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Research Article

HOW MUCH SODIUM NORMOTENSIVES WERE TAKING DAYWISE?

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ABSTRACT
Sodium intake is of great concern in present scenario due to increased prevalence of heart diseases all over the world. Number of studies have been reported the association between increasing prevalence of hypertension and high sodium intake. Thus, sodium consumption among normotensive subjects in Jaipur city was carried out. Two hundred normotensive subjects aged between 25-45 years were selected by purposive sampling. Dietary intake was taken by using 24 h dietary recall method for three consecutive days, i.e., two working days and one weekend day. Studies evaluated that weekends presented worse nutritional quality than on weekdays. Any possible difference in sodium intake and dietary sources of sodium of the subjects on weekdays and weekend days separately was also assessed. Blood pressure of all the subjects was taken to unreported prevalence of hypertension. Mean sodium intake reported by studied subjects was 3840.6±1810.1 mg/day obtained through 24 hours dietary recall method. A statistical significant difference was obtained among different age groups. The results illustrated a non-significant difference regarding sodium consumption in weekdays and weekend. The mean sodium naturally present in food was 749.2±177.8 mg/day, whereas salt (NaCl) was contributing 3091.4±900.7 mg/day of sodium. It means 80.5% of sodium was coming from salt added in food during cooking or on the table. The results of present study provide the evidence regarding salt intake among subjects of Jaipur City. It will help the concern authorities to plan consequential strategies for sodium reduction at population levels.

Keywords: *Sodium, Table salt, Hypertension, Cardiovascular disease, Sodium reduction*

INTRODUCTION
India, likewise other developing countries, is undergoing an epidemiological and along with nutritional transition and thus, is on the threshold of an epidemic of cardiovascular disease too. The growing load of hypertension in India needs to be addressed on priority as a public health concern as it is strongly associated with CVD and other NCDs. About 7.5 million deaths or 12.8% of the total annual deaths globally occur due to hypertension burden (Mendis, 2010). It is expected to be raised to 1.56 billion adults with hypertension in 2025 (Tabrizi et al, 2016). The total disease burden caused by NCDs in India was 55.0% in 2016. Data provided by ICMR-PHFI-IHME (2017) regarding diseased burden showed that the proportion of NCDs was 49.3% of total disease burden in Rajasthan with 69.7% premature deaths and 30.3% morbidity rate (Gupta, 2011). Data obtained from India showed similar overall trends as in low-income countries (Gupta, 2011). It might be due to changing food consumption pattern shifting more western along with traditional one. The situation is creating the double burden of sodium in the regional diets. Indians have a "salt-preponderance", they crave salt. This craving reaches for packed namkeen stuff and dishes high on salt, hidden salt in pickles, papads and processed foods too. Local markets are flooded with vast range of packed and processed foods. Availability of different national and international food chain products makes the nation crazy about their flavor. Increased national and international food trade, advanced food technology, manipulations in cooking methods through cooking apps and videos are activating eating simulation and make making the people gourmet. Still available evidences have proven that majority of the salt in Asian countries is due added salt, either while cooking or on the table. The

impact of adequate but unhealthy diet along with lifestyle and environmental factors are fast replacing the trend and are becoming the major focus of epidemiologists. Rapid urbanization, access to labor-saving technologies and rise in services providing sectors have reduced the need and scope for physical activities to a level a level which is contributing to a sharp rise in the prevalence of overweight and obesity and NCDs. Evidences showed that the days of the week are classically considered as sources of variability of food consumption among individuals (Monteiro *et al.*, 2017; Beaton *et al*., 1983). Studies evaluated the difference in food consumption according to the days of the week presented the food consumption worse from nutritional point of view on weekend. It was due to higher consumption of soft drinks and other sugary drinks, alcoholic drinks and fats, and lower consumption of whole foods (Nowson *et al.*, 2018; Rothausen *et al.*, 2013; Rothausen *et al.*, 2012). The possible variation could be influenced the sodium consumption too and thus worthwhile to evaluate its consumption during week days and week end separately.

MATERIALS AND METHODS

Locale of the study

The present study was conducted in Jaipur City of Rajasthan, a North-East state of India. Prevalence of hypertension has climbed from 32.2% in 2012 to 36.1% in 2017 in Jaipur (Gupta and Gupta, 2017). City is very much known for its diverse food culture flooded with spices and salt.

