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Health awareness and nutritional assessment of tribal in Kashmir: A case study of Gujjar and Bakerwal Population

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Abstract
This cross-sectional study investigates the impact of socio-demographics on health status, awareness and prevalence of non-communicable diseases (NCDs) among Gujjar and Bakerwal tribes in Kashmir. Multistage cluster sampling using probability proportion to size was adopted and 6808 respondents were enrolled with a mean age of 37 years. A structured data collection form was used and a p-value ≤0.05 was considered as statistically significant. Of the total 2872 males and 3936 females, 53.6% and 69.6% of subjects respectively, were found to be illiterate. The annual income of households was around Rs.25000. Around 862 (33.8%) male and 1016 (28.5%) female subjects were malnourished. Further, the study revealed only 7.9%, 9% and 11% of the subjects were aware of thyroid dysfunction/dyslipidemia, diabetes and heart diseases respectively whereas hypertension was known to 39.3% of the subjects. The awareness regarding the family history of NCDs was scarce. Appropriate nutritional intervention, NCD awareness, and educational policies are warranted to improve their health status, literacy rates and per-capita income.

Keywords: Socio-demographics, tribal population, nutrition, awareness, family history and prevalence

1. Introduction
The tribal societies in India are considered as the most vulnerable and marginalized section of the population in terms of socio-economic and demographic factors such as poverty, illiteracy, lack of developmental and adequate primary healthcare facilities [1, 2]. Tribal constitute a significant percentage of the population. According to the 2011 census, the tribal population in India was about 104 million, which constitutes about 8.6 percent of the total population. According to the Ministry of Tribal Affairs, Government of India, over 84 million people belonging to 698 communities are identified as members of Scheduled Tribes (ST) [3]. For the development and upliftment of weaker and underprivileged sections, from the last few decades, 'growth with equity and social justice' has remained the top developmental agenda of developing nations, but from the historical past, Indian society suffers from substantial disparity in education, employment, and income-based on caste and ethnicity [4]. As a result, the tribal face an issue of negligence and exclusion. These tribes mainly live in isolated areas, forest fringes far away from the modern civilization with their traditional values, customs, beliefs and myths and may engage in transhumance pastoralism [5].

This exclusionism and backwardness of tribals lead to a number of challenges and problems. The available information on the tribal represents that they face problems related to education, economy and health. Although, these areas have largely remained under-researched, whatever scant information is available on the theme confirms that they commonly face health issues such as seasonal illnesses, skin problems, diarrhoeal diseases, fever, gastroenteritis, malaria, and various other communicable diseases such as tuberculosis, hepatitis, sexually transmitted diseases (STDs), viral and fungal infections, scabies, measles, leprosy etc. Besides this, the children of this community suffer from anaemia, malnutrition, low birth weight, pneumonia etc. Pregnant and lactating mothers in tribal settings complained of irregular excessive bleeding during menstruation, swelling of feet, anaemia etc [6, 7]. Besides this, pregnant women have low dietary and nutritional intake [8] which makes them at a greater risk of health complications [9]. However, the diseases affecting the tribal population may vary from one area to other, owing to reasons of demography, social and cultural practices [7]. Recognizing the health scenario of tribal, it can be said that tribal health is one of the important areas for action.

Considering the situation of Tribal in Jammu and Kashmir, specifically the Gujjar and Bakerwal tribes, their health status is no different from the rest of India. Their health status has been found poor as compared to that of the general population. As mentioned already that diseases among Tribal may be context-specific, Gujjars and Bakerwals in Jammu and Kashmir have been found suffering from rheumatism, skin problems, high blood pressure, respiratory and reproductive disorders, and non-chronic ailments like fever, common cold and cough, gastrointestinal and abdominal pain [5]. Women generally face issues of malnutrition [10], nutritional anemia, infections and complications of unwanted pregnancy [11].

