



## Knowledge and Awareness on NCDs among the Adult Rural Population of Chittoor District, Andhra Pradesh

P. CHANDRASEKHAR RAO<sup>1</sup>, T. MUNESWARA REDDY<sup>2</sup>,  
K. SURENDRANADHA REDDY<sup>1</sup>, K. RAMALINGA REDDY<sup>1</sup>, J. LALU NAIK<sup>1</sup>,  
T. RAMAKRISHNA REDDY<sup>1</sup> AND KANALA KODANDA REDDY<sup>1</sup>

<sup>1</sup>Department of Anthropology, Sri Venkateswara University, Tirupati, Chittoor District, Andhra Pradesh-517 502, India

<sup>2</sup>Department of General Medicine, Sri Venkateswara Medical College, Tirupati, Chittoor District, Andhra Pradesh

Corresponding Author: E-mail: [kanalakra@gmail.com](mailto:kanalakra@gmail.com)

Received: 06-08-2021 / Revised: 26-08-2021 / Accepted: 02-09-2021 / Published: 30-12-2021

**Abstract:** *Aim:* An attempt has been made in the present study to assess the knowledge and awareness regarding noncommunicable diseases (NCDs) among the adults of Chittoor District, Andhra Pradesh. *Materials and Methods:* 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. *Results:* The average score assessed through visual analogue scale on knowledge and awareness on NCDs was 12.45 out of 20 (62.25%). Subjects with higher education were 1.24 times (95%CI: 1,203, 1.277; p<0.05) better when compared with illiterates in terms of possessing knowledge and awareness on NCDs. Similarly subjects involved in business were 1.203 times better towards the knowledge and awareness on NCDs. The causative factors for NCDs as opined by subjects were junk foods (25%), obesity (20%), decreased physical activity (11%) and mental stress (11%). Half of the sample expressed that combination of quitting smoking, losing weight, regular physical activity, improving diet and treatment compliance will be helpful in prevention or reducing the chances of getting NCDs. *Conclusion:* This study reflects the poor knowledge and awareness about NCDs in rural India, hence policy measures are warranted to take the message at gross root level.

**Keywords:** Adults, Andhra Pradesh, Knowledge and awareness, Noncommunicable diseases, Rural population

### INTRODUCTION

Noncommunicable diseases (NCDs) tend to be of long duration and are the result of a combination of genetics, physiological, environmental and behavioral traits (WHO, 2020). NCDs kill 41 million people each year, equivalent to 71% of all deaths globally. Each year, 15 million people die from NCDs between the ages of 30 and 69 years; over 85% of these premature deaths occur in low- and middle-income countries. The total number of deaths from NCDs increases to 55 million by 2030, if timely interventions are not done for

prevention and control of NCDs (GBD, 2015). Genetic predisposition to central obesity, metabolic syndrome, smoking status and faulty life styles are accounted as major factors for the escalating NCD-related morbidity and mortality among the Indians (Joseph *et.al*, 2018; Jaiswal and Jaiswal, 2013). According to National Health Portal, in India, nearly 5.8 million people die from NCDs every year (NHP, 2019). The burden of modifiable risk factors of NCD's is increasing among Indian populations in the recent past (Joseph *et.al*, 2018; Perianayagam, 2018). Lack of awareness on NCDs is low thus corresponding to a surge in the prevalence of diabetes, hypertension and other risk factors in Indian populations Indians (Gupta and Gupta, 2017; Swaminathan *et.al*, 2017; Jaiswal, 2013).

Healthy diet, regular physical activity, maintaining a normal body weight and avoiding tobacco usage are the ways to prevent the NCD's. (Nathan *et.al*, 2009; Jaiswal, 2012). WHO formulated a policy for the adoption of effective measures for surveillance, prevention and control of NCD's and its complications, particularly in low- and middle-income countries. (2020). 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 NCD in developing countries like India is extremely important for implementation of national NCD control programs. Majority of the studies dealt with the people with disease and community level studies are sparse (Muninarayana *et.al*, 2010). India being multiethnic and multilingual, there is every need to understand the current level of knowledge and awareness on NCD's. In the light of this back ground, an attempt has been in the present investigation to assess the community wide knowledge and awareness regarding NCD's among the rural 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 (Jain *et.al*, 2018; Gupta *et.al*, 2018; Jaiswal, 2012; Mahajan *et.al*, 2019). 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 any 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 NCD was measured using 14 item questionnaire. Answers were graded with two categorical responses “Yes” and “No”. The survey instrument is as mentions below.

