

## Risk Factors Profile for Chronic Non-Communicable Diseases: A Community-Based, Cross-Sectional Study in Warangal District, Telangana, India

Niharika Lakkoju<sup>1</sup>, Rafath Unnisa Begum<sup>2\*</sup>, Raj Kumar<sup>3</sup>

<sup>1</sup>Assistant Professor, Department of Community Medicine, Malla Reddy Institute of Medical Sciences, Hyderabad, Telangana, India

<sup>2</sup>Assistant Professor, Department of Community Medicine, Dr. VRK Women's Medical College, Hyderabad, Telangana, India

<sup>3</sup>Assistant Professor, Department of Orthopaedics, Malla Reddy Institute of Medical Sciences, Hyderabad, Telangana, India

Received: 16-06-2021 / Revised: 18-07-2021 / Accepted: 10-08-2021

### Abstract

**Background:** Non-communicable disease (NCD) can be chronic diseases of long duration and slow progression. This cross sectional, community based, single-center study was carried out to assess the socio-demographic profile and risk factors of non-communicable diseases using WHO STEPUP approach among adults. **Methods:** Four hundred cases with age population in range of 20-59 years and residing in rural field were included in the study. Study tools included a WHO step up approach questionnaire, Sphygmomanometer, weighing scale, non-stretchable tape and stethoscope. The data was entered and tabulated in MS-Excel 2007, and statistical analysis was performed by using Statistical Package for the Social Sciences (SPSS 22.0) and  $p < 0.05$  is considered as statistical significance. **Results:** Maximum 61.8% of the study participants were male, whereas 38.2% were females. Age increases proportion of diabetes mellitus and hypertension and the prevalence was high among 50-59 years. Nearly more than half of females were suffering from hypertension and this difference was found to be statistically significant. Among 221 hypertensive study participants, 8 were associated with history of cerebro-vascular accident, 166 are found to be  $\leq 25\text{kg/m}^2$  BMI, 44 were tobacco users, nearly equal distribution of alcoholic users (111) and non-users (110). Among 111 diabetes mellitus study subjects, around 50% (67) was found to be  $\leq 25\text{kg/m}^2$  BMI, 31 with are tobacco users, 10 are having the history of both forms of tobacco users. **Conclusion:** Proportion of hypertension was highest among obese group with BMI  $\geq 25\text{mg/kg}^2$  was 55 and the association was found to be significant. The proportion of hypertension was found to be statistically significant among alcoholic and non-alcoholic users.

**Keywords:** Adults, Non-communicable disease, Risk factors

This is an Open Access article that uses a fund-ing model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.

### Introduction

Non communicable diseases (NCDs) are defined as diseases of long duration and are generally slow in progression. NCDs are the leading cause of adult mortality and morbidity worldwide [1], because they are under appreciated as development issues and underestimated as diseases with profound economic effects; many governments take little interest in their prevention and leave this responsibility primarily to individuals. It is estimated currently that of every 10 deaths, 6 are attributable to non-communicable conditions [2].

According to WHO report 2014, reducing the global burden of NCDs is an overriding priority and a necessary condition for sustainable development. As the leading cause of death globally NCDs were responsible for 38million (68%) of the world's 56 million deaths in 2012, more than 40% of them (16 million) were premature deaths under age 70years. Cardiovascular diseases (including heart diseases and stroke), Diabetes, Cancers and Chronic respiratory diseases (including chronic obstructive pulmonary disease (COPD) and asthma) [3-5].

In view of this, the present cross sectional, community based, single-center study was carried out to assess the socio-demographic profile and risk factors of non-communicable diseases using WHO STEPUP approach among adults.

### Materials and Methods

This cross sectional, community based, single-center study was conducted at Department of Community Medicine, Kakatiya Medical College and Hospital, Warangal district, Telangana, India. The study period was of 12 months from 1<sup>st</sup> September 2015 to 31<sup>st</sup> August 2016. Four hundred cases with age population in range of 20-59years and residing in rural field area wardhanapet were included in the study. However, pregnant women, bed ridden and paralytic persons, persons who refused to participate in the study, persons in <20 years and >59 years age group, persons who were not present at the time of study and persons who don't have at least 1 risk factor of NCD were excluded from this study.

