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Original Research Article

Anthropometry based nutritional status and dietary pattern of working adults of Gir Somnath District, Gujarat

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ABSTRACT

Background: According to World health organization, health is a complete state of physical, mental and social well being. Various factors are responsible for good health. One of the important contributors of good health is type of food consumed by the people.
Objectives: To assess the demographic and socio economic factors affecting the food habit and to assess the food pattern and nutritional status prevalent in working adults of Veraval city.
Materials and Methods: 141 adults working in government or non government sectors we arerandomly selected from urban Veraval. Pre tested semi structured questionnaire was used to elicit information on Area,TypesofFamily,Types ofEmployer,Gender, Detailed FoodPattern,Medical history and Nutritional and health status of working adults.
Findings: Mean age range of the sample of (N=141) was found to be 43 years. According to social category it was found that majority of the sample was OBC (48.2%) followed by General (28.4%), SC (12.1%) and ST (11.3%). percent of the population were doing Government jobs followed by 35.5 % Non-Government Jobs among them only 2.1 % were servant and housewife. 30 percent of the sample were found to have Normal (18.9-22.9 kg/m^2) BMI as well as 33.3% were obese (≥25kg/m^2). Twenty three percent of them were overweight (23-24.9 kg/m^2) and only 11.3% were underweight (≤18.5 kg/m^2). None of the sample was having the history of Heart related problems, Cancer and Asthma. Fifty nine percent of the sample was vegetarian. Fifty two percent of the sample was consuming meal 3 times a day. Conclusion: Dual Burden of Mal Nutrition was found in working adults of Veraval urban. Also their dietary practices were poor. There need for sensitization of people in workplace setting on healthy diets.

1. Background

According to World health organization, health is a complete state of physical, mental and social well being. Various factors are responsible for good health. One of the important contributors of good health is type of food consumed by the people.

The top risk factors affecting DALY's (Disability adjusted life years), an economic indicator are related to diet & nutrition with maternal and child malnutrition being the top risk factor, followed by Air Pollution & Dietary Risks (Burden of Diseases 2016).[1] This in an era of sustainable development goals the role of healthy diets is recognized to be associated with many SDG's and thus an emphasis on sustainable, resilient & safe food systems approach is being recommended. Improving children's diets is the foundation of sustainable and prosperous societies and paramount to achieving the 2030 Sustainable Development Goals (SDGs) including Goal 2 to improve nutrition and end all forms of malnutrition. According to NFHS 4 (2015-16)[2] data in

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Gir Somnath District it was found that some of the risk factors which increase the NCDs among the population of 15-49 years were women who are overweight/ obese were (BMI ≥ 25.0 kg/m2) 25.5% whereas men 21.3%. Blood sugar levels >140gm/dl 5.1% levels > 160gm/dl were 1.8%. Women having Slightly above normal (Systolic 140-159 mm of Hg and/or Diastolic 90-99 mm of Hg) blood pressure were 6.8 %, 6. Moderately high (Systolic 160-179 mm of Hg and/or Diastolic 100-109 mm of Hg) 1% and very high (Systolic ≥180 mm of Hg and/or Diastolic ≥110 mm of Hg) 0.5 % whereas Blood pressure level among men were 8.3%. 0.3% and 0%. Among the health status it was also found that Women whose Body Mass Index (BMI) is below normal (BMI < 18.5 kg/m2) was 16.9% similarly for men was 16.3% whereas women who are overweight or obese (BMI ≥ 25.0 kg/m2) 25.5% whereas men were 21.3%.NCDs are the leading cause of death in the world. The four main non-communicable diseases - cardiovascular disease, cancer, chronic lung diseases and diabetes - kill three in five people worldwide.Physical inactivity, unhealthy diets (diets low in fruit, vegetables, and whole grains, but high in salt and fat), tobacco use (smoking, secondhand smoke, and smokeless tobacco), and the harmful use of alcohol are the main behavioral risk factors for NCDs.

