

KNOWLEDGE AND AWARENESS ON DIABETES MELLITUS AMONG THE ADULT RURAL POPULATION OF CHITTOOR DISTRICT, ANDHRA PRADESH



Anthropology

P. Chandrasekhar Rao	Ph.D Department of Anthropology, Sri Venkateswara University, Tirupati, Chittoor District, Andhra Pradesh-517 502, India
K. Surendranadha Reddy	Ph.D Assistant Professor, Department of Anthropology, Sri Venkateswara University, Tirupati, Chittoor District, Andhra Pradesh-517 502, India
K. Ramalinga Reddy	Ph.D Department of Anthropology, Sri Venkateswara University, Tirupati, Chittoor District, Andhra Pradesh-517 502, India
J. Lalu Naik	Ph.D Department of Anthropology, Sri Venkateswara University, Tirupati, Chittoor District, Andhra Pradesh-517 502, India
Dr. S. Narasimhulu	Medical Officer, Rural Primary Health Centre, Chittoor District, Andhra Pradesh"
Kanala Kodanda Reddy *	Ph.D Department of Anthropology, Sri Venkateswara University, Tirupati, Chittoor District, Andhra Pradesh-517 502, India *Corresponding Author

ABSTRACT

An attempt has been made in the present study to assess the knowledge and awareness regarding diabetes among the adults of Chittoor District, Andhra Pradesh. A total of 4850 healthy adults of both genders >20 years of age were screened by administering open ended standardized questionnaire in a cross sectional design. Knowledge on diabetes was recorded to an extent of 84 percent. Half of the study subjects felt that diabetes can damage other organs like feet, heart, eye etc. 58 percent opined that diabetes can be prevented. Opinion of the subjects regarding diabetes mellitus towards due to consumption of sweets was about 25 percent, obesity for about 20 percent, decreased physical activity and stress each about 11 percent respectively. The average score assessed through visual analogue scale on knowledge and awareness was 10.41 out of 18 (57.84%). Subjects with higher education were 1.288 times (95%CI: 1.250, 1.326; $p < 0.05$) better when compared with illiterates in terms of knowledge and awareness on diabetes. Similarly subjects with business and higher income showed better score. In conclusion, this study reflects the poor knowledge and awareness about diabetes in rural India, hence policy measures are warranted to take the message at grass root level.

KEYWORDS

Diabetes mellitus, knowledge and awareness, adults, rural population.

INTRODUCTION

Diabetes is a metabolic disease characterized by elevated levels of blood glucose and over time its accumulation may lead to serious damage to heart, blood vessels, eyes, kidneys and nerves [1]. Diabetes mellitus occupies the seventh leading cause of death. Latest statistics indicate that 422 million people worldwide, particularly in low- and middle-income countries have diabetes, and 1.6 million deaths are directly attributed to diabetes each year. Decadal trends indicate a surge in the prevalence rates of diabetes [2].

In India, it is estimated that 72.96 million cases of diabetes in adults and the prevalence ranges between 10.9% and 14.2% in urban and 3.0-7.8% among rural population with higher prevalence among >50 aged individuals [3]. Rapid urbanization and industrialization brought several changes in the life styles of Indians, which resulted in the escalating figures of non-communicable diseases including diabetes [4]. Diabetes became a great challenge to the health systems in India as it exhausts upto 25 percent of the family income of an average Indian [5]. Further individuals quality of life also affected to a great extent [6].

