



Health status of *Koraga* community: A pilot study among a particularly vulnerable tribal group of Udupi District, Karnataka, India

Sneha Deepak Mallya¹, Shyamsundar Shreedhar³, Deepak Sudhakaran¹, B. Aravindhkumar⁴, Suma Nair⁵ & Ranjitha S. Shetty^{1,2}

¹Department of Community Medicine, ²Centre for Indigenous Population, Kasturba Medical College Manipal, Manipal Academy of Higher Education, Manipal, ³Department of Community Medicine, Karwar Institute of Medical Sciences, Karwar, Karnataka, ⁴Solidarity Action Against The HIV Infection in India (SAATHI), Chennai, Tamil Nadu & ⁵D. Y. Patil School of Public Health, D. Y. Patil Deemed to be University, Navi Mumbai, Maharashtra, India

Received November 3, 2021

Background & objectives: Undertaking tribe-specific assessment of health status provides the required data for planning appropriate interventions. Hence, a study was conducted to assess the health profile of the *Koraga* tribe.

Methods: This community-based cross-sectional study was conducted among a particularly vulnerable tribal group, the *Koragas* residing in the Udupi district. Data were collected using a pro forma and were analyzed using the SPSS software version 16.0.

Results: A total of 273 participants aged ≥ 18 yr and 94 children aged ≤ 17 yr were recruited through screening and referral services organized in *Koraga* hamlets of the Udupi district. Among the adults, 59.7 per cent were females and their median age was 35 yr. About 13.9 per cent had elevated blood pressure and 18.4 per cent had impaired/elevated random blood sugar levels. About 47.6 per cent were underweight and 35.2 per cent were anaemic. Multivariate logistic regression analysis showed that individuals with morbidities were more likely to be aged ≥ 45 yr [45-60 yr: adjusted odds ratio (AOR)=4.3; 95 per cent confidence interval (CI)=1.3-13.8 and >60 yr: AOR=6.4; 95 per cent CI=1.7-23.7] and overweight or obese [23-24.9 kg/m²: AOR=8.1; 95% CI=1.3-48.2 and >25 kg/m²: AOR=7.9; 95% CI=1.6-38.4]. Of the 26 *Koraga* children aged ≤ 5 yr, 30.7 and 42.3 per cent had their height for age and weight for age below the third percentile, respectively. Further, 15.3 per cent of under-five children and 27.9 per cent of 6-17 yr old children were severely wasted. About 21.2 per cent of the children aged ≤ 17 yr were found to be anaemic and 56.3 per cent had symptoms of respiratory tract infection in the past 15 days.

Interpretation & conclusions: Malnutrition was prevalent among *Koraga* adults and children, which warrants designing and implementing appropriate social and health interventions in this population.

Key words Demography - health - *Koraga* - morbidities - PVTG - tribal population

Tribal communities are an integral part of the Indian population and constitute about 8.6 per cent of the total

population¹. Of the 705 Scheduled Tribes (STs) spread across the country, 75 of them have been categorized

as particularly vulnerable tribal groups (PVTGs) by the Government of India based on prevailing factors in these communities such as pre-agriculture level of technology, subsistent level of economy low level of literacy and a declining or stagnant population². Compared to the general population and other tribal populations, the health indicators among PVTGs are poor. Inadequate utilization of maternal and child health services, poor health-seeking behaviour and wide prevalence of substance abuse have made them vulnerable to malnutrition, anaemia and communicable diseases². Similarly, a previously published review³ on anthropometric and sociodemographic factors showed that majority of adult men and women from various tribal populations across India were found to be undernourished (males: 5-94.9; females: 4.2-98.0%), with Rajasthan, Madhya Pradesh, Gujarat, Jharkhand and Kerala having a prevalence of over 50 per cent. A comprehensive national nutritional survey among 5-19 yr old tribal children and adolescents across various States of India showed that over 20 per cent of them were undernourished⁴.