In light of the above scenario of GirSomnathDistrict a study was planned to see the impact of food pattern on health of working adults in Veravalcity.

1.1. Specific objectives of the study are

1. To assess the demographic and socio economic factors affecting the food habit of the selected community.
2. To assess the food pattern and nutritional status prevalent in the selected community.
3. To identify the dietary habits and food consumption patterns
4. To evaluate the impact of food pattern on the health status of the different working community
5. To formulate a suitable nutritional solution with reference to the health status for improvement of the selected working adults
6. To collect the information about the medical history of selected community
7. To know the effects of traditional food pattern of health

2. Materials and Methods

141 adults working in government or non government sectors we arerandomly selected from urbanVeraval. A questionnaire was developed and translated in local languageto elicit information on different variables.Background information of the subjects was elicited.Pre tested semi structured questionnaire was used to elicit information on Area,TypesofFamily,Types ofEmployer,Gender, Detailed FoodPattern,Medical history and Nutritional and health status of working adults. Height, weight of the subjects will be collected by following standard method for anthropometric measurements. Body mass index will be calculated using formula as Wt(KG)/ Ht(m)*HT(m).For weight measurement: Calibrated adult weighing scale will be used.For height measurement, non flexible not stretchable measuring tape will be used. Nutritional status of the subjects will be classified as per Asia pacific classification based on BMI for adults. Health status will be classified based on self reported history of various NCDs like diabetes, Blood pressure, hyper lipidemia etc.

3. Findings

Socioeconomic status of the enrolled subjects is presented in Table 1. Mean age range of the sample of (N=141) was found to be 43 years. Among them majority (83%) of the sample was APL. Seventy seven percent were living in urban area whereas 22.7 % in rural area. Sex ratio was found to be 46.8% male and 53.2 % female. According to social category it was found that majority of the sample was OBC (48.2%) followed by General (28.4%), SC (12.1%) and ST (11.3%). More than 90 percent of the population was Hindu by religion. More than half (61.7%) of the sample was Graduate by their educational status. Forty percent of the populationwere doing Government jobs followed by 35.5 % Non-Government Jobs among them only 2.1 % were servant and housewife.

Ninety one percent of the sample has Pucca house. Among the type of family it was found that 53.9 % were living in joint families whereas 46.1 % were in Nuclear families. It was also found that monthly income =Less than ₹25,000 is 35.5% followed by = ₹26000 to ₹49,000 (38.3%) and = 50,000 and above ₹50,000 (26.2%) respectively. Eighty percent of the sample has source of drinking water as private tap and only 2.1 percent were using hand pump. Above 90% of the population has close defecation drainage facility. The entire selected sample has Private toilet facility. Fifty five percent of the population has facility of canteen at their work place.

Nutritional status of the subjects is presented in Table 2. With respect to Anthropometric measurement it was found that above 30 percent of the sample were found to have Normal (18.9-22.9 kg/m^2) BMI as well as 33.3% were obese (≥25kg/m^2). Twenty three percent of them were overweight (23-24.9 kg/m^2) and only 11.3% were underweight (≤18.5 kg/m^2).

Health status is presented in Table 3.According to the medical history of sample collected it was found that the highest problem suffered by the sample was constipation (9.2%) followed by Diabetes (7.0%), Skin diseases and Obesity (4.26%), Gout and Thyroid (3.5%), Cholesterol (2.8%) and Arthritis (1.4%).None of the sample was having

the history of Heart related problems, Cancer and Asthma.