Bhasin (2007) [12], commenting on the health status of Tribal says that they score very low on health parameters as compared to the national average and is worsening with time. Although the National Health Policy, 1983 accords a high priority to extend organized services to this fragile/vulnerable community, however, no significant positive development is seen in their health parameters. Instead, increased disease risk is found and predicted among the Tribal population attributing to reasons, such as (i) poverty and consequent undernutrition; (ii) poor environmental sanitation, poor hygiene and lack of safe drinking water leading to increased morbidity from water and vector-borne infections; (iii) lack of access to healthcare facilities resulting in the increased severity and duration of illnesses; (iv) social barriers and taboos preventing utilization of available healthcare services; (v) vulnerability to specific diseases like glucose-6-phosphate dehydrogenase (G-6 PD) deficiency, yaws and other endemic diseases like malaria etc. Also, the tribal population, being heterogeneous, there are wide variations in their health status, access to and utilization of health services [7].

Despite such a grim scenario of health among Tribal, inadequate attention has been paid both by the government and non-governmental sector. This is because of the three reasons namely; (i) there is a general belief that living close to nature they enjoyed an environment which is conducive to good health, (ii) the tribal have been regarded as not very amenable to the western system of medicine as they still depend very much on supernatural remedies and (iii) the difficult terrain where it is difficult to reach health service adequately. Tribal population, in general, relies on traditional practices of healing not just for general health issues but also for chronic illness [13]. Tribal are a relatively isolated and autonomous group. The existence of own cultural and medical system is one of the important features of a tribal society. The tribal social structure has its own structural and ethnic specificity and the diseases that inflict upon the tribal people are likewise specific to the attribute of their social structure. Moreover, the knowledge of the disease, their classification and etiology are constituents of their cultural system and they develop methods and ways of curing the diseases [7].

Globally, the morbidity and mortality caused by non-communicable diseases (NCDs hereinafter) have been steadily increasing over the past few decades. NCDs are causing more deaths than all other causes combined together. According to world health statistics 2016, in the year 2012 alone, non-communicable deaths accounted for about two-third of total deaths and the South East Asia region is the worst affected [14]. Changing lifestyle patterns among tribal people is contributing to the triple burden of diseases as it directly impacts the nutritional status of an individual. There has been found an inextricable relation between nutritional status and the health or ability of an individual to resist the infections [10]. Therefore, identifying the current health and nutritional status of the Gujjar and Bakerwal population and understanding their health-seeking behaviour is significant in providing insights to policymakers, health officials for improving the condition of this population in availing access to quality health care services. Not much research has been published on the health status of Gujjars and Bakerwal tribe in Jammu and Kashmir. In order to minimize this gap, the present study was attempted to look into the impact of socio-demographics on health status. Besides this, it estimates the prevalence of known common non-communicable diseases (NCDs) and assesses the awareness regarding family history of these diseases among the target population.

2. Material and Methods
2.1 Study population and sample size
The information regarding nutritional status, awareness, family history and demographic background with the prevalence of non-communicable diseases was procured from the Gujjar and Bakerwal tribal population of the Kashmir Valley, India from January 2015 till December 2018 (3 years). Since this study deals with humans, therefore, in order to preserve their dignity and to keep the research ethics intact, this study sought approval from the Sheri Kashmir Institute of Medical Sciences (SKIMS) Institutional Ethics Committee. The sample size was calculated using prevalence of 34% of NCDs reported from Central Kashmir from the previous research with the level of significance 5% and the absolute error (e) which has been considered as 2% in this study. Although a large number of subjects agreed to participate in the study and were enrolled, complete data was available for 6808 participants.

2.2 Study Design
Out of 10 districts housing tribal population, five districts (Anantnag, Pulwama, Ganderbal, Kupwara and Srinagar) were selected based on the Multi-Cluster Sampling (MCS) with Probability Proportional to Size (PPS) technique. The number of individuals per district was chosen from randomly selected villages with a minimum cap of 1000 individuals and the individuals in the village were considered for sampling. For the purpose of study, villages with population less than 1000 individuals, although very few, were excluded. A study protocol pamphlet (in English and Urdu) was circulated to selected subjects in addition to giving them verbal instructions through village heads/health workers and religious heads. Informed consent was obtained from all the participants. Individuals aged 15 years and above residing in selected study areas who gave consent to participate in the study were included. Any participants who could not give a complete response due to physical or mental illness and those whose anthropometry or biochemical parameters could not be performed were excluded from the study.