Sampling

Two hundred normotensive subjects (100 men and women each) were selected through purposive sampling. Different community clinics in different areas of the city were approached for attendants coming with patients. Subjects were also approached at government and private organizations like schools, colleges, banks etc. for the purpose. Initial contacts were made to confirm their eligibility and potential participants were then selected. Normotensive subjects, men and women both, in the age group of 25-45 years were selected for the purpose after taking their consent. Pregnant and lactating women, subjects with reported disease or taking any type of medicine were not included in the study. After selection of the subjects, data was collected in home settings as prescribed by WHO/PAHO (2010).

Methodology of the present study was designed on the basis of protocol provided for estimation of sodium consumption in a population (WHO, 2018; WHO/PAHO, 2010).

Ethical approval for the study was taken by the Ethical Committee of the Home Science Department, University of Rajasthan, Jaipur.

Data collection

General information of the subjects was gathered by using a self developed, pre-tested, pre-coded questionnaire.

General information

This section was dealt with the background characteristics of the respondents i.e. age, socio-economic status, food habits and habits regarding smoking and alcohol consumption. Subjects were interviewed to find out their family history of hypertension and heart diseases.

Anthropometric measurements

Anthropometry included height (with heightometer), weight (with Omron HN-286 digital weighing scale), waist circumference (with non-stretchable tape) was conducted. Body–mass index (BMI) was then further calculated by using observed measurements of height and weight and interpreted as per given

cutoff (WHO, 2000). A WHO expert consultation (2004) reviewed scientific evidence that suggested Asian populations have different associations between BMI, percentage of body fat, and health risks than do European populations. As stated earlier that the consultation concluded that the proportion of Asian people with a high risk of type 2 diabetes and cardiovascular disease is substantial at BMIs lower than the existing WHO cut-off point for overweight (≥25 kg/m^2) (WHO Expert Consultation, 2004). Studies from northern parts of India had also shown that the normal BMI for an Indian was 22 kg/m^2 and supported the view that a BMI of 23.0 kg/m^2 might be ideal for the Asian Indian population (Singh *et al.*, 1998; Dudeja *et al.*, 2001). Therefore, the results were assessed according to both criteria in the present study.

Blood pressure

Blood pressure was taken by using validated digital automatic blood pressure monitor i.e. OMRON-HEM 7130. Two readings were taken with 5 minutes interval and then mean was calculated. A cuff bladder encircling at least 80% of the arm was used to ensure accuracy. The cuff was tie round above the elbow and aligning the mark ART on the cuff with the brachial artery. The cuff was wrapped snugly onto the arm and securely fastens with Velcro. The level of cuff was same as the heart during measurement.

The latest guidelines of hypertension as per ACC/AHA was used, categorizing patients as having either Elevated (120-129 and less than 80) or Stage 1 hypertension (130-139 or 80-89). While previous guidelines classified 140/90 mm Hg as Stage 1 hypertension, this level is classified as Stage 2 hypertension under the new guidelines (Whelton *et al.*, 2018).

Dietary assessment

Dietary intake of subjects was assessed by 24-hour dietary recall by a trained nutritionist for three days including one holiday. Food consumption was estimated using three consecutive 24 dietary recalls. Participants were instructed to report all food and beverages consumed, the amount consumed, the day of the week, and the time and place of consumption (inside or outside the home). The reported use of discretionary salt and other sodium containing condiments at the table were also recorded during the recall. Number of shakes of salt dispenser was taken and then quantity of salt was measured by its standardization in the laboratory.

Conversion of food consumption into nutrients: A set of standardized cups, glasses and spoons were used to assess the intake of each food item during bed tea, breakfast, lunch, evening tea, dinner and any other in between meal. Standardization of commonly used food stuff was performed in the food laboratory (Bamji *et al.*, 2010). Raw food items were weighed for their edible potions. From the raw weight of food stuffs, an intake of various foods consumed by the subjects was estimated and data were entered on data sheet. Salt content of ready to eat food was taken as mentioned on the label of its packaging.

The nutrient content of these diets were calculated by using "Dietcal" software that was based on Indian Food Composition Tables (Longvah *et al.*, 2017).

Statistical analysis

Means and standard deviations were calculated for all variables Pearson's correlation coefficient was calculated between different variables wherever required. Frequency distribution and percentage, student t test, ANOVA, Graphical representation, Multinomial regression was made using IBM SPSS software.

RESULTS AND DISCUSSION

General information

Subjects were classified into two age groups, i.e., 25-35 years and 35-45 years, for both genders. Total sample consisted of 30.5% women in younger age group and 19.5% in elder one, whereas men consisted of 24.5% and 25.5% of younger and elder age group respectively of total sample size. The mean age of the subjects was 34.3±6.5 years (Table 1).