3.1. Dietary information

Fifty nine percent of the sample was vegetarian. Fifty two percent of the sample was consuming meal 3 times a day. With respect to consuming number of glasses of water per day it was found that 54.6% consume 5-7 glasses/day, 25.5% <3 glasses/day and 19.9% >7 glasses/day. Half of the sample was commonly consuming Green Leafy Vegetables and 41.8% were consuming Glv's, Roots and Tubers and other vegetables also. It was disheartening to know that nearly half of the samples (43.2%) were consuming only one fruit in a day whereas 27.7% % were not consuming any fruit in a day. More than half of the samples (70.2%) were consuming seasonal fruits in their daily diets

Information on food groups consumed by the subjects is presented in Table 4. The entire sample selected consumed Grains, white roots and tubers, and Plantains followed by Dairy (97.2%), Other vegetables (96.4%), Pulses (83.6%) whereas more than 30 percent of samples consumed Iron Rich Foods (Bajri, Green Leafy vegetables, khajoor, jaggery, chana and Packed foods (Biscuits, toast, any packet) on that day. It was disheartening to know that less than 10 percent of the samples consumed Nuts and seeds, Meat, Fish and poultry, Eggs and Other fruits.

According to food frequency questionnaire it was found that among Grains, white roots and tubers, and plantaincommonly consumed items were Bajri. Makai, Jowar, Rice,wheatflour, Potatoes almost daily.

With respected to Pulses (beans, peas and lentils) it was found that consumption of items were thrice in a week or once in a week which were Bengal gram dal (chana dal), Red gram dal (tuver dal), Peas (vatana/matar), Green gram whole (sabot/mung/magni).

With respected toNuts and Oilseedsit was found that consumption of items were rarely consumed by the sample.

With respect to Dairy products it was found that almost all the samples consumed buffalo milk, curd and chaas (Buttermilk) daily.

With respect to Meat, poultry and fishit was found that only some of the sample were non vegetarian so it was most commonly consumed items were egg and goat meet once in a week.

With respect to Green leafy vegetables it was found that commonly consumed items were fengreek, drumstick, and spinach seasonally some of the items never like shepu, chana bhajibhindabhaji, chil nib haji and mudanibhaji.

With respect to Other vegetables it was found that almost all the items like karela, bottle gourd, brinjal, cauliflower , kankoda, bhinda were consumed mostly thrice in a week or once in a week.

With respect toother fruits it was found that fruits like apple, banana, grapes, lemondaadam were consumed thrice in a week and items like orange, sitafal, chiku, papya, mango, jamfal were consumed seasonally only.

4. Discussion

The global burden of non-communicable diseases constitutes a major public health challenge that undermines social and economic development throughout the world. An estimated 36 million deaths, or 63% of the 57 million deaths that occurred globally in 2008, were due to non-communicable diseases, comprising mainly cardiovascular diseases (48% of non-communicable diseases), cancers (21%), chronic respiratory diseases (12%) and diabetes (3.5%). In India, nearly 5.8 million people (WHO report, 2015) die from NCDs (heart and lung diseases, stroke, cancer and diabetes) every year or in other words 1 in 4 Indians has a risk of dying from an NCD before they reach the age of 70. Targets to be achieved for NCDs according to Global Action Plan is presented in below

Fig. 1:

Source:-Scaling up nutrition-Global Nutrition Targets

In Gujarat according to (NFHS 5 2019-2020)[2] factors affecting the health of the working adults is their nutritional status Men and women whose BMI is below normal <18.5 kg/m^2 found to be 20.9 % and 25.2% whereas in Junagadh district (NFHS 2015-2016)[2] of Gujarat state it was similar (16%) for both men and women. In Gujarat state men and women who are overweight or obese (BMI ≥25.0 kg/m^2) found to be 19.6% and 22.6% whereas in Junagadh district 21.3% and 25.5%.

In Gujarat according to (NFHS 5 2019-20)[6] it was found that prevalence of women aged above 15 years having high blood sugar levels (141-160 mg/dl) was 8.1% very high levels >160 mg/dl (6.7%) and very high >140 mg/dl or taking medicines to control blood sugar levels found to be (15.8%). Similarly for men found to be 9.0%, 7.1% and 16.9% respectively.