Healthy diet, regular physical activity, maintaining a normal body weight and avoiding tobacco usage are the ways to prevent the diabetes mellitus [7]. WHO [2] formulated a policy for the adoption of effective measures for surveillance, prevention and control of diabetes and its complications, particularly in low and middle income countries. In 2010, Government of India, launched a National Programme for prevention and control of cancer, diabetes, cardiovascular diseases and stroke, and as 2017, NCD cells have been established 55% percent of the districts only, leaving half of the country still remains uncovered. Data on the level of awareness about diabetes in developing countries like India is extremely important for implementation of national diabetes control programs. Majority of the studies dealt with the people with disease and

community level studies are sparse [8]. India being multiethnic and multilingual, there is every need to understand the current level of knowledge and awareness on diabetes. In the light of this background, an attempt has been in the present investigation to assess the community wide knowledge and awareness regarding diabetes among the adults of Chittoor District, Andhra Pradesh.

METHODOLOGY

The present study was cross sectional in its nature. The sample for the present study was healthy adults of both genders > 20 years of age in the rural areas of Chittoor District of Andhra Pradesh. A total of 4850 subjects were screened randomly covering the entire rural areas of the district. Departmental ethical clearance was procured and individual consent was taken before subject participation. A structured questionnaire has been devised by going through similar studies published in elsewhere Indian populations [8 – 10]. A pilot study has been undertaken to validate the questionnaire and final one as mentioned below is exercised in the field area for the data collection. Data collection took place during January 2019 to February 2020. The exclusion criteria was subjects with gross abnormality and bedridden.

The questionnaire was divided into two sections. The first part of the questionnaire addressed the respondent's demographic information which included: age, sex, level of education, occupation and income etc. Age of the subject was ascertained through birth certificates if available or through cross check with kith and kin. Educational status was classified as illiterates, primary, secondary and higher. Income of the subjects was classified as per Indian criteria.

Knowledge, risk factors and complications and awareness of diabetes mellitus was measured using 12 item questionnaire. Answers were graded with two categorical responses "Yes" and "No". The survey instrument is as mentions below.

1. Have you ever been told you have or had diabetes? 1. Yes 2. No
2. Do you know what is diabetes? 1. Yes 2.No
3. Do you think, more and more people are getting affected with diabetes nowadays? 1. Yes 2.No
4. Do you know that diabetes can cause complications in other organs?1. Yes2.No
5. Has anyone in your family ever had Diabetes? 1. Yes 2.No
6. Diabetes can cause loss of sensation in your feet 1. Yes 2. No
7. Diabetes patients can live a normal and healthy life 1. Yes 2. No
8. Diabetes can damage your heart 1. Yes 2. No
9. Diabetes can causes blindness 1. Yes 2. No
10. Diabetes can be prevented 1. Yes 2. No
11. What are the factors you think that contribute to diabetes?
 1. Obesity 4. Mental stress
 2. Decreased physical activity 5. Consuming more sweets
 3. Family history of diabetes 6. Others (name)
12. In your view how one can prevent or reduce the chances of getting diabetes
 1. Improving their diet 6. Above all
 2. Taking medications 7. I don't know
 3. Doing more exercise 8. There is nothing someone can do
 4. Losing weight 9.Others

For closed questions, 1 to 10 correct answers were graded as 1 and incorrect answers as 0. For question No. 11 which was on causative factors for diabetes, highest score of 4 was awarded for subjects who ticked obesity, decreased physical activity or family history of diabetes, 3 was given for consuming sweets and other high calorie or junk foods, 2 for mental stress and 1 for any other answer which made sense or was close to the above answers, while all other answers were scored 0.

For question no. 12 which was on prevent or reduce the chance of getting diabetes, highest score of 4 was awarded for subjects who ticked taking medications, improving their diet, losing weight, doing more exercise and quit smoking or above all, 3 was given for taking medications, losing weight or improving their diet or doing more exercise, 2 for losing weight and quit smoking and 1 for taking medication, while all other answers were scored 0. The aggregate score on the knowledge and awareness range from 0 and 18 with higher score indicating better knowledge and awareness in diabetes.