Approximately 10 per cent of the total tribal population of India resides in Karnataka¹. Further, within Karnataka, 6.9 per cent of the population belongs to various tribal communities, of which *Jenu Kuruba* and *Koraga* tribes have been classified as PVTGs. Although limited information is available regarding their health status, the existing literature suggests that their health literacy is inadequate and they lack access to quality healthcare facilities, leading to their poor health outcomes⁵⁻⁷.

Koragas mainly reside in the Udupi and Dakshina Kannada districts of Karnataka⁸. Addressing issues pertaining to this vulnerable population is in line with achieving India's commitment for United Nations Sustainable Development Goals (SDGs) and achieving universal health coverage (UHC). Hence, this study was carried out with the objective of assessing health status and to study the sociodemographic factors associated with it among the *Koraga* tribe, residing in the Udupi district of Karnataka.

Material & Methods

The total *Koraga* tribe population is 14,794 in Karnataka and the majority (approximately 68%) inhabits all the blocks of Udupi district. This cross-sectional study was conducted during September 2018 - November 2019, among the *Koraga* population residing in the Udupi district of Karnataka. The study

was carried out by the department of Community Medicine, Kasturba Medical College (KMC) and Kasturba Hospital (KH), Manipal, in collaboration with the District Health and Family Welfare Department, the Integrated Tribal Development Project (ITDP) of Udupi and local tribal community leaders. Prior permissions were obtained from District Health and Family Welfare Department and ITDP, Udupi district, for undertaking this study. Institutional Ethics Committee approval for the study was obtained from KMC and KH, Manipal. A waiver of consent was granted since this was a retrospective study based on available medical records with no medical intervention or risk to individual's safety.

Tribal people from seven selected remote tribal hamlets were informed about the date and time of screening and referral services provided at their localities on a pre-specified day. Beneficiaries included adult members, adolescents as well as children from the *Koraga* community. The survey team comprised doctors, nurses and laboratory technicians. The study proforma was administered by the doctors, nurses facilitated the screening activities and laboratory technicians performed the required blood tests.

Sociodemographic and health-related information was collected using a semi-structured questionnaire. The socio-economic status (SES) was assessed using the modified BG Prasad Scale⁹.

Height and weight of individuals aged ≥ 18 yr were measured as per the World Health Organization (WHO) standards and body mass index (BMI) was calculated and classified using the Asian Indian guidelines^{10,11}. Blood pressure was measured and classified as per the Joint National Committee-VIII guidelines¹². Random blood sugar (RBS) level was estimated using a hand-held glucometer for all adults >30 yr and was classified as per the American Diabetes Association guidelines¹³. Haemoglobin level was estimated using a portable haemoglobinometer and was classified using the WHO guidelines¹⁴.

Height and weight for age and weight for height were measured and classified for children ≤ 5 yr using the WHO 2006 guidelines and BMI, age and gender centiles were calculated for children between 6-17 yr using Indian Academy of Paediatrics 2015 guidelines^{15,16}. Haemoglobin level was estimated for a sub-sample of children and classified using the WHO guidelines¹⁴.

Statistical analysis: Data were analyzed using the SPSS version 16.0 (Statistical Package for the Social Sciences (SPSS) for Windows, Version 16.0. SPSS Inc. Released 2007, Chicago, IL, USA). Results were expressed as frequencies and proportions. Continuous variables were presented as median with interquartile range (IQR) wherever applicable. Multivariate logistic regression analysis was done to find out the association between the presence of any morbidity and various background characteristics and the strength of association was expressed as odd's ratio (OR) and adjusted OR with 95 per cent confidence interval (CI).

Results

As shown in Table I, the study included a total of 273 individuals aged ≥ 18 yr of which 59.7 per cent were females. The median age (IQR) of the study participants was 35.0 yr (25.5-47.0). About 38.5 per cent of the study participants had not received any formal education and although three fourth of them were employed at the time of the study, majority (86.9%) were involved in unskilled work. Almost two-third (61.9%) of the study participants were married and over half of the families were of nuclear type (51.6%). Majority of them (81.7%) belonged to a social class of 4 and 5.