- |  |                                    |       |
|--|------------------------------------|-------|
| 1. Do you know about NCDs  | 1. Yes                             | 2. No |
| 2. NCDs cannot spread between people                                       | 1. Yes                             | 2. No |
| 3. Dietary habits cause NCDs   | 1. Yes                             | 2. No |
| 4. Sedentary life style cause NCDs   | 1. Yes                             | 2. No |
| 5. Mental stress is a risk factor for NCDs                                 | 1. Yes                             | 2. No |
| 6. People with high blood pressure are more likely to have a stroke.       | 1. Yes                             | 2. No |
| 7. People with diabetes are more likely to have a stroke                   | 1. Yes                             | 2. No |
| 8. NCDs diseases can be prevented  | 1. Yes                             | 2. No |
| 9. Do you agree that excess weight leads to NCDs                           | 1. Yes                             | 2. No |
| 10. Do you smoke cigarettes / Beedies now?                                 | 1. Yes                             | 2. No |
| 11. Chewing of tobacco   | 1. Yes                             | 2. No |
| 12. Do you consume alcohol now?  | 1. Yes                             | 2. No |
| 13. What are the factors you think that contribute to NCDs?                |                                    |       |
| 1. Obesity   | 4. Mental stress                   |       |
| 2. Decreased physical activity   | 5. Consuming more sweets           |       |
| 3. Family history  | 6. Others (name)                   |       |
| 14. In your view how one can prevent or reduce the chances of getting NCDs |                                    |       |
| 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                          |       |
| 5. Quit smoking  |                                    |       |

For closed questions, 1 to 12 correct answers were graded as 1 and incorrect answers as 0. For question No. 13 which was on causative factors for NCDs, highest score of 4 was granted for subjects who selected obesity, decreased physical activity or family history, 3 was awarded 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. 14 which was on prevent or reduce the chance of getting NCDs, 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 20 with higher score indicating better knowledge and awareness on NCDs.

### 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 NCDs.

### RESULTS

In the study population based on self-reported data, the prevalence of diabetes and hypertension was around 8 percent & 14 percent, and family history of diabetes and hypertension was 14 percent & 18 percent respectively (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.

Around 30 percent of the subjects had of the opinion that family history of diabetes leads to develop NCDs (Fig. 1). One quarter of the subjects felt consumption of Junk foods may lead to NCDs. Around 20 percent felt that obesity may lead to develop NCD and only 11 percent each opined that decreased physical activity and mental stress were the causative factors for developing NCDs.

The average score assessed through visual analogue scale on knowledge and awareness on NCDs was 12.45 out of 20 (62.25%) in both genders (Table 2). The average score was significantly higher in subjects with self-reported diabetes ( $p < 0.05$ ). The average score increases with increase in income levels. Illiterates were found to have less knowledge and awareness on NCDs 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 NCDs, sex adjusted multinomial logistic regression model was fitted by considering demographic variables as dependent variables and average score on knowledge and awareness on NCDs as 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 1.24 times (95%CI: 1.203, 1.277;  $p < 0.05$ ) better when compared with illiterates in terms of possessing knowledge and awareness on NCDs. Similarly subjects involved in business were 1.203 times better towards the knowledge and awareness on NCDs compared to agriculturists and skilled workers. Income and age of the subject failed to show any variation in odds of awareness and knowledge on NCDs.

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 NCDs (Fig. 2).