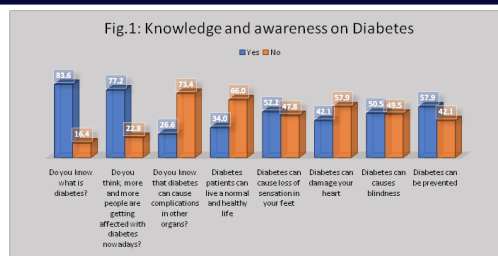
Statistical analysis

Statistical analysis was carried out via SPSS 16 and alpha levels were set at $p < 0.05$. Continuous variables were provided with average values and discontinuous variables with percentages. Analysis of variance and t-test was carried out to assess the significance in average values between groups. Further, multivariate logistic regression was fitted to investigate the relationship of independent variables on individuals average score towards knowledge and awareness on diabetes.

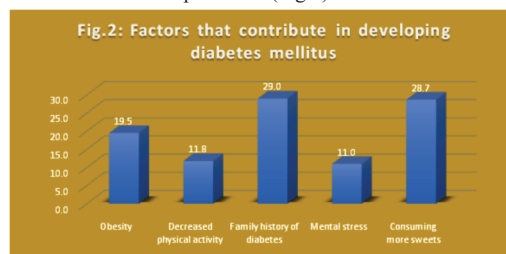
RESULTS

In the study population based on self reported data, the prevalence of diabetes was around 8 percent, and 14 percent of the subjects have family history of diabetes (Table 1). Around half of the subjects belonging to middle income group, 34 percent were low income group and a minimum of 14 percent were from high income group. A majority of the subjects (44%) were illiterates and a maximum of 70 percent were skilled workers or agriculturalists.

Knowledge on diabetes was recorded to an extent of 84 percent. Majority of the people perceived their opinion that now-a-days more and more people are getting affected with diabetes. Only 34 percent of the subjects opined that people with diabetes can lead a normal and healthy life, on the other hand half of the subjects felt that diabetes can damage other organs like feet, heart, eye etc. On the whole 58 percent of the people felt that diabetes can be prevented (Fig. 1).



Around 30 percent of the subjects had of the opinion that family history of diabetes leads to develop diabetes (Fig.2).

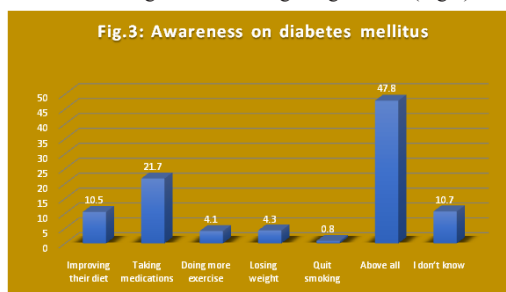


One quarter of the subjects felt consumption of sweets may lead to develop diabetes. Around 20 percent felt that obesity may lead to develop diabetes and only 11 percent each opined that decreased physical activity and mental stress were the causative factors for developing diabetes.

The average score assessed through visual analogue scale on knowledge and awareness in diabetes was 10.41 out of 18 (57.84%) in both genders (Table 2). The average score was significantly higher in subjects with self reported diabetes and family history of diabetes ($p < 0.05$). The average score increases with increase in income levels and advancement of age. Illiterates were found to have less knowledge and awareness on diabetes and the average score increases as educational status increases ($p < 0.05$). Professionals or Business people possess higher score than agriculture/skilled workers/House wife.

In order to assess the effect of demographic factors on knowledge and awareness on diabetes, sex adjusted multinomial logistic regression model was fitted by considering demographic variables as dependent variables and average score on knowledge and awareness on diabetes was covariate and sex as factor and the results with odds ratio and 95% confidence intervals were shown in table 3. Subjects with higher education were 1.288 times (95%CI: 1.250, 1.326; $p < 0.05$) better when compared with illiterates in terms of possessing knowledge and awareness on diabetes. Similarly subjects involved in business were 1.274 times better towards the knowledge and awareness on diabetes compared to agriculturists and skilled workers. An increase in income also showed better score on knowledge and awareness on diabetes. Age of the subject failed to show any variation in odds of awareness and knowledge on diabetes.