Tobacco use was found to be prevalent, with almost half of the population (48.7%) claiming to have ever used some form of tobacco. Among them, nine smoked bidis/cigarettes [frequency of use: 2-10/day; median (IQR) duration of use: 6 (2.5-20) years]. Among 126 users of smokeless tobacco, 106 (84.1%) used up to five packets per day [median (IQR) duration of use: 10 (3.-20.) years]. About 11 per cent of participants had ever consumed alcohol, 16 consumed daily, duration of use was 15 (5-20) years.

Family history of hypertension and diabetes was reported by only nine (3.3%) and six (2.2%) individuals. Nearly 50 per cent of the individuals were found to be underweight.

Of the 273 study participants, 12 (4.4%) had at least one family member who was diagnosed with pulmonary tuberculosis (TB) in the past, while 15 (5.5%) reported to be diagnosed with pulmonary TB in the past. Further, 15 (5.5%) of the study participants had symptoms suggestive of pulmonary TB. Symptoms suggestive of respiratory infections were reported by 12.1 per cent and those suggestive of musculoskeletal disorders were reported by 9.9 per cent of the participants. Blood

pressure was found to be elevated among 38 (13.9%) participants.

Table II shows that about 12.8 per cent (35/273) of the study participants self-reported previously diagnosed morbidities (participants reported one or more morbidities), with hypertension being the most common (9.5%), followed by diabetes (1.8%). Nonspecific symptoms were also reported by 12.8 per cent of the study participants. Of the study participants for whom RBS was estimated, it was found to be impaired/elevated (≥ 140 mg/dl) among 18.4 per cent and found to be significantly associated with age > 35 yr ($P=0.01$). Prevalence of anaemia was found to be 35.2 per cent and only gender was found to be significantly associated with anaemia ($P<0.05$). The blood pressure was found to be elevated among 13.9 per cent and was significantly associated with higher age ($P<0.001$) and lower SES ($P<0.05$).

About 43.6 per cent of the participants complained of one or more symptoms which indicated of existing health problems related to various body systems as shown in Table II. An adult male aged 24 yr had a growth in the oral cavity suggestive of malignancy. Most of these complaints were managed at health screening services itself or were referred wherever warranted. Medical officers of local primary health centres (PHCs) were informed about the same. Individuals with abnormal findings were linked to respective tribal community leaders who facilitated their further management and follow up at local primary health centres.

As shown in Table III, the univariate analysis found that individuals with morbidities were more likely to be aged > 45 yr, to be illiterate, to be widowed/separated, alcohol consumers and obese (BMI > 23 kg/m²). However, on multivariate logistic regression analysis, only higher age groups (> 45 yr) and BMI > 23 kg/m² were found to be the significant predictors of the presence of morbidities.

The study included a total of 94 *Koraga* children of whom, 38.2 per cent were aged between 12-17 yr. Height for age and weight for age was below the third percentile among 30.7 and 42.3 per cent, respectively, among children aged ≤ 5 yr. Four (15.3%) children aged ≤ 5 yr, and 19 (27.9%) children aged 6-17 yr were found to be having severe wasting (Table IV).