2.3 Socio-demographic characteristics
Modified questionnaire surveillance was used to obtain socio-demographic information of the target tribal population. The standardized questionnaire was prepared in English language and translated into Urdu language. To administer the questionnaire, a face-to-face interview was conducted in the local language (Urdu) by a limited number of trained researchers. Revised modified BG Prasad socioeconomic classification scale was used to ascertain socio-economic

class of the study population. Education was categorized as high (secondary or high school, college, or university) and low (primary education or no education).

2.4 Anthropometric and Nutritional status
The body mass index (BMI) was calculated on the basis of anthropometric measurements of the height and weight of subjects. BMI was defined as weight (in kilograms) / (height (in sq. meters) and Asian cut-off for BMI recommended by WHO[15] was used for classification of subjects as malnourished (BMI below 18.5 Kg/m^2), normal (BMI 18.5-22.9 Kg/m^2), overweight (BMI 23.0 – 24.9 Kg/m^2) and obese (BMI >25 Kg/m^2). The malnourished status was evaluated using Chronic Energy Deficiency (CED) categorization with Grade-III (BMI < 16.0), Grade-II (BMI 16.0-16.9) and Grade-I (BMI 17.0-18.4) categories.
According to this classification, the status of a malnourished population is given as:
1. Low (5–9%): warning sign, monitoring required.
2. Medium (10–19%): poor situation.
3. High (20–39%): serious situation.
4. Very high (≥40%): critical situation.

2.5 Disease awareness
To assess the awareness of subjects regarding different NCDs and family history of these NCDs, both open and close-ended questions were asked to respondents. For effectively administering the questionnaire, a face-to-face interview was conducted in the local vernacular language (Urdu) by trained research staff.

2.6 Statistical analysis
The data was entered in Microsoft excel and analyzed using IBM-SPSS version 21.0 (SPSS Inc, Chicago, IL, USA). The variables in this study are categorical. The prevalence of NCD risk factors has been presented in the form of frequencies and percentages. P-value ≤ 0.05 was considered statistically significant. A Chi-square test was tested between the disease knowledge and responses.

3. Results
A total of 6808 subjects (2872 Men and 3936 women) were recruited for the study. The mean age of the subjects observed is 37.3 years (39.5 men and 35.1 women). The details of various study parameters are given as below.

3.1 Socio-demographic characteristics of the population
These tribes largely exhibit nuclear family setup (53.7%). 43.9% lived in joint families with a very less number of (2.4%) extended families. Illiteracy was very high with 53.6% male and 69.6% female subjects. The school dropout rate was very alarming as out of primary education (29% male and 19.5% female), only a meagre proportion (1.3% male and 0.3% female) of students attained the university level education. The majority of the subjects (70.9% male and 72.5% female) are married, but a large section of unmarried subjects (27.2% male and 23.7% female) were also found. Divorcees were found least (0.1% male and 0.2% female) in these tribal populations. The majority of male subjects (42.4%) are self-employed while unemployment (69.5%) is largely prevalent among female subjects of these tribes with a small section of the population (5.4% male and 1.4% female) in government employment. The economic condition is extremely low with the majority of subjects (81% male and 82% female) of the population having a household income of Rs. 25000 per annum (Table 1).

Table 1: Socio-demographic characteristics of the population

Variable	Status	Male n=2872		Female n= 3936		
		Frequency	Percentage	Frequency	Percentage	p-value
Age groups	Less than 20	647	22.5	954	24.2	P < 0.05
	20 - 40	965	33.6	1378	35.01	
	41 - 60	773	26.9	1214	30.8	
	More than 60	487	16.9	390	9.9	
Education level	Illiterate	1540	53.6	2740	69.6	P < 0.05
	Primary	832	29.0	767	19.5	
	Secondary	285	9.9	269	6.8	
	Higher secondary	104	3.6	100	2.5	
	Graduate	60	2.1	40	1.0	
	Postgraduate	36	1.3	12	0.3	
	University	15	0.5	8	0.2	
Marital status	Single	782	27.2	934	23.7	P < 0.05
	Married	2037	70.9	2854	72.5	
	Separated	24	0.8	22	0.6	
	Widowed	25	0.9	119	3.0	
	Divorced	4	0.1	7	0.2	
Occupation	Government employee	156	5.4	55	1.4	P < 0.05
	Non-government employee	232	8.1	140	3.6	
	Self employed	1218	42.4	210	5.3	
	Student	555	19.3	586	14.9	
	unemployed (able to work)	221	7.7	2420	61.5	
	unemployed (unable to work)	257	8.9	315	8.0	
Yearly income (Rs.)	< 25000	2326	81.0	3226	82.0	P < 0.05
	25000 – 50000	372	13.0	522	13.3	
	50001 – 75000	97	3.4	81	2.1	
	> 75000	10	0.3	10	0.3	