Study tools included a WHO stepup approach questionnaire, Sphygmomanometer, weighing scale, non-stretchable tape and stethoscope. Study variables for assessment included age, gender, educational status, occupation, economic status, tobacco use, alcohol consumption, dietary habits, history of hypertension and diabetes, physical activity and physical measurements like height, weight, BMI, WHR etc. All The study protocol was performed in accordance with the principle of the declaration of Helsinki and after approval by the Institutional ethical scientific committee.

\*Correspondence

**Dr. Rafath Unnisa Begum**

Assistant Professor, Dept. of Community Medicine, Dr. VRK Women's Medical College Hyderabad, Telangana, India.

E-mail: [dr.rafathunnisa@gmail.com](mailto:dr.rafathunnisa@gmail.com)

**Statistical analysis**

The data was entered and tabulated in MS-Excel 2007, and statistical analysis was performed by using Statistical Package for the Social Sciences (SPSS 22.0). Data had been summarized as mean for numerical variables and count and percentages for categorical variables. Relevant statistical tests were applied and  $p < 0.05$  is considered as statistical significance.

**Results**

The study of 'Assessment of the association between risk factors and outcome of non-communicable diseases among adults: A cross sectional study, community based, single-center study' was conducted in department of community medicine, Kakatiya medical college and hospital, Warangal district, Telangana, India. The study period was of 12 months from 1st September 2015 to 31st August 2016. 400 patients were enrolled in our study. Maximum of the study participants were male (61.8%), whereas remaining 38.2% were females.

**Table 1: Distribution of age group of study population with NCD diseases**

Age Group	Hypertension		Total
	Yes	No	
21-29 years	16	15	31
30-39 years	36	27	63
40-49 years	79	54	133
50-59 years	90	83	173
Total	221	179	400
$\chi^2 = 26.8$ ; df=3; $p < 0.000$			
Age Group	Diabetes Mellitus		Total
	Yes	No	
21-29 years	5	26	31
30-39 years	22	41	63
40-49 years	33	100	133
50-59 years	51	122	173
Total	111	289	400
$\chi^2 = 4.13$ ; df=3; $p = 0.24$			

Distribution of the age group of study population with NCD diseases was tabulated in **Table 1**. Among (113) 40-49 years age group study participants more than half of them (79) are suffering with hypertension. And among 20-29 years and 30-39 years there is equal proportion of Hypertensive and Normotensives and among 30-39 years age group study participants nearly 25% are suffering with diabetes and these differences were found to be statistically significant. As age increases proportion of history of cancer also increases and the prevalence was high among 50-59 years.

**Table 2: Distribution of gender among study population with NCD diseases**

Gender	Hypertension		Total
	Yes	No	
Male	112	135	247
Female	109	44	153
Total	221	179	400
$\chi^2 = 25.6$ ; df=1; $p < 0.001$			
Gender	Diabetes Mellitus		Total
	Yes	No	
Male	63	184	321
Female	48	105	153
Total	111	289	400
$\chi^2 = 1.62$ ; df=1; $p = 0.25$			

Distribution of gender among study population with NCD diseases was tabulated in **Table 2**. Among 221 Hypertensive study participants 109 are females and 112 are males. Among 111 diabetes mellitus participants 63 are males and 48 are females. There is nearly a equal proportion of gender with distribution of cancer. Nearly more than half of females (109) from 153 study participants are suffering from hypertension and these differences were found to be statistically significant.

**Table 3: Distribution of the study population of tobacco users with NCD diseases**

Tobacco Users	Hypertension		Total
	Yes	No	
Yes	44	79	123
No	177	100	277
Total	221	179	400
$\chi^2 = 27.25$ ; df=1; $p < 0.001$			
Tobacco Users	Diabetes Mellitus		Total
	Yes	No	
Yes	31	92	123
No	80	197	277
Total	111	289	400
$\chi^2 = 0.57$ ; df=1; $p = 0.50$			

Distribution of the study population of tobacco users with NCD diseases was tabulated in **Table 3**. Among 221 Hypertensive 44 are tobacco users ; among 111 study participants of diabetes mellitus 31 with are tobacco users; and among 4 cancer study participants the total 4 are with non-tobacco users.