As shown in Table IV, two-third (63.3%) of the children had respiratory infections, one child (≤ 5 yr) had a history of pulmonary TB in the past, and one child

Table I. Background characteristics of the study participants aged ≥ 18 yr (n=273)

Characteristics	Frequency		
	Males (n=110) n (%)	Females (n=163) n (%)	Total n (%)
Age (yr)			
18-45	82 (74.5)	118 (72.4)	200 (73.3)
46-60	15 (13.6)	32 (19.6)	47 (17.2)
>60	13 (11.8)	13 (8.0)	26 (9.5)
Educational status			
Illiterate	35 (31.8)	70 (42.9)	105 (38.5)
Literate	75 (68.2)	93 (57.1)	168 (61.5)
Current occupation status			
Employed	99 (90.0)	108 (66.3)	207 (75.8)
Unemployed	11 (10.0)	55 (33.7)	66 (24.2)
Marital status			
Married	61 (55.5)	108 (66.3)	169 (61.9)
Unmarried	49 (44.5)	35 (21.5)	84 (30.8)
Widowed/separated	0	20 (12.3)	20 (7.3)
Type of family			
Joint	33 (30.0)	61 (37.4)	94 (34.4)
Nuclear	60 (54.5)	81 (49.7)	141 (51.6)
Three generation	17 (15.5)	21 (12.9)	38 (13.9)
SES			
Class 2 and 3 (upper middle and middle)	26 (23.6)	24 (14.7)	50 (18.3)
Class 4 and 5 (lower middle and lower)	84 (76.4)	139 (85.3)	223 (81.7)
Tobacco use			
Ever	61 (55.5)	72 (44.2)	133 (48.7)
Never	49 (44.5)	91 (55.8)	140 (51.3)
Alcohol use			
Ever	22 (20.0)	8 (4.9)	30 (11.0)
Never	88 (80.0)	155 (95.1)	243 (89.0)
Family history of hypertension			
Yes	2 (1.8)	7 (4.3)	9 (3.3)
No	108 (98.2)	156 (95.7)	264 (96.7)
Family history of diabetes			
Yes	3 (2.7)	3 (1.8)	6 (2.2)
No	107 (97.3)	160 (98.2)	267 (97.8)
BMI			
<18.5 (underweight)	48 (43.6)	82 (50.3)	130 (47.6)
18.5-22.9 (normal)	55 (50.0)	62 (38.0)	117 (42.9)
23.0-24.9 (overweight)	2 (1.8)	9 (5.5)	11 (4.0)
≥ 25 (obese)	5 (4.5)	10 (6.1)	15 (5.5)

BMI, body mass index; SES, socio-economic status

Table II. Morbidity pattern among tribal individuals aged ≥ 18 yr (n=273)

Morbidities	Frequency (%)
Self-reported morbidities	
Hypertension	26 (9.5)
Diabetes	5 (1.8)
Mental illness	4 (1.5)
Asthma	2 (0.7)
Cardiovascular disease	2 (0.7)
System specific symptoms reported by the study participants	
Respiratory system (cough with expectoration)	33 (12.1)
Musculoskeletal system (backache, difficulty in walking, shoulder pain)	27 (9.9)
Gastrointestinal system (burning in epigastric region)	8 (2.9)
Ocular (blurring of vision, pain in the eyes)	8 (2.9)
Genitourinary system (menstrual irregularities, vaginal discharge, burning micturition)	4 (1.5)
Cardiovascular system (chest pain)	2 (0.7)
Non-specific symptoms (fever, dizziness, fatigue, generalized body ache)	35 (12.8)
Abnormalities detected on examination	
Nutritional status	
Underweight	130 (47.6)
Obesity	15 (5.5)
Anaemia (n=238)*	96 (35.2)
Elevated blood pressure	38 (13.9)
Impaired/elevated RBS (n=158)#	29 (18.4)

*Haemoglobin level could be estimated only for these study participants; #RBS was estimated for study participants aged ≥ 30 yr. RBS, random blood sugar

(aged eight years) had uncorrected cleft palate. Three male children aged between six and 17 yr had symptoms suggestive of pulmonary TB and were referred to the nearest PHC for further evaluation. About 24 (30.4%) children were not dewormed in the last six months and hence were given deworming tablets. Other morbidities included skin infections, musculoskeletal, genitourinary, gastrointestinal problems and vitamin A deficiency. Haemoglobin levels could be estimated only among 33 children and seven (21.2%) were found to be having anaemia.