In Gujarat according to (NFHS 5 2019-2020)[6] it was found that prevalence of women aged above 15 years having

Table 1: Socio economic background

	N	%
Age (Mean)	42.9	
Economic Status		
APL	117	83.0
BPL	24	17.0
Area		
Urban	109	77.3
Rural	32	22.7
Sex		
Male	66	46.8
Female	75	53.2
Social Category		
General	40	28.4
ST	16	11.3
SC	17	12.1
OBC	68	48.2
Religion		
Hindu	132	93.6
Muslim	6	4.3
Christian	3	2.1
Education status		
Illiterate		
Primary	10	7.1
Secondary	38	27.0
Graduate	87	61.7
Post Graduate	6	4.3
Occupation		
Agricultural worker	8	5.7
Farm Labourer		
Servant	3	2.1
Housewife	3	2.1
Self-Employed	20	14.2
Government Job	57	40.4
Non-Government Job	50	35.5
Type of house		
Kuchha	1	0.7
Semi pucca	12	8.5
Pucca	128	90.8
Total Family Members		
Children <18 years	76	53.9
Adults >18 years	65	46.1
Type of family		
Joint	76	53.9
Extended	0	0.0
Nuclear	65	46.1
Total monthly income of the family		
Less than ₹25,000	50	35.5
₹26000 to ₹49,000	54	38.3
50,000 and Above ₹50,000	37	26.2
Source of Drinking water		
Private Tap	113	80.1
Public Tap	19	13.5
Borewell	6	4.3
Hand-Pump	3	2.1
Drainage Facility		
Open	27	19.1
Close	114	80.9
Toilet Facility		
Private Toilet	141	100.0
Facility of Canteen at Work Place		
Yes	63	44.7

Table 2: Anthropometric measurements

Particulars	N (%)	Mean (±SD) range
Body Mass Index categories		
Underweight (≤18.5)	16 (11.35)	
Normal (18.5-22.9)	46 (32.62)	
Overweight (23-24.9)	32 (22.69)	
Obese(≥25)	47(33.33)	
BMI		23.3 (±3.92)
Height		164.58 (±12.81)
Weight		62.54 (±9.42)
Waist Circumferences		82.96 (±9.99)
Hip Circumference		87.96(±12.56)
Waist to Hip Circumference		0.94 (±0.02)

Table 3: Medical history of sample

Particulars	N (%)
Obesity	6 (4.26)
Diabetes	10 (7.09)
Blood pressure	12 (8.51)
Cholesterol	4 (2.83)
Thyroid	5 (3.55)
Heart related problems	None
Cancer	None
Constipation	13 (9.22)
Athrities	2 (1.42)
Gout	5 (3.55)
Skin diseases	6 (4.26)
Asthma	None
Any other (Specify)	None

Table 4: Meal pattern (24 hour diet recall)

Grains, white roots and tubers, and plantains	141(100)
Pulses (beans, peas and lentils)	118(83.69)
Nuts and seeds	1(0.71)
Dairy	137(97.2)
Meat, Fish and poultry	12(8.51)
Eggs	4(2.84)
Dark green leafy vegetables	35(24.82)
Vitamin A rich fruits and vegetables	17(12.06)
Other vegetables	134(96.45)
Other fruits	7(4.96)
Iron Rich Foods (Bajri, Green Leafy vegetables, khajoor, jaggery, chana)	44(31.21)
Packed foods (Biscuits, toast, any packet)	50(35.46)

mildly elevated blood pressure (Systolic 140-159 mm of Hg and/or Diastolic 90-99 mm of Hg) was 11.7 %, moderately or severely elevated blood pressure (Systolic ≥160 mm of Hg and/or Diastolic ≥100 mm of Hg) 4.6 % and Elevated blood pressure (Systolic ≥140 mm of Hg and/or Diastolic ≥90 mm of Hg) 20.6 %. Similarly for men it was found to be 31.1%, 4.4% and 20.3 % respectively. According to (NFHS 4 2015-16)[6] in Junagadh district prevalence of Sugar levels and Blood pressure found to be between the ranged of 5-10% respectively.