## DISCUSSION

The present study intended to understand the levels of knowledge and awareness on NCDs among rural population. The study highlights that average score on knowledge and awareness was 62 percent, and the score was better with socioeconomic indicators like educational and occupational status of the subjects. Similar results were published in elsewhere population of India (Jain *et.al*, 2018; Jaiswal, 2007). A systemic review by Strobele *et al* (2011) highlighted that educational status found to have good association with knowledge and awareness level on NCD risk factors. The other studies carried out by Menor *et al* (2014) and Joseph *et al* (2018) highlighted the strength of educational status towards knowledge and awareness on NCDs. Education on NCDs risk factors is needed to make individuals better informed about the ill effects and preventive measures (Margaret, 2019; Jaiswal, *et.al*, 2011).]

The self-reported prevalence of diabetes in the present study was 8.1 percent and hypertension was 13.7 percent, which is in good agreement with other published works

(Anjana *et.al*, 2017). A cross examination of results on knowledge and awareness on NCDs in different population groups of India shows regional variation (Srivastava *et.al*, 2014). NCD risk factor knowledge and awareness was found to higher in urban dwellers when compared to rural ones (Thippeswamy and Chikkegowda, 2016). 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 NCD risk factors Gassasse *et.al*, 2017). The results of the present study indicates that around 70 percent opined that excess weight, sedentary behavior and mental stress leads to NCDs. Around 40 to 60 percent opined that diabetes and hypertension leads NCDs. On the other hand tobacco consumption either smoking or chewing as risk factors was observed between 13 to 18 percent of the people only.

The observed discrepancy in the subjects perception on NCDs and its associated complications and management warrants to have continuing medical education programmes on NCDs and its risk factors in order that better NCDs education is imparted to subjects. Despite the importance of diet and exercise in the prevention of NCD risk factors, significant gaps in public education clearly exist in India (Mohan, 2017). The risk factors for NCD management as observed in the current study shows overweight, physically inactive and altered behavioral traits could predispose to NCDs. In developing countries or economy, as a societal highness, being overweight, increased leisure time activity and consumption of junk foods 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 their behavioral and life style cultures.

Another important observation in the present study was that only 60 percent of the people believe that the NCDs can be prevented. Similar observations were made in other populations of India (Joseph *et.al*, 2018). Our results clearly indicate lack of awareness on NCD and its risk factors. Unless the public knows that NCDs can be prevented and are aware of risk factors, primary prevention of NCDs 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 but also in adolescents (Anuradha *et.al*, 2015). 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 NCDs. In conclusion, this study reflects the poor knowledge and awareness about NCDs in rural India, hence policy measures are warranted to take the message at gross root level.

**Table 1: Demographic Characteristics of the Study Population**

<i>Variables</i>	<i>N</i>	<i>%</i>
<b>Sex</b>		
Male	3007	62.0
Female	1843	38.0
<b>Self reported diabetes</b>		
No	4458	91.9
Yes	392	8.1
<b>Family history of diabetes</b>		
No	4163	85.8
Yes	687	14.2
<b>Self reported hypertension</b>		
No	4185	86.3
Yes	665	13.7
<b>Family history of hypertension</b>		
No	3999	82.5
Yes	851	17.5
<b>Income in INR</b>		
Less than 49999	1626	33.5
50000-99999	2556	52.7
100000 and above	668	13.8
<b>Age groups</b>		
<39 years	2096	43.2
40 to 59 years	2310	47.6
>60 years	444	9.2
<b>Education</b>		
Illiterate	2113	43.6
Primary	881	18.2
Secondary	1023	21.1
Higher	833	17.2
<b>Occupation</b>		
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 NCDs in the Study Population**