Discussion

The study included a total of 367 individuals belonging to the *Koraga* community residing in the Udupi district of Karnataka.

In this study, only 11 per cent of the participants claimed to consume alcohol which is in contrast to other studies from Karnataka and Kerala reporting a higher proportion of their study population to be alcohol consumers (ranging from 25.9 to 36.2%)^{17,18}

and a Gujarat study reporting a much lower proportion (5.5%)¹⁹. Similarly, the prevalence of tobacco use was 48.7 per cent among our study population, while a much higher prevalence (81.5%) was reported by Sajeev and Soman in Kerala¹⁸ and lower proportions were reported by other studies from Karnataka (smokers among men – 25.6%; tobacco chewers among women – 24.8%)¹⁷ and Gujarat (ever smokers – 38.5%)¹⁹. The higher prevalence of tobacco use in our study could be due to their low SES and lower literacy levels.

In the present study, 47.6 per cent of those aged ≥ 18 yr were underweight, which is similar to the reports of various tribal studies across India³. However, it was much lower (19.3%) in the tribal population from Bandipur¹⁷. The overall prevalence of anaemia was 35.2 per cent which is similar to the findings of surveys conducted among tribes in Madhya Pradesh (38.6%)² and Kerala (overall – 51%; males – 33.3%; females – 64.6%)²⁰. In our study, females were found to be significantly associated with anaemia, whereas

Table III. Multivariate logistic regression analysis depicting association between the presence of morbidities and socio-demographic variables among the participants (n=273)

Variable	Morbidity		Crude OR (95% CI)	AOR (95% CI)
	Present (n=35), n (%)	Absent (n=238), n (%)		
Age (yr)				
18-45	10 (4.0)	190 (95.0)	1	1
46-60	15 (31.9)	32 (68.1)	8.9 (3.6-21.5)*	4.3 (1.3-13.8)*
>60	10 (38.5)	16 (61.5)	11.8 (4.3-32.7)*	6.4 (1.7-23.7)*
Gender				
Male	12 (10.9)	98 (89.1)	0.7 (0.3-1.5)	
Female	23 (14.1)	140 (85.9)	1	
Educational status				
Illiterate	28 (26.7)	77 (73.3)	8.3 (3.4-19.9)	2.6 (0.7-9.1)
Literate	7 (4.2)	161 (95.8)	1	1
Current occupation status				
Employed	24 (11.6)	183 (88.4)	1	
Unemployed	11 (16.7)	55 (83.3)	1.5 (0.7-3.3)	
Marital status				
Married	24 (14.2)	145 (85.8)	1	1
Unmarried	4 (4.8)	80 (95.2)	0.3 (0.1-0.9)	1.0 (0.2-3.7)
Widowed/separated	7 (35.0)	13 (65.0)	3.2 (1.1-8.9)	2.2 (0.6-7.5)
Type of family				
Joint	16 (17.0)	78 (83.0)	1	
Nuclear	14 (9.9)	127 (90.1)	0.5 (0.2-1.1)	
Three generation	5 (13.2)	33 (86.8)	0.7 (0.2-2.1)	
SES				
Class 2 and 3	3 (6.0)	47 (94.0)	2.6 (0.7-8.9)	
Class 4 and 5	32 (14.3)	191 (85.7)	1	
Tobacco use				
Ever	20 (15.0)	113 (85.0)	1.4 (0.7-3.0)	
Never	15 (10.7)	125 (89.3)	1	
Alcohol use				
Ever	9 (30.0)	21 (70.0)	3.5 (1.4-8.6)	2.7 (0.9-7.8)
Never	26 (10.7)	217 (89.3)	1	1
Family history of hypertension				
Yes	1 (11.1)	8 (88.9)	0.8 (0.1-6.9)	
No	34 (12.9)	230 (87.1)	1	
Family history of diabetes				
Yes	1 (16.7)	5 (83.3)	1.3 (0.1-12.1)	
No	34 (12.7)	233 (87.3)	1	
BMI (kg/m²)				
<18.5	10 (8.5)	107 (91.5)	1.7 (0.7-3.8)	1.7 (0.6-4.5)
18.5-22.9	18 (13.8)	112 (86.2)	1	1
23-24.9	3 (27.3)	8 (72.7)	4.0 (0.9-17.5)	8.1 (1.3-48.2)*
≥25	4 (26.7)	11 (73.3)	3.8 (1.0-14.4)*	7.9 (1.6-38.4)*