Half of the sample in the study area expressed that combination of activities like quitting smoking, losing weight, regular physical activity, improving diet and treatment compliance will be helpful in prevention or reducing the chances of getting diabetes (Fig.3).



DISCUSSION

In the present study, about 83 percent of the study population exposed to the term 'Diabetes'. The current level of knowledge and awareness on diabetes and management was 57.84 percent, which is found to be a worrying phenomenon. Several studies have expressed this sound

impediment in elsewhere population groups of India [3, 11 – 13]. In the recent past the media and other organizations have succeeded to implant the terminology 'Diabetes' to the community level, but grossly failed to establish knowledge and awareness on diabetes and its associated complications as observed in the present study.

Epidemiological data indicate that in India in 2011 there were around 62.4 million people with diabetes and projected to increase 101.2 million by 2030 (ICMR-INDIAB study) [14]. One recent study published in The Lancet: Diabetes and Endocrinology by Basu et al [15], highlighted that diabetes is expected to rise from 406 million to 511 million globally in the next 12 years. The study highlights that China is going to have 130 million people with diabetes, India will have 98 million and US will have 32 million diabetics by 2030. A good number of studies have emphasized that urbanization, changes in diet and physical activity and aging were the predominant causative factors for the surge in diabetes prevalence [16].

The self reported prevalence of diabetes in the present study was 8.1 percent, which is in good agreement with other published works [3]. Further, subjects with self reported diabetes and family history possessed better score. A cross examination of results on knowledge and awareness on diabetes in different population groups of India shows regional variation. In the present study socioeconomic status especially education found to be significant factor in creating awareness about diabetes. Subjects with higher education found to have higher score than illiterates, which is in agreement with other studies [17]. Education on diabetes is needed to make individuals better informed about the ill effects and preventive measures [18].

The observed discrepancy in the subjects perception on diabetes and its associated complications and management warrants to have continuing medical education programmes on diabetes in order that better diabetes education is imparted to subjects. Despite the importance of diet and exercise in the prevention of diabetes, significant gaps in public education clearly exist in India [19]. The risk factors for diabetes and management as observed in the current study shows that only 12% were aware that obesity and physical inactivity could predispose to diabetes. In developing countries or economy, as a societal highness, being overweight perceived to be a mark of status, wealth, health and power. This attitude besides western culture has brought significant changes in the life styles of natives especially in food, eating and exercise cultures.

Another important observation in the present study was that only 58 percent of the people believe that the diabetes can be prevented. Similar observations were made in a population from Tamilnadu [10]. Our results clearly indicate lack of awareness on diabetes and its risk factors. Unless the public knows that diabetes can be prevented and are aware of risk factors, primary prevention of diabetes is unlikely to become feasible in India. In a densely populated country like India, where unplanned urbanization is rapid, a significant decrease in physical activity witnessed with increased overweight and obesity not only in adults and but in adolescents also [20]. Substantial measures to teach the population about the ill effects of obesity, decreased physical activity and life styles will have a sizeable effects in the mitigation of the burden of diabetes. In conclusion, this study reflects the poor knowledge and awareness about diabetes in rural India, hence policy measures are warranted to take the message at gross root level.

Table 1. Demographic characteristic of the study population

Variables	N	%
Sex		
Male	3007	62.0
Female	1843	38.0
Self reported diabetes		
No	4458	91.9
Yes	392	8.1
Family history of diabetes		
No	4163	85.8
Yes	687	14.2
Income in INR		
Less than 49999	1626	33.5
50000-99999	2556	52.7
100000 and above	668	13.8
Age Groups		
<39 years	2096	43.2

40 to 59 years	2310	47.6
>60 years	444	9.2
Education		
Illiterate	2113	43.6
Primary	881	18.2
Secondary	1023	21.1
Higher	833	17.2
Occupation		
Agriculture/Skilled Workers/House wife	3341	68.9
Business	545	11.2
Professional/Job	964	19.9