Table 1: Distribution of the subjects according to different parameters

S. No	Parameters	25-35 Years Men (n=49)	35-45 Years Men (n = 51)	25-35 Years Women (n = 61)	35-45 Years Women (n = 39)	Total Subjects (n=200)
1.	**Mean age (years)**	28.6±3.5	40.6±.9	29.7±3.8	39.4±5.9	34.3±6.5
2.	**Socio-economic Status**					
	Upper (I)	1 (0.5)	7 (3.5)	1 (0.5)	2 (1.0)	11 (5.5)
	Upper Middle (II)	43 (21.5)	42 (21.0)	54 (27.0)	37 (18.5)	176 (88.0)
	Middle/Lower middle (III)	5 (2.5)	-	6 (3.0)	-	11 (5.5)
	Lower/Upper lower (IV)	-	2 (1.0)	-	-	2 (1.0)
3.	**Food habits**					
	Vegetarian	27(13.5)	41(20.5)	46 (23.0)	30 (15.0)	144 (72.0)
	Non- vegetarian	16 (8.0)	8 (4.0)	7 (3.5)	4 (2.0)	35 (17.5)
	Ovo- vegetarian	6 (3.0)	2 (1.0)	8 (4.0)	5 (2.5)	21 (10.5)
4.	**Family history of hypertension**					
	Paternal	7 (3.5)	17 (8.5)	12 (6.0)	7 (3.5)	43 (21.5)
	Maternal	12 (6.0)	6 (3.0)	10 (5.0)	7 (3.5)	35 (17.5)
	Both	7 (3.5)	8 (4.0)	7 (3.5)	5 (2.5)	27 (13.5)
	None	23 (11.5)	20 (10.0)	32 (16.0)	20 (10.0)	95 (47.5)
5.	**Family history of heart disease**					
	Paternal	10 (5.0)	1 (0.5)	21 (10.5)	8 (4.0)	40 (20.0)
	Maternal	7 (3.5)	6 (3.0)	4 (2.0)	2 (1.0)	19 (9.5)
	Both	3 (1.5)	5 (2.5)	2 (1.0)	0 (0.0)	10 (5.0)
	None	29 (14.5)	39 (19.5)	34 (17.0)	29 (14.5)	131 (65.5)

Figures given in parenthesis are percentage.

Large section of the sample (88.0%) was belonged to upper middle class. To measure this variable the classification[20] was referred that was revised scales[21]. Regarding food habits, major percentage of sample (72.0%) was vegetarian. Remaining were also not consuming non-vegetarian food or eggs very frequently. More than half (52.5%) of the subjects had family history of hypertension and 34.5% had family history of heart diseases either paternal, maternal or from both sides.

Anthropometric measurements

Mean BMI of subjects belonging to different age groups was found to be 26.1±3.8 kg/m^2 (Table 2). Results indicated the prevalence of overweight and obesity in subjects in all groups. Maximum (61.5%) of the subjects were overweight or obese.

Table 2: Mean anthropometric measurements of the subjects

S No	Parameters	25-35 Yrs (Men) (n = 49)	35-45 Yrs (Men) (n = 51)	25-35 Yrs (Women) (n = 61)	35-45 Yrs (Women) (n = 39)	Total subjects (n = 200)
1	Height (cm)	170.6 ±6.9	170.4 ±5.4	159.2 ±6.2	158.0 ±5.6	164.6 ±8.5
2	Weight (kg)	76.8 ±13.6	75.8 ±8.4	61.7 ±9.2	70.4 ±11.1	70.7 ±12.3
3	BMI (kg/m^2)	26.3 ±4.4	26.3 ±2.3	24.5 ±3.7	28.2 ±3.8	26.1 ±3.8
4	Waist circumference (cm)	90.6 ±10.3	92.5 ±6.7	80.1 ±8.6	87.9 ±9.3	87.3 ±10.0

When the prevalence of general obesity was assessed as given by WHO (2004) for global population, near about half (47.5%) of the total subjects were found to be pre obese. Only 37.5% of subjects had normal BMI (i.e. 18.50- 24.99). Fourteen percent of subjects were found existing in various classes of obesity. Data assessed according to the classification given for Asian population revealed that 77.0% of subjects were exceeding the normal range of BMI. Only 22% of subjects had normal BMI, indicating the high prevalence of general obesity (Figure 1).