Distribution (%) adult men and women according to BMI grades (who cut offs) in rural Gujarat: Time trends

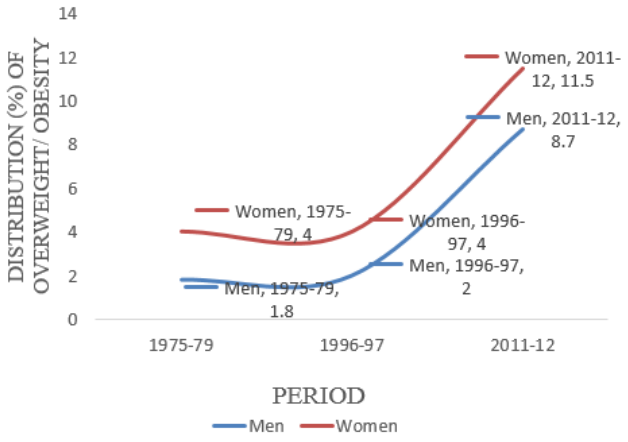

Fig. 2:

At present, the probability of an Indian, between the ages of 30-70 years dying due to one of the fore-mentioned NCDs is 23% (WHO, NCD India Profile, 2018).[3] Therefore screening this age group for NCDs is of utmost importance. CVD will contribute to 29% of all deaths by 2030 as a leading cause of death (Jayanna et. al., 2019)[4], indicating a clear urgency of addressing this challenge.

(Rao, et. al 2010)[5] also revealed that the intake of all the foods except for other vegetables and roots and tubers was lower than the suggestedlevel among rural as well as tribal women. The prevalence of goiter was relatively higher (4.9%) among tribal women compared to their rural counterparts (0.8%). Tribal women were particularly vulnerable to undernutrition compared to women in rural areas. The prevalence of chronic energy deficiency was higher (56%) among tribal NPNL women compared to rural women (36%).(Vadera, et. al 2010).[6] also concluded that the prevalence of overweight and obesity in the urban population in Jamnagar was found to be 22.04% and 5.20%, respectively.

The burden of Diabetes in India has increased from 26.0 million diabetics in 1990 to 65.0 million diabetics in 2016 with overweight as the major risk factor India's NCDs country profile. Diabetes attribute to the highest increase in health loss among the major NCDs (Tandon et. al., 2018).[7] CVDs contributed to 27% of total deaths in 2016 in India as compared to 15.2% in 1990. The leading risk factors included dietary risks, high systolic blood pressure, air pollution, high blood cholesterol, tobacco use, high fasting plasma glucose and high body mass index (Prabhakiran et. al., 2018).[8] The contribution of cancer to total deaths doubled from 1990 to 9% on 2016 (Dhillon et. al., 2018).[9] This indicated the urgency to address the NCDs with preventive measures which is the major objective of Ayushman Bharat.

Beegom, Niaz and Singh 1995[10] found that central obesity is a strong predictor of higher prevalence of diabetes, hypertension and coronary artery disease among Indian immigrants to Britain. Findings suggested that Indians could benefit by decreasing total fat intake to 21% kcal/day and by increasing physical activity with the aim of decreasing central obesity, to prevent hypertension in the community.

It is estimated that better hypertension control can prevent 400-500,000 premature deaths in India. Krishnan, et, al. 2016[11] found that a high burden of tobacco use and alcohol use among men, inactivity and overweight among women and low fruit and vegetable consumption among both sexes in rural population of Haryana.

Singh, Gupta and Ghosh 2015[12,13] concluded that poor dietary diversitywith a predominantly cereals and fats based diet and a high prevalence of overweight was found among the free living adults in urban slumps of Delhi. Further he suggested Community based awareness programs for prevention of non-communicable diseases should incorporate healthy diet and lifestyle practices with emphasis on quantity and quality of nutrient intake. This must be considered as an integral part of chronic disease prevention strategy for underprivileged communities in urban India

5. Conclusion

Dual Burden of Mal Nutrition was found in working adults of Veravalurban. Also their dietary practices were poor. There need for sensitization of people in workplace setting on healthy diets.

6. Source of Funding

None.

7. Conflict of Interest

None.

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