3.2 Nutritional status

Among male subjects, 862 (33.8%) and among female subjects 1016 (28.5%), individuals were malnourished and 1072 (42%) men and 1428 (40.2%) women subjects were having normal BMI. The study also showed that 247 (9.7%) of male subjects and 404 (11.4%) of female subjects were overweight, whereas 371 (14.5%) male and 703 (19.8%) female subjects were obese.
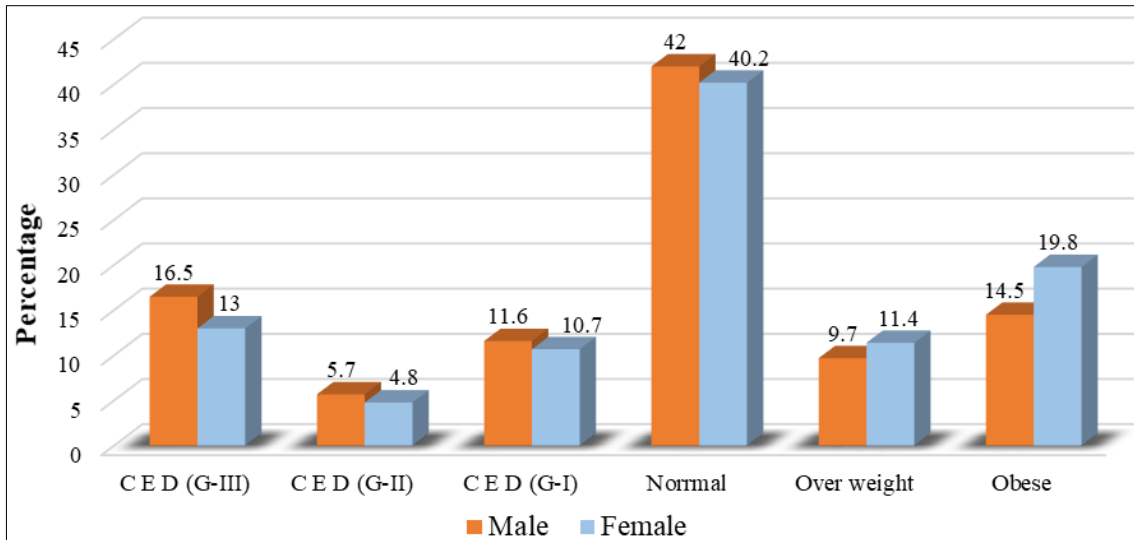

Fig 1: Nutritional status

On stratification of the malnourished group, 422 (49.0%) of male and 463 (45.6%) of female subjects fell in CED grade-III, while as 145 (16.8%) male and 172 (16.9%) female subjects fell in CED grade-II. The CED grade-I comprises 295 (34.2%) male and 381 (37.5%) female subjects (see Fig. 1).