**Table 4: Distribution of the study population of smokeless tobacco users with NCD diseases**

Smokeless Tobacco Users	Hypertension		Total
	Yes	No	
Yes	23	29	52
No	198	150	348
Total	221	179	400
$\chi^2 = 2.9$ ; df= 1; p=0.08			
Smokeless Tobacco Users	Diabetes Mellitus		Total
	Yes	No	
Yes	14	38	52
No	97	251	348
Total	111	289	400
$\chi^2 = 0.02$ ; df=1; p=0.88			

Distribution of the study population of smokeless tobacco users with NCD diseases was tabulated in **Table 4**. Among 221 hypertensive study participants 23 are with smokeless form of tobacco and 198 are with non-smokeless form of tobacco, among 111 diabetes mellitus study subjects 14 are with smokeless form of tobacco and 97 are with non-smokeless form of tobacco. Among 4 cancer study participants a total of all 4 are with non-smokeless form of tobacco users. Among smokeless tobacco form (52) study subjects nearly half of the smokeless tobacco users(23) are suffering with hypertension. And these differences were found not to be statistically significant.

**Table 5: Distribution of the study population of both forms of tobacco users with NCD diseases**

Both Forms of Tobacco	Hypertension		Total
	Yes	No	
Yes	2	8	10
No	219	171	390
Total	221	179	400
Both Forms of Tobacco	Diabetes Mellitus		Total
	Yes	No	
Yes	2	8	10
No	109	281	390
Total	111	289	400

Distribution of the study population of both forms of tobacco users with NCD diseases was tabulated in **Table 5**. Among the hypertensive study participants (221), 10 are having the history of both forms of tobacco users and among (111) diabetic study participants 10 are having the history of both forms of tobacco users.

**Table 6: Distribution of the study population of alcohol users with NCD diseases**

Alcohol Users	Hypertension		Total
	Yes	No	
Yes	111	127	238
No	110	52	162
Total	221	179	400
$\chi^2 = 17.6$ ; df=1; p<0.000			
Alcohol Users	Diabetes Mellitus		Total
	Yes	No	
Yes	56	182	238
No	55	107	162
Total	111	289	400
$\chi^2 = 5.22$ ; df= 1; p<0.02			

Distribution of the study population of alcohol users with NCD diseases was tabulated in **Table 6**. Among (221) hypertensive study subjects, nearly equal distribution of alcoholic users (111) and non-users (110). Among (111) diabetes mellitus study subjects nearly equal proportion of alcoholic users and non-users was found. Among cancer study participants a proportion of (4) were non-alcoholic users and these differences was found to be statistically significant.

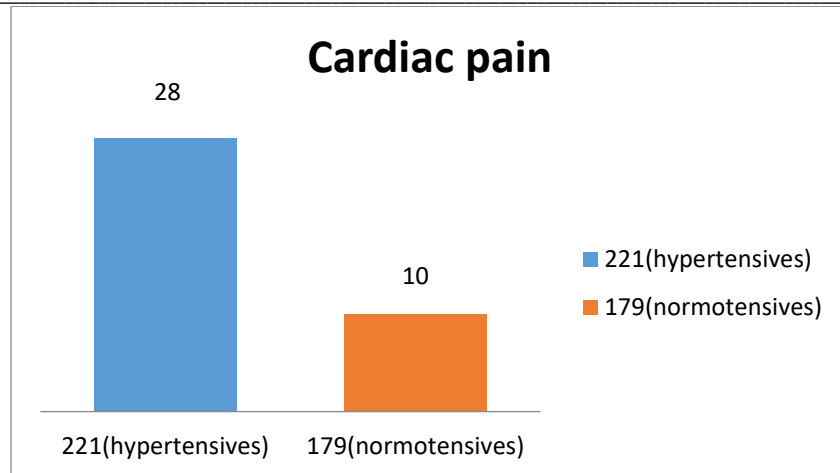


Fig 1: Study distribution according to the risk factor and complications

Among 221 hypertensive study participants 28 were associated with history of cardiac pain, and among 179 normotensives 10 are associated with history of cardiac pain (hospital records available with the study participants at the time of study)