<i>Variables</i>	<i>Mean ± SD</i>	<i>F</i>	<i>P</i>
<b>Sex</b>			
Male	13.04± 3.05	13.140	0.000
Female	11.85± 3.06		
<b>Self reported diabetes</b>			
No	12.53± 3.11	4.420	0.000
Yes	13.25± 3.03		
<b>Family history of diabetes</b>			
No	12.58± 3.15	0.373	0.709
Yes	12.63± 2.86		
<b>Self reported hypertension</b>			
No	12.57± 3.09	1.061	0.289
Yes	12.71± 3.23		
<b>Family history of hypertension</b>			
No	12.58± 3.15	0.337	0.736
Yes	12.62± 2.89		
<b>Income in INR</b>			
Less than 49999	12.53± 2.82	4.896	0.008
50000-99999	12.48± 3.16		
100000 and above	12.78± 3.13		
<b>Age Groups</b>			
<39 years	12.57± 3.11	3.013	0.049
40 to 59 years	12.66± 3.08		
>60 years	12.27± 3.25		
<b>Education</b>			
Illiterate	11.75± 3.16	117.805	0.000
Primary	12.64± 2.97		
Secondary	13.34± 2.81		
Higher	13.74± 2.87		
<b>Occupation</b>			
Agriculture/Skilled Workers/House wife	12.35± 3.18	65.025	0.000
Business	13.97± 2.58		
Professional/Job	12.63± 2.95		



**Table 3: Multinomial Logistic Regression Model to Assess the Odds Ratios**

<i>Variables</i>	<i>OR</i>	<i>P value</i>	<i>CI</i>
<b>Age Groups</b>			
Age > 39 years	Reference		
40 to 59 years	0.972	0.088	0.940, 1.004
>60 years	1.005	0.647	0.985, 1.024
<b>Education</b>			
Illiterate	Reference		
Primary	1.096	0.000	1.067, 1.125
Secondary	1.181	0.000	1.150, 1.212
Higher	1.240	0.000	1.203, 1.277
<b>Income in INR</b>			
Less than 49999	Reference		
50000-99999	0.956	0.000	0.936, 0.976
100000 and above	1.055	0.000	1.024, 1.087
<b>Occupation</b>			
Agriculture/Skilled Workers/House wife	Reference		
Business	1.203	0.000	1.163, 1.245
Professional/Job	1.099	0.000	1.071, 1.128