3.3 Disease awareness

This study showed that only 2.6% male and 5.3% female subjects were aware of thyroid dysfunction, 4.7% male and 3.2% female subjects were aware of dyslipidaemia, 5.3% male and 4.7% female subjects are aware of diabetes and 5.7% male and 5.3% female subjects are aware of heart diseases. Hypertension is the only disease of which subjects are more aware with 19% male and 20.3% female subjects but this proportion of awareness is still very marginal (Fig. 2).
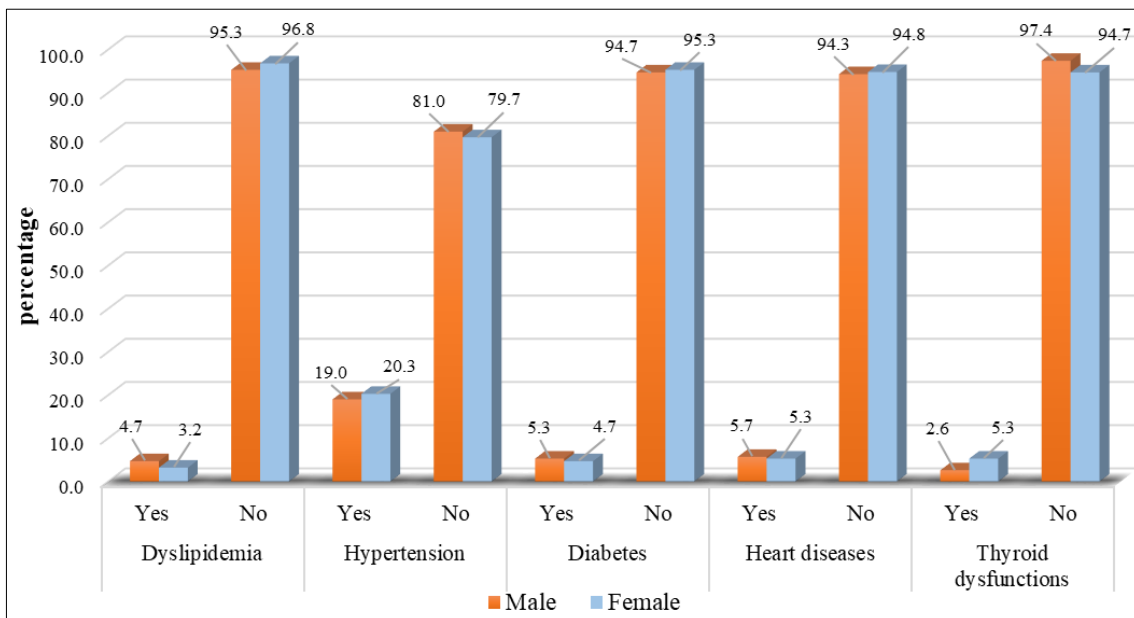

Fig 2: Gender wise subject awareness regarding NCDs (% age)

As far as the awareness regarding family history of NCDs is concerned, only a less proportion of subjects affirmed about it. Irrespective of gender differentiation, it is the subject's age group, which shows a relation with the awareness about diseases. It was revealed that the respondents in the age group of 21-40yrs was having some awareness about the family history of different diseases, except the osteoporosis where subjects with age group lying between 41-60 years, showed a little more awareness. Hypertension-related family history awareness is comparatively more than that of any other disease with 9.7% male and 10.4% female subjects confirmed it, while the 53.7% male and 61.2% female subjects denied it

and the rest of 36.6% male and 28.4% female subjects were unaware about it. Awareness about the history of cancer in the family is very low among the subjects with 0.3% male and

0.3% female subjects affirming it, 58.2% male and 71% female subjects denying it while the rest of 41.5% male and 28.7% female subjects were unaware about it (Table 2).

Table 2: Family history Awareness of NCDs

Diseases	Response	Male n (%)	Female n (%)	p-value
Obesity	Yes	107 (3.8)	160 (4.1)	< 0.05
	No	1761 (62.1)	2683 (69.3)	
	Don't Know	969 (34.2)	1029 (26.6)	
Hypertension	Yes	276 (9.7)	403 (10.4)	< 0.05
	No	1523 (53.7)	2367 (61.2)	
	Don't Know	1037 (36.6)	1097 (28.4)	
Diabetes	Yes	63 (2.2)	84 (2.2)	< 0.05
	No	1598 (56.4)	2664 (68.9)	
	Don't Know	1173 (41.4)	1120 (29.0)	
Cancer	Yes	8 (0.3)	13 (0.3)	< 0.05
	No	1649 (58.2)	2744 (70.9)	
	Don't Know	1176 (41.5)	1111 (28.7)	
Stroke	Yes	11 (0.4)	21 (0.5)	< 0.05
	No	1638 (57.8)	2706 (70.0)	
	Don't Know	1185 (41.8)	1137 (29.4)	
Cataract	Yes	51 (1.8)	51 (1.3)	< 0.05
	No	1606 (56.7)	2678 (69.4)	
	Don't Know	1173 (41.4)	1132 (29.3)	
Osteoporosis	Yes	75 (2.6)	99 (2.6)	< 0.05
	No	1583 (55.9)	2625 (68.0)	
	Don't Know	1173 (41.4)	1138 .5)	