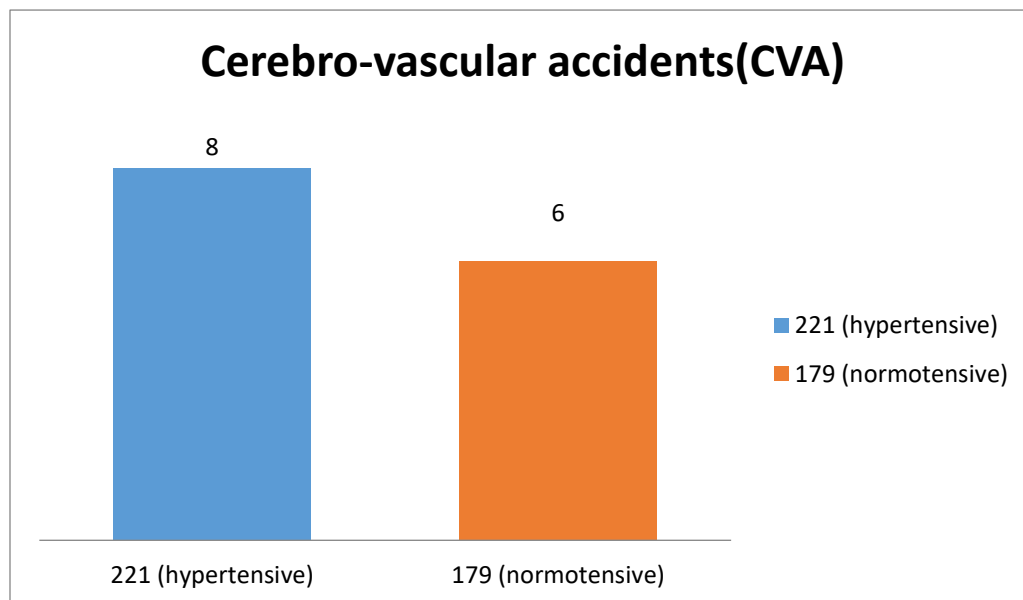


Fig 2: Study distribution according to the risk factor and complications

Among 221 hypertensive study participants 8 were associated with history of cerebro-vascular accident, and among 179 normotensives 6 are associated with history of cerebro-vascular accident, (hospital records available with the study participants at the time of study)

Table 7: Distribution of the study population of physical activity with NCD diseases

Physical Activity	Hypertension		Total
	Yes	No	
Sedentary worker	111	63	174
Moderate worker	34	31	65
Heavy worker	76	85	161
Total	221	179	400
$\chi^2 = 9.577$ ; df=2; p<0.00			
Physical Activity	Diabetes Mellitus		Total
	Yes	No	
Sedentary worker	51	123	174
Moderate worker	23	42	65
Heavy worker	37	124	161
Total	111	289	400
$\chi^2 = 3.97$ ; df=2; p=0.14			

Distribution of the study population of physical activity with NCD diseases was tabulated in **Table 7**. Among 221 hypertensive study participants nearly half of the study subjects 111 are with sedentary nature of work. And among 111 diabetes mellitus study subjects 51 are found to be with sedentary nature and among 4 cancers subjects a total of 4 was found by sedentary nature of work.

**Table 8: Distribution of the study population of BMI with NCD diseases**

BMI	Hypertension		Total
	Yes	No	
≤25 kg/m <sup>2</sup>	166	98	264
≥25 kg/m <sup>2</sup>	55	81	136
Total	221	179	400
$\chi^2 = 18.2$ ; df= 1; p<0.000			
BMI	Diabetes Mellitus		Total
	Yes	No	
≤25 kg/m <sup>2</sup>	67	197	264
≥25 kg/m <sup>2</sup>	44	92	136
Total	111	289	400
$\chi^2 = 2.17$ ; df=1; p=0.139			

Distribution of the study population of BMI with NCD diseases was tabulated in **Table 8**. The prevalence of hypertension was found to be statistically significant with body mass index (BMI). Among 221 hypertensive study participants more than half (166) are found to be ≤25 kg/m<sup>2</sup> BMI. Among 111 diabetes mellitus study subjects 50% (67) was found to be ≤25kg/m<sup>2</sup> BMI, equal distribution of cancer (4) among study subjects was found with BMI.