P* < 0.05. AOR, adjusted odds ratio; CI, confidence interval

Table IV. Health profile of children (<18 yr) belonging to *Koraga* community

Characteristic	Frequency (%)		Total
	Males	Females	
Age (yr)	n=38	n=56	94
≤5	5 (13.2)	21 (37.5)	26
6-11	13 (34.2)	19 (33.9)	32
12-17	20 (52.6)	16 (28.6)	36
Educational status, ≥6 yr	n=33	n=35	68
Studying in 1-7 th standard	17 (51.5)	22 (62.9)	39
Studying in 8-10 th standard	15 (45.5)	12 (34.3)	27
School dropouts/not attending school	1 (3.0)	1 (2.9)	2
Height for age, ≤5 yr	n=5	n=21	26
<3 rd percentile	3 (60.0)	5 (23.8)	8
3-97 th percentile	1 (20.0)	15 (71.4)	16
>97 th percentile	1 (20.0)	1 (4.8)	2
Weight for age, ≤5 yr	n=5	n=21	26
<3 rd percentile	2 (40.0)	9 (42.9)	11
3-97 th percentile	3 (60.0)	12 (57.1)	15
Weight for height, ≤5 yr	n=5	n=21	26
≥-2SD (normal)	5 (100.0)	14 (66.7)	19
-2SD to-3SD (wasted)	0	3 (14.3)	3
Below-3SD (severely wasted)	0	4 (19.0)	4
BMI-age and gender centile, 6-17 yr	n=33	n=35	68
≥-2SD (normal)	8 (24.2)	21 (60.0)	29
-2SD to-3SD (wasted)	11 (33.3)	9 (25.7)	20
Below-3SD (severely wasted)	14 (42.4)	5 (14.3)	19
Morbidities	n=38	n=56	94
Respiratory infection*	20 (52.6)	33 (58.9)	53
Dental problems	3 (7.0)	4 (7.1)	7
Skin infections	1 (2.6)	4 (7.1)	5
Others	1 (2.6)	3 (5.3)	4

*History of respiratory infection was collected for the past 15 days. SD, standard deviation

higher age and low SES were identified as the risk factors for anaemia in a study from Kerala²⁰. Higher prevalence of anaemia and its association with females in the present study warrants further research on dietary patterns and any prevailing customs among this tribal population.

There is limited literature with respect to factors associated with overall morbidities among the tribal population of India. Most of the studies have focussed on a particular disease/health condition. In the present study, 5.2 per cent of the participants aged ≥18 yr had symptoms suggestive of pulmonary TB, which is slightly higher as compared to the reports

of previous studies (ranging from 2.1 to 3.6%)^{21,22}. A study by Patwa *et al*²³ among the tribal population of Gujarat stated hypertension (4.5%), diabetes (1.7%) and cardiovascular diseases (1.6%) as commonly reported morbidities²³. Although the prevalence of diabetes and cardiovascular diseases in the study is akin to our findings, the prevalence of hypertension was higher (9%) in our study. Prior studies among tribal populations in India have also reported a higher prevalence of hypertension ranging from 16.7 to 48.3 per cent^{18-20,24-26}. Studies from Tamil Nadu and Uttarakhand reported the prevalence of diabetes to be 3.8 per cent and 6.9 per cent, respectively as compared

to a lower prevalence in the present study^{25,26}. This could be due to the differences in the age group of individuals included in each of these studies and due to the self-reported nature of data in the present study. A systematic review by Upadhyay *et al*²⁷ showed the prevalence of diabetes among the tribal population to be ranging between 0.7 and 10.1 per cent in India. Age and BMI were significantly associated with the presence of any morbidity and similar findings were reported from a study by Sathiyarayanan *et al*²⁵.