3.4 Prevalence of commonly known non-communicable diseases/disorders

As far as prevalence of some common NCDs is concerned, hypertension is significantly prevalent especially in the age group of 41-60 years among both male (N=185) and female (N=279) subjects, while as dyslipidaemia, which is most

prevalent in male (N=70) subjects of the age group of 41-60 years and female (N=95) subjects of the age group of 21-40 years. Diabetes is mostly prevalent in both male (N=50) and female (N=52) subjects in the age group of 41-60 (see Table 3).

Table 3: Prevalence of commonly known NCDs

Diseases	Gender	Observation	Age groups (years)										P-Value
			Less than 20 n % age		20 – 40 n % age		41 – 60 n % age		More than 60 n % age		Total * n % age		
Hypertension	Male	Yes	11	0.17	80	1.21	185	2.79	164	2.47	440	6.63	<0.05
		No	621	9.36	866	13.05	575	8.66	307	4.62	2369	35.69	
	Female	Yes	19	0.29	215	3.24	279	4.20	102	1.53	615	9.26	<0.05
		No	862	12.99	1520	22.91	649	9.78	181	2.72	3212	48.4	
Diabetes	Male	Yes	4	0.06	15	0.23	50	0.76	36	0.54	105	1.59	<0.05
		No	629	9.50	933	14.09	707	10.68	432	6.50	2701	40.77	
	Female	Yes	2	0.03	37	0.56	52	0.79	17	0.25	108	1.63	<0.05
		No	880	13.29	1699	25.66	862	13.02	267	4.02	3708	55.99	
Dyslipidemia	Male	Yes	15	0.22	51	0.76	70	1.04	42	0.63	178	2.65	<0.05
		No	627	9.29	913	13.52	698	10.34	432	6.50	2670	39.65	
	Female	Yes	32	0.47	95	1.41	74	1.10	23	0.34	224	3.32	<0.05
		No	861	12.75	1674	24.80	877	12.99	267	4.02	3679	54.56	

* This percentage prevalence is calculated out of total males and females.

4. Discussion
Education plays an important role in the knowledge of awareness. Health education is often indicated to accommodate an individual approach by substituting the three domains of health "healthcare, disease prevention, and health promotion". Health assessment of tribal population is of prime concern, as studies revealed that literacy level of these Gujjar and Bakerwal tribes is significantly low. The prevalence of CED among the adult subjects with 33.8% male and 28.5% female population is a ''High'' public health problem as per World Health Organization criteria, 2009 (CED = 20-39%). The reason of this situation may be attributed to consumption of low nutrient rich food due to

poverty and low family income of this section of population. The tribal populations in the present world couldn't remain unaffected from urbanisation. There is conspicuous prevalence of obesity with 14.5% males and 19.8% of females and overweight with 9.7% males and 11.4% of females among the adult subjects of Gujjar and Bakerwal population of Kashmir valley which may be attributed to change of life style or environmental induced metabolism. While another study of western Rajasthan show a ''very high'' CED prevalence with about 42% males and 52% of females respectively which is a critical case [16].
The present study reported the awareness rate regarding hypertension is 19% in males and 20.3% in females. This is

slightly different to the meta-analysis by R. Anchala *et al.*, in 2014 which revealed the awareness of prevalence, treatment, and control of hypertension as 25.3%, 25.1% and 10.7% respectively for rural Indians; and 42.0%, 37.6% and 20.2% respectively for urban Indians [17], While a recent review by Gupta *et al.*, in 2018 revealed that hypertension awareness rate has almost doubled from less than 30% in 1980 to around 60% at present among urban populations and less than 10% in 1980s to 35–40% presently among rural population. However, the treatment and control status were still low at around 30% in urban and 20% in rural areas [18]. The subject awareness regarding diabetes is significantly low as it is known as a "silent disease," as no symptoms occur until it progresses to severe target organ [19].