### Discussion

The present study included 400 subjects with age population in range of 20-59 years and residing in rural field. In this study, there were 247 males and 153 females. Male is to female ratio was found to be close to 2:1. As according to census 2011, sex ratio in India reports 943 females per 1000 males. Whereas, according to NFHS-4, in Telangana for rural population it was 1035 females for 1000 males. The current study mainly focused on the age group 20-59 years as to study the pros and cons of the productive economic burden. About one-fourth of global NCD-deaths take place before the age of 60. The probability of dying during the most productive years (ages 30-70) from one of the four main NCDs is a staggering 26%.

In this study, the prevalence of hypertension among the study population was 221(55.3%), which is similar to the study conducted by Priyanka among tribal population in Kerala found prevalence of hypertension was 48.3% [6]. Among the study participants male participants were found to be 118(29.5%) and female participants were found to be 103(25.8%) and this difference was found to be statistically significant ( $p < 0.001$ ). Similar findings found by the study conducted by S Yadav et al [7] where males are 1.83 time more prone for Hypertension. Prevalence was more among men than women as in New Delhi birth cohort study. In contrast to other studies, the present study findings can be compared to study done by Prashant KR et al [8] in rural areas of Karimnagar. They found that prevalence of hypertension was more in female (23.4%) compared to male (14.4%) and similar results found by the study conducted by Singh DR et al [9] where significance existed between female gender and hypertension. In the current study, 13% are normotensives, 31.7% of study population were in pre hypertensive stage, 29.5% study participants have >140/90 and 25.7% with > 160/>100. These results were similar to Krishnan et al (2008) [10] where prevalence of hypertension ≥140 & or 90 mm of Hg was 10.7% in rural area of Faridabad, Haryana. Reddy S and Prabhu G R (2005) [11] carried out a study of hypertension in an urban slum of Tirupathi, Andhra Pradesh reported that, the overall prevalence of hypertension was 8.6%. The prevalence of self-reported diabetes was found to be 27.8% where male participants found to 16.5% and female participant's was 11.3% and the association between them was not found to be statistically significant. According to Deepa M et al [12] NCD risk factor surveillance (2003-2006), lowest prevalence of self-reported diabetes was recorded in rural (3.1%) followed by peri-urban/slum (3.2%) and the highest in urban areas (7.3%). Similar results were found by Gupta A, Gupta R et al (2003) where the prevalence of diabetes was 8.6 & in urban population of western India. Deo S S et al

(2006) [13] reported that the prevalence of diabetes was 9.3% in rural Maharashtra. In the study more than one fourth (34.1%) of the study population were found to be overweight/obese (BMI ≥ 25kg/m<sup>2</sup>) and 66% were found to be normal (BMI ≤ 25kg/m<sup>2</sup>). Quite similar with the study conducted by Thankappam KR et al (2011) [14] where the prevalence of overweight (BMI ≥ 25kg/m<sup>2</sup>) was 30.8% (urban:3.3%, rural:20.9%, slum:35.3%) in a community based study in Kerala. In contrast to the study conducted by Kokiwar PR et al (2009) [15], where the prevalence of obesity (BMI ≥ 25kg/m<sup>2</sup>) was 16.4% in a rural community in Andhra Pradesh.

The proportion of hypertension among the study population was significantly associated with age, gender, education, tobacco users, and both forms of tobacco users, alcohol consumption, physical activity and BMI. Increasing age was associated with increased likelihood of developing hypertension, and cancer and this result concurs with IDSP-NCD risk factors survey. Age group of 40-49 years had highest proportion of hypertension. Alcohol consumption was associated with higher proportion of hypertension, diabetes mellitus, stroke and cancer. However, the low proportion of study participants who had been tested for NCDs diseases reflects a lack of public sensitization towards early detection. Similar results are seen in the study among primitive tribes in Kerala by Meshram et al [16] and by Tawa et al [17] in Mombasa, Kenya.

### Conclusion

Proportion of hypertension was highest among obese group with BMI ≥ 25mg/kg<sup>2</sup> was 55 and the association was found to be significant. The proportion of hypertension was found to be statistically significant among alcoholic and non-alcoholic users.

### Limitations

In this study, diabetes mellitus prevalence was taken even though Hypertension was the highest prevalence. All the risk factors and WHO Step-III approach (Lipid profile, RBS,) could not be included in the study. Only 20-59 years age group was included so as to study the secondary prevention, geriatric age group was excluded, even though burden of disease is high in this age group. Mental health (NIMHAMS steps questionnaire) are not studied. Because of feasibility, less number of questions from WHO STEPS approach questionnaire was taken up for this study. Further, this study included sample size of only 400 subjects, whom do not represent or generalize the whole population.