Table 2. Data on the average score on knowledge and awareness about diabetes in the study population

Variables	Mean $\pm$ SD	F	P
Sex			
Male	10.41 $\pm$ 3.09	0.018	0.986
Female	10.41 $\pm$ 3.08		
Self reported diabetes			
No	10.17 $\pm$ 2.99	19.144	0.000
Yes	13.17 $\pm$ 2.82		
Family history of Diabetes			
No	10.11 $\pm$ 3.01	16.927	0.000
Yes	12.21 $\pm$ 2.96		
Income			
Less than 49999	9.69 $\pm$ 3.41	38.354	0.000
50000-99999	10.30 $\pm$ 3.06		
100000 and above	10.87 $\pm$ 2.91		
Age Groups			
<39 years	10.40 $\pm$ 2.88	2.679	0.069
40 to 59 years	10.35 $\pm$ 3.17		
>60 years	10.72 $\pm$ 3.57		
Education			
Illiterate	9.42 $\pm$ 3.20	147.863	0.000
Primary	10.81 $\pm$ 2.80		
Secondary	11.15 $\pm$ 2.82		
Higher	11.58 $\pm$ 2.62		
Occupation			
Agriculture/Skilled Workers/House wife	9.92 $\pm$ 3.15	151.825	0.000
Business	11.95 $\pm$ 2.69		
Professional/Job	11.23 $\pm$ 2.60		

Table 3. Multinomial logistic regression model to assess the odds ratios

Variables	OR	P value	CI
Income			
Less than 49999	Reference		
50000-99999	1.066	0.000	1.037, 1.095
100000 and above	1.134	0.000	1.102, 1.168
Age Groups			
Age > 39	Reference		
40 to 59	0.995	0.585	0.976, 1.014
60 and Above	1.035	0.047	1.000, 1.070
Education			
Illiterate	Reference		
Primary	1.165	0.000	1.134, 1.198
Secondary	1.218	0.000	1.186, 1.251
Higher	1.288	0.000	1.250, 1.327
Occupation			
Agriculture/Skilled Workers/House wife	Reference		
Business	1.274	0.000	1.230, 1.319
Professional/Job	1.177	0.000	1.145, 1.210

REFERENCES

- American Diabetes Association. Diagnosis and classification of diabetes mellitus. Diabetes Care, 32: s62-s67, 2009.
- WHO fact sheet on Diabetes. World Health Organization, 2020. https://www.who.int/health-topics/diabetes#tab=tab_1.
- Anjana RM, Deepa M, Pradeepa R, Mahanta J, Narain K, Das HK et al. Prevalence of diabetes and prediabetes in 15 states of India: results from the ICMR-INDIAB population-based cross-sectional study. The Lancet (Diabetes and Endocrinology), 2017; 5:585-596.
- Sudhakar G, Anuradha RK, Reddy TM, Chandrasekharan PA, Sathyavathi RB, Hemalatha R, Geetha P, Reddy KK. Body mass index, social conditions and environmental effect on high blood pressure among the adolescent school children. J Food Nutr Disorders (SciTech), 2014; 3:3. doi:10.4172/2324-9323.1000140.
- Shobhana R, Rama Rao P, Lavanya A, Williams R, Vijay V, Ramachandran A.