Awareness regarding family history of different NCDs revealed that hypertension is the highest known disease among the target population with 9.7% (n=276) men and 10.4% (n=403) women subjects affirming it which may be due to clear symptomatic nature of hypertension. The awareness regarding family history of all the other NCDs like obesity, diabetes, cancers, stroke, cataract and osteoporosis is very low and this may be attributed to the poor subject health awareness and insufficient healthcare facilities available in the past. Another reason for less awareness may be the widespread illiteracy (Men= 53.6% and women=69.6%) and low economic conditions (with 81% male and 82% female subjects having income <25000 INR/year).

Prevalence of hypertension has increased dramatically in the last few decades [20]. In the year 2000, it has been estimated the global prevalence of hypertension as 26.5 per cent and 972 million people were estimated to have hypertension and is projected to increase to 1.56 billion by 2025 [14]. Though the estimated prevalence among tribal has been found to be comparatively lower, the sharp increase in prevalence during the last decade proves that even tribal populations are not immune to the ill effects of lifestyle modernization [21]. Similar to the general population is strongly associated with smoking, higher age, physical inactivity, alcohol consumption, and obesity [22].

A known prevalence of diabetes in our study has been estimated 1.6%. It increases with increase in age, common in the 41-60 years age group. The same has been reported in developing countries and for older age group (>65 years) as well [23]. The reason for lower assessment of diabetes maybe that Kashmir valley being part of a developing country, only few people are likely to volunteer for diagnostic testing in early stages of the disease, screening provides for a cost-effective way of reducing the burden of disease.

In the present study the prevalence of dyslipidaemia has been estimated 2.64% in males and 3.32% in females. Studies have shown that dyslipidaemia is an independent risk factor for hypertension. TC/HDL ratio are good predictors of incident hypertension and future research is needed as limited studies are available. The global prevalence of high cholesterol is 39%. According to the Lipid Association of India, prevalence of hypercholesterolemia is 10-15 percent in rural and 25-30 percent in urban populations [24]. ICMR –INDIAB study revealed that prevalence of dyslipidaemia among Indian population was 79 percent [25]. The prevalence of hypercholesterolemia was 14 percent, high LDL was 11 percent, low HDL was 72 percent and hypertriglyceridemia was 30 percent. Raised cholesterol is estimated to cause 2.6 million deaths annually; it increases the risks of heart disease and stroke and is highest in high-income countries [14].

According to a study done among tribal in Kashmir valley, prevalence of high total cholesterol was 21.2 percent, 39.4 percent had high triglycerides, 45.4 percent had high LDL and 87.9 percent had low HDL[1]. In another study of two tribal populations in north east India, prevalence of high triglycerides was more among males (27-64.7 percent) than females (23.4-36.6 percent) and prevalence of low HDL among females was higher (66-100 percent) than males (33-82 percent) [7].

It was found that numerous factors that influence dyslipidaemia include age, smoking, body mass index (BMI), alcohol intake, lifestyle, etc. [26] One of the possible mechanisms is that smoking leads to dyslipidaemia and endothelial injury, and further accelerates atherosclerosis, cardiovascular disease and stroke. High body mass index (obesity) was found to be significantly associated with dyslipidaemia revealed by a good number of studies conducted in past to know this association. The analytical statistics revealed significant difference between the subject stream and the awareness of the importance of family history ($p < 0.05$), Gender was not found to be having any notable significant influence on any studied factors.

We recognize some limitations in our study as we were unable to present the dietary intakes of the older adults specifically because we could not collect the information on individual dietary intakes. Similarly, we recorded the anthropometric measurements of height and weight to assess the nutritional status and were not able to collect other measurements such as middle upper arm circumference, fat fold, and skin fold thickness. However, the finding of high rates of CED as defined by BMI classification adds strength to our conclusions about insufficient nutrient intake in this population.

5. Conclusion
The study revealed that in general there was poor awareness about NCDs and the preventive measures were not practiced by a significant number of respondents. A multi-pronged health intervention focussing not only on active medical care but considering the aspects such as health-seeking behaviour and awareness is due to save this community from the life-long repercussions of these chronic diseases.

7. Compliance with Ethical Standards
The study was approved by Institutional Ethics Committee vide no. SIMS 301-02-09/2014-61 and an informed consent was obtained from all the participants.

8. Conflict of interest:
8. Conflict of interest: The authors declare that they have no conflict of interest.

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