### References

1. Malta DC, Duncan BB, Schmidt MI, Teixeira R, Ribeiro AL, Felisbino-Mendes MS, Machado IE, Velasquez-Melendez G, Brant LC, Silva DA, de Azeredo Passos VM. Trends in mortality due to non-communicable diseases in the Brazilian adult population: national and subnational estimates and projections for 2030. *Population Health Metrics*. 2020;18(1):1-4.
2. Geidl W, Abu-Omar K, Weege M, Messing S, Pfeifer K. German recommendations for physical activity and physical activity promotion in adults with non-communicable diseases.

- International Journal of Behavioral Nutrition and Physical Activity. 2020;17(1):1-3.
3. World Health Organization. Global action plan for the prevention and control of non-communicable diseases 2013-2020. World Health Organization; 2013.
4. Nyaaba GN, Stronks K, Aikins AD, Kengne AP, Agyemang C. Tracing Africa's progress towards implementing the Non-Communicable Diseases Global action plan 2013-2020: a synthesis of WHO country profile reports. BMC Public Health. 2017;17(1):1-3.
5. World Health Organization. Western Pacific Regional action plan for the prevention and control of non-communicable diseases (2014-2020).
6. Priyanka S. Prevalence of non communicable disease risk factors among Kani tribe in Thiruvananthapuram district, Kerala (Doctoral dissertation, SCTIMST).
7. Yadav S, Boddula R, Genitta G, Bhatia V, Bansal B, Kongara S, Julka S, Kumar A, Singh HK, Ramesh V, Bhatia E. Prevalence & risk factors of pre-hypertension & hypertension in an affluent north Indian population. Indian Journal of Medical Research. 2008;128(6):712-21.
8. Kokiwar PR, Gupta SS, Durge PM. Prevalence of hypertension in a rural community of central India. J Assoc Physicians India. 2012;60(6):26-9.
9. Ragoobirsingh D, McGrowder D, Morrison EY, Johnson P, Lewis-Fuller E, Fray J. The Jamaican hypertension prevalence study. Journal of the National Medical Association. 2002;94(7):561.
10. Krishnan A, Kapoor SK. Prevalence of risk factors for non-communicable disease in a rural area of Faridabad district of Haryana. Indian J Public Health. 2008;52(3):117-24.
11. Reddy SS, Prabhu GR. Prevalence and risk factors of hypertension in adults in an Urban Slum, Tirupati, AP. Indian Journal of community medicine. 2005;30(3):84.
12. Deepa M, Anjana RM, Mohan V. Noncommunicable diseases risk factor surveillance: experience and challenge from India. Indian Journal of Community Medicine 2011;36(Suppl1):S50.
13. Deo SS, Zantye A, Mokal R, Mithbawkar S, Rane S, Thakur K. To identify the risk factors for high prevalence of diabetes and impaired glucose tolerance in Indian rural population. International journal of Diabetes in Developing countries. 2006 ;26(1):85-87.
14. Thankappan KR, Shah B, Mathur P, Sarma PS, Srinivas G, Mini GK, Daivadanam M, Soman B, Vasana RS. Risk factor profile for chronic non-communicable diseases: results of a community-based study in Kerala, India. Indian Journal of Medical Research. 2010;131(1):53-7.
15. Kokiwar PR, Rao JG, Shafee MD. Prevalence of coronary risk factors in a rural community of Andhra Pradesh. Indian Journal of Public Health. 2009;53(1):52-4.
16. Meshram II, Arlappa N, Balkrishna N, Rao KM, Laxmaiah A, Brahmam GN. Prevalence of hypertension, its correlates and awareness among adult tribal population of Kerala state, India. Journal of postgraduate medicine. 2012;58(4):255-57.
17. Tawa N, Frantz J, Waggle F. Risk factors for chronic non communicable diseases in Mombasa, Kenya: Epidemiological study using WHO stepwise approach. African Journal of Health Sciences. 2011;19(3-4):24-29.

**Conflict of Interest:** Nil

**Source of support:** Nil