- Expenditure on health care incurred by diabetic subjects in a developing country-a study from southern India. *Diabetes Res ClinPract*2000;48:37-42.
6. Wild S, Roglic G, Green A, Sicree R, King H. Global prevalence of diabetes: estimates for the year 2000 and projections for 2030. *Diabetes Care* 2004;27:1047-53.
 7. Nathan DM, Buse JB, Davidson MB, Ferrannini E, Holman RR, Sherwin R, et al. Medical management of hyperglycemia in type 2 diabetes: a consensus algorithm for the initiation and adjustment of therapy: a consensus statement of the American Diabetes Association and the European Association for the Study of Diabetes. *Diabetes care*. 2009; 32(1):193-203.
 8. Muninarayana C, Balachandra G, Hiremath SG, Iyengar K, Anil NS.Prevalence and awareness regarding diabetes mellitus in ruralTamaka, Kolar. *Int J Diabetes DevCtries* 2010;30:18-21.
 9. Murugesan N, Snehalatha C, Shobhana R, Roglic G, Ramachandran A.Awareness about diabetes and its complications in the general anddiabetic population in a city in southern India. *Diabetes Res ClinPract*2007;77:433-7.
 10. Deepa M, Bhansali A, Anjana R M, Pradeepa R, Joshi S R, Joshi P P, Dhandhanian V K, Rao P V, Subashini R, Unnikrishnan R, Shukla D K, Madhu S V, Das A K, Mohan V, Kaur T. Knowledge and awareness of diabetes in urban and rural India: The Indian Council of Medical Research India Diabetes Study (Phase I): Indian Council of Medical Research India Diabetes 4. *Indian J EndocrMetab*2014;18:379-85.
 11. Singla A, Sharma T, Kaeley N. Awareness of Diabetic Patients towards Diabetes Mellitus: A Survey Based Study. *National J Commun Med*, 2017; 8: 606-610.
 12. Aljin V, Umadevi R, AnanthaEashwar VM. Awareness of diabetes among patients with type 2 diabetes mellitus attending a rural health and training center. *Int J Community Med Public Health*. 2018 Oct;5(10):4597-4602.
 13. Lingam S, Rani PK, Sheeladevi S, Kotapati V, Das T. Knowledge, attitude and practices on diabetes, hypertension and diabetic retinopathy and the factors that motivate screening for diabetes and diabetic retinopathy in a pyramidal model of eye health care. *Rural and Remote Health* 2018; 18: 4304. <https://doi.org/10.22605/RRH4304>
 14. Anjana RM, Pradeepa R, Deepa M, Datta M, Sudha V, Unnikrishnan R, et al. Prevalence of diabetes and prediabetes (impaired fasting glucose and/or impaired glucose tolerance) in urban and rural India: Phase I results of the Indian Council of Medical Research-INDIA Diabetes (ICMR-INDIAB) study. *Diabetologia* 2011;54:3022-3027.
 15. Basu S, Yudkin JS, Kehlenbrink S, Davies JI, Wild SH, Lipska KJ, Sussman JB, Beran D. Estimation of global insulin use for type 2 diabetes, 2018-30: a microsimulation analysis. *The Lancet (Diabetes and Endocrinology)*, 2019;7:25-33.
 16. Gassasse Z, Smith D, Finer S, Gallo V. Association between urbanisation and type 2 diabetes: an ecological study. *BMJ Glob Health*. 2017; 2(4): e000473.
 17. Caliskan D, Ozdemir O, Ocaktan E, Idil A. Evaluation of awareness of diabetes mellitus and associated factors in four health center areas. *Patient EducCouns*2006;62:142-7.
 18. Margaret Amankwah-Poku. A cross-sectional study of knowledge and awareness of type 2 diabetes mellitus in a student population in Ghana: do Demographics and lifestyle make a difference. *Health Psychology and Behavioral Medicine*, 2019; 7(1): 234-252.
 19. Mohan LalKanojia. Knowledge, attitude and practice of diabetes amongst rural population - an institutional based study. *International Journal of Contemporary Medical Research* 2017;4(8):1761-1764.
 20. Anuradha RK, Sathyavathi RB, Reddy TM, Hemalatha R, Sudhakar G, Geetha P, Reddy KK. Effect of social and environmental determinants on overweight and obesity prevalence among adolescent school children. *Ind J Endo Meta*, 2015; 19: 283-287.