The findings of our study showed that almost 42.3 per cent of children aged ≤ 5 yr had a low weight for age, 30.8 per cent had a low height for age and 15.4 per cent had a low weight for height which is supported by the study findings of Divakar *et al*²⁸ (45.03% of under-five children being malnourished) and Narayanappa *et al*²⁹ (33.1% and 35.7% of Jenukuruba tribal children having low height for age and low weight for age respectively). Furthermore, the prevalence of undernutrition among 6-17 yr old children was found to be 57.3 per cent (< -2 SD BMI for age and gender centile) in our study, which is much higher than that reported from a nationwide survey in which it ranged from 18-30 per cent among 5-19 yr old tribal children and adolescents⁴. Prevalence of anaemia in this age group was 21.2 per cent while a higher prevalence was reported from other studies conducted in Karnataka (≤ 15 yr - 82.7%)²⁹ and Madhya Pradesh (≤ 5 yr - 62.1%; 6-14 yr - 58.2%)².

The commonly reported morbidities among children in our study were respiratory infections followed by skin infections and dental problems, which is in concordance with the findings from the study by Divakar *et al*²⁸. In our study, only 5.3 per cent of the children had skin infections which are in contrast to that reported by Narayanappa *et al*²⁹ which reported skin infections in at least one-fifth of the children. It also reported a substantial proportion of children to be having dental problems (68.4%), while only 7.4 per cent had dental problems in the present study. Similarly, only one child was found to have Bitot's spots in our study in contrast to 16.4 per cent children in the above-mentioned study²⁹.

The current study provides baseline information about the health problems among *Koragas*, majority of whom dwell in the Udupi district and hence are homogeneous, the findings and so the results could be generalized to this tribe within the district. However, this study also had some limitations; for instance,

the results of the study could be an overestimation of the true picture of this tribal population as data were collected through specially organized screening and referral services. However, the prevalence of morbidities could be an underestimation as we relied on self-reported information. Low proportion of alcohol consumers could mainly be due to underreporting as there is a stigma towards this habit in the community. Haemoglobin level could not be assessed for all the participants as some refused to get this test done. Similarly, RBS levels were used for the assessment of glycaemic status due to feasibility issues.

The study findings were disseminated to stakeholders of ITDP and District Health and Family Welfare Department, and further steps were planned by the team. Health conditions such as malnutrition and anaemia were found to be prevalent among *Koragas*. Hence, designing targeted health interventions to address these health problems among *Koraga* individuals through robust awareness programmes and sustained efforts is the need of the hour. Furthermore, as old age and BMI were found to be associated with one or more health conditions, it is imperative to plan community-based studies in the future to explore the lifestyle, health-seeking behaviour and specific cultural practices and their association with morbidities in this population. Utilization of existing tribal-specific welfare measures could be further enhanced by involving the local tribal leaders in the planning and execution of programmes.

Acknowledgment: The authors acknowledge the support received from District Health and Family Welfare Department, Udupi, Integrated Tribal Development Project, Udupi, Samagra Grameena Ashrama, Shirva, Udupi, local Gram Panchayats and tribal community leaders.

Financial support & sponsorship: None.

Conflicts of Interest: None.

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For correspondence: Dr Ranjitha S. Shetty, Department of Community Medicine, Kasturba Medical College Manipal, Manipal Academy of Higher Education, Madhav Nagar, Manipal 576 104, Karnataka, India
e-mail: ranjitha.shetty@manipal.edu