**Figure 1: Factors that Contribute in Developing NCDs**

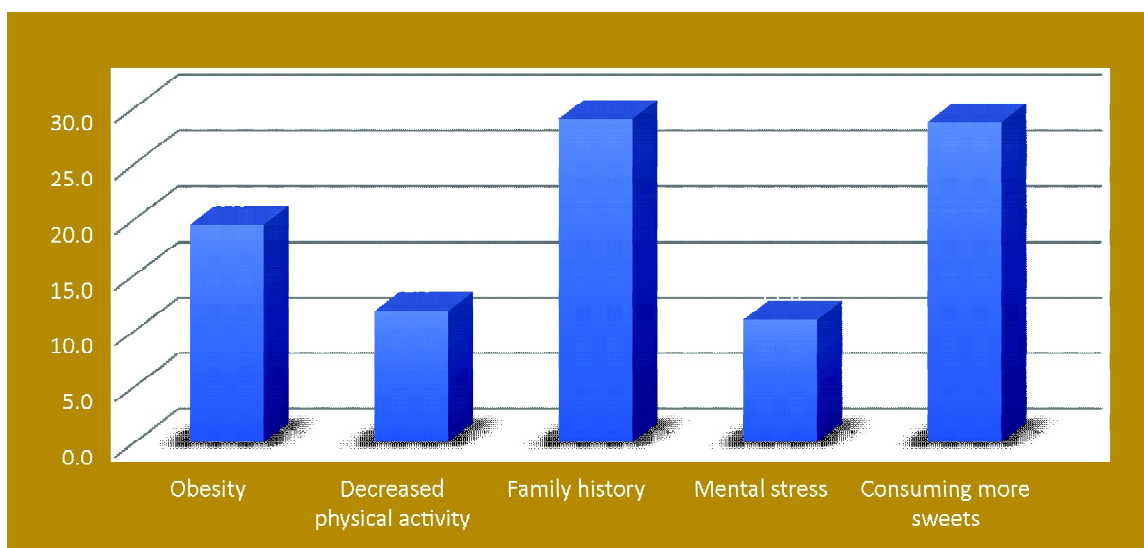
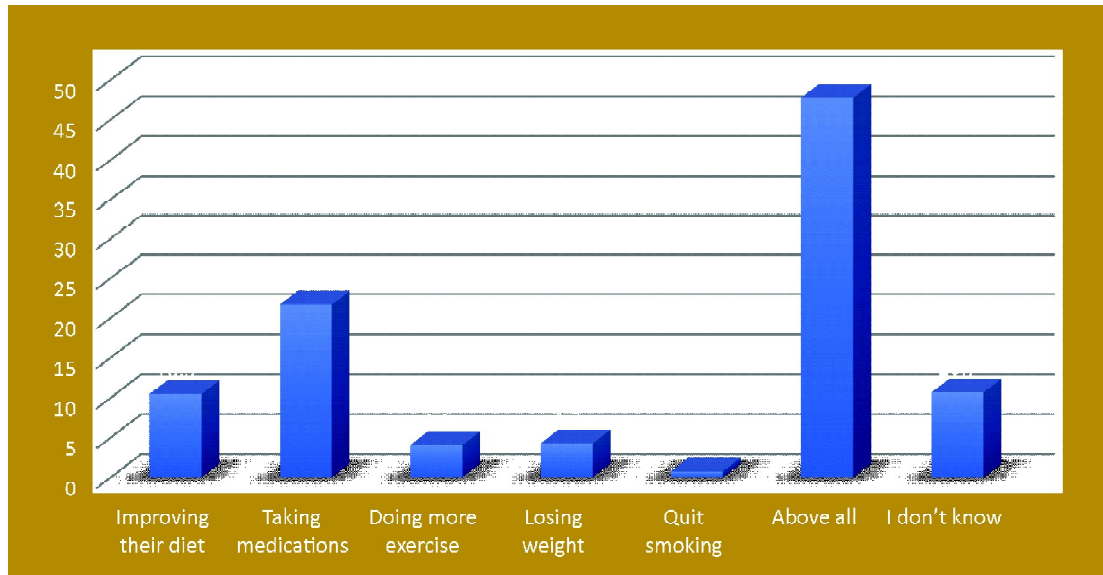


Figure 2: Awareness on NCDs



### References

- 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.
- 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.
- 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.
- GBD. (2015). Risk Factors Collaborators. Global, regional, and national comparative risk assessment of 79 behavioural, environmental and occupational, and metabolic risks or clusters of risks, 1990–2015: a systematic analysis for the Global Burden of Disease Study 2015. *Lancet*, 2016; 388(10053):1659-1724.
- Gupta R, Gupta S. Hypertension in India: Trends in prevalence, awareness, treatment and control. *RUHS J Health Sci*. 2017; 2:40-46.
- Gupta RK, Kumari R, Hussain S, Raina SK, Langer B, Parveen Z. A cross-sectional study to evaluate awareness about noncommunicable diseases among rural adolescents in North West India. *J Dent Allied Sci*. 2018;7:60-4.
- Jaiswal, A., & Jaiswal, A. (2013). Low back pain and work-related risk factors among drivers of Pondicherry. *International Journal of Scientific Footprints*, 1(2), 7-16.
- Jaiswal, A. (2013). Health and nutritional status of a primitive tribe of Madhya Pradesh: Bhumia. *Global J Hum Soc Sci Hist Archaeol Anthropol*, 13(1), 14-19.

