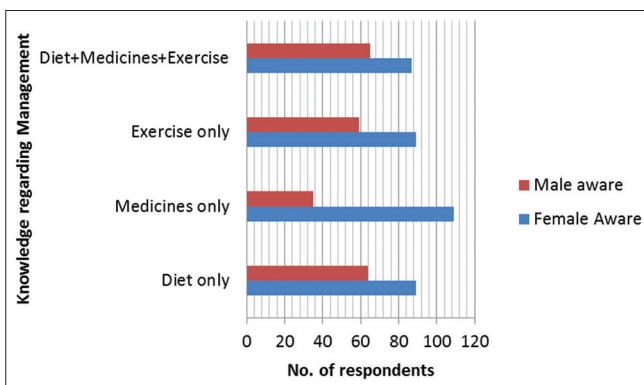
Majority of our respondents were unaware of the risk factors or the complications of diabetes. This reflects a significant lack of knowledge about diabetes, which may have an adverse outcome in terms of prevention, which again affects the economy of the country.

The results showed that there is a statistically significant difference in the mean knowledge of the participants with different age ranges, but there was no significant difference in the knowledge among different gender.





**Figure 6:** Knowledge regarding Complications of DM



**Figure 7:** Knowledge regarding Management of DM

In this study, the majority of the respondents were illiterates (39%). Hardly, 10% of the respondents were graduates. This results are in contrast to other studies like Chennai based study and European study, where age and educational status plays an important role in the Diabetes knowledge of the population. Higher the education level better is the knowledge.<sup>13 14</sup>

Many studies have revealed that women had better knowledge about diabetes when compared to men.<sup>15-17</sup>

According to Pond et al.,<sup>18</sup> women had worse diabetes control than men, probably because they often have to balance both their diabetes care and the family care. A German study showed significant gender-specific differences in the association of adherence and poor glycaemic control. In men, poor glycaemic control was found in 37% of the participants and 19% of women participants reporting non-adherence.<sup>19</sup>

Our study shows no gender difference regarding the diabetes knowledge. However, women had better knowledge with respect to the cause of diabetes. Similarly, there was no gender difference observed even in the Ethiopian study conducted.<sup>20</sup>

According to Hibbard, the attitude and behavior of men and women towards diabetes care is different.<sup>21</sup> Women

are more sensitive to illnesses and seek medical advice. Handerson study found that women have a greater interest and concern for diabetes<sup>22</sup> Women make greater use of diabetes services and have a larger network of people with whom to discuss medical problems.<sup>23</sup>

Women have greater responsibility in terms of her family health. Differences between men and women with regard to their attitudes and behaviors associated with diabetes have not received as much attention in the literature.<sup>24</sup>

There was no significant difference in the knowledge of diabetes among the diabetics and non-diabetics. Diabetic patients had a better knowledge regarding the renal complications ( $p < 0.013$ ), and the symptoms like blurring of vision ( $p < 0.043$ ) and burning feet ( $p < 0.009$ ). Nonetheless, the patients without diabetes were also able to identify the risk factors of diabetes, but not well versed with the complications of diabetes. Our study is in accordance with the study conducted by Tham et al.<sup>25</sup>

Tham et al showed that the knowledge of patients with and without diabetes was not statistically significant. But according to Ding et al, diabetics (81%) had better knowledge compared to non-diabetics (64%).<sup>26</sup>

## CONCLUSION

It is very much important to emphasize the fact that diabetes mellitus is a non-curable condition which can be managed well. Hence, it becomes necessary to stress on the cause of diabetes, risk factors, symptoms, complications and the management of diabetes mellitus. The need of the hour is “Diabetes health education” for both diabetics as well as healthy adults. In developing country like India, Diabetes education will definitely play a crucial role in creating public awareness about diabetes.

## Limitations of the study

The studies on gender differences regarding diabetes mellitus have been cross sectional most of the time. There is a need for more longitudinal studies about gender and diabetes.

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#### Authors Contribution:

**IUK** - Principal Investigator, Concept and design of the study, reviewed the literature, collected the data, manuscript preparation and critical revision of the manuscript; **JPM** - helped in preparing first draft of manuscript; **U** - prepared first draft of manuscript and critical revision of the manuscript; **MV** - statistically analyzed and interpreted; **S** - Review of study.

**Source of Support:** Nil, **Conflict of Interest:** None declared.