- Jaiswal, A. (2012). The changing occupational structure and economic profile of textile industry of Banaras, Uttar Pradesh. *Journal of Social Sciences*, 30(1), 89-98.
- Jaiswal, A. (2004). Respiratory efficiency as affected by exposure to textile dust: health status evaluation of textile workers of district Varanasi, Uttar Pradesh. *Gene. Environment and Health*, 135-162.
- Jaiswal, A. (2012). A Study on Factors Associated With the Deterioration of Respiratory Function Among Male Textile Workers in Uttar Pradesh. *Indian Journal of Public Health Research & Development*, 3(3).
- Jain S, Gupta SK, Gupta S, Jain V, Jain S. Knowledge of Modifiable Risk Factors of Non Communicable Diseases (NCDs): A Cross Sectional Study from Urban Slum Bhopal. *National Journal of Community Medicine*, 9: 443-447, 2018.
- Jaiswal, A., Kapoor, A. K., & Kapoor, S. (2011). Health conditions of the Textiles Workers and their association with breathing condition. *The Asian Man-An International Journal*, 5(1), 28-33.
- Jaiswal, A. (2007). Health status of textile industrial Workers of Uttar Pradesh, India. EAA Summer School eBook, 1, 217-223.
- Jaiswal, A. (2007). The hominization process of homo sapiens. EAA Summer School eBook, 43-46.
- WHO fact sheet on Diabetes. World Health Organization, 2020. [https://www.who.int/health-topics/diabetes#tab=tab\\_1](https://www.who.int/health-topics/diabetes#tab=tab_1).
- Joseph N, Srinath R, Ramanathan A, Gupta AK, Nandan P, Afnan R. Awareness of risk factors, warning signs, and immediate management measures of noncommunicable diseases: A multihospital-based study. *J Nat Sc Biol Med* 2018;9:227-35.
- Mahajan M, Naik N, Jain K, Patira N, Prasad S, Mogri S. Study of Knowledge, Attitudes, and Practices Toward Risk Factors and Early Detection of Noncommunicable Diseases Among Rural Women in India. *J Glob Oncol*, 5: 1-10, 2019.
- 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.
- Menon B, Swaroop JJ, Deepika HK, Conjeevaram J, Munisusmitha K. Poor awareness of stroke – A hospital-based study from South India: An urgent need for awareness programs. *J Stroke Cerebrovasc Dis* 2014; 23: 2091-8.
- Mohan Lal Kanojia. Knowledge, attitude and practice of diabetes amongst rural population - an institutional based study. *International Journal of Contemporary Medical Research* 2017; 4(8) : 1761-1764.
- Muninarayana C, Balachandra G, Hiremath SG, Iyengar K, Anil NS. Prevalence and awareness regarding diabetes mellitus in rural Tamaka, Kolar. *Int J Diabetes Dev Ctries* 2010; 30: 18-21.
- 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.
- NHP. Noncommunicable diseases and their risk factors. National Health Portal, India, <https://www.nhp.gov.in/healthyliving/ncd2019>
- Perianayagam A. India's escalating burden of non-communicable diseases. *The Lancet*, 6: e1262-w1263, 2018

- Srivastava R, Gupta A, Chinnakali P, Aslesh OP, Yadav K, Gupta V *et al.* Awareness about noncommunicable diseases role of nutrition among an urban resettlement population of Delhi. *Ind J Nutr Dieter*, 51: 429-438, 2014.
- Stroebele N, Müller-Riemenschneider F, Nolte CH, Müller-Nordhorn J, Bockelbrink A, Willich SN, *et al.* Knowledge of risk factors, and warning signs of stroke: A systematic review from a gender perspective. *Int J Stroke* 2011; 6: 60-6.
- Swaminathan K, Veerasekar G, Kuppusamy S, Sundaresan M, Velmurugan G, Palaniswami NG. Noncommunicable disease in rural India: Are we seriously underestimating the risk? The Nallampatti noncommunicable disease study. *Indian J EndocrMetab* 2017; 21: 90-5.
- Thippeswamy T, Chikkegowda P. Basic risk factors awareness in non-communicable diseases (BRAND) study among people visiting tertiary care centre in Mysuru, *Karnataka. J Clin Diagn Res* 2016; 10: OC04-7.

---

**To cite this article:**

- P. Chandrasekhar Rao, T. Muneeswara Reddy, K. Surendranadha Reddy, K. Ramalinga Reddy, J. Lalu Naik, T. Ramakrishna Reddy and Kanala Kodanda Reddy (2021). Knowledge and Awareness on NCDs among the Adult Rural Population of Chittoor District, Andhra Pradesh, *Anthropo-Indialogs*, Vol. 1, No. 3, pp. 209-220.
-