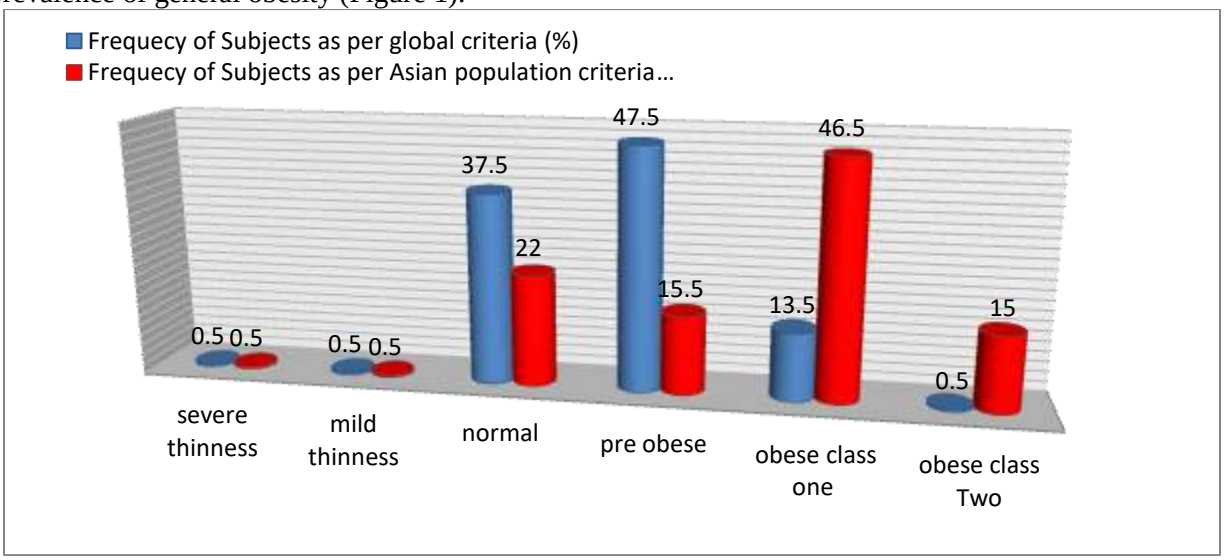


Figure 1: Comparative prevalence of general obesity for Global and Asian population Criteria (WHO, 2004)

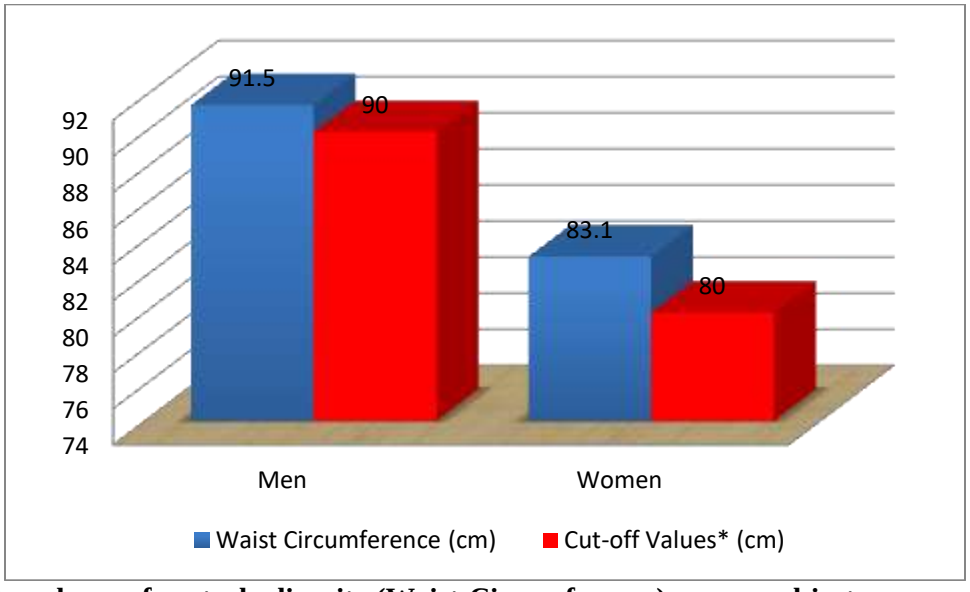


Figure 2: Prevalence of central adiposity (Waist-Circumference) among subjects

Waist Circumference is a strong predictor of intra abdominal adiposity. The average WC of the men was 91.5 ±8.6 cm, which was found to be exceeding the cut-off values recommended for adult men (90 cm) (WHO, 2011). Same trend was also seen in women (83.1 ±9.6 cm in comparison to 80 cm). In the age

group of 25-35 years men, mean WC was 90.6 ±10.3 cm which increased with age (92.5 ±6.7 cm in 35-45 years men). Women were also following the same trend of increasing WC along with age decade (80.1 ±8.6 cm vs 87.9 ±9.3 cm in respective age groups) as shown in Figure 2. Prevalence of central obesity defined as WC ≥ 80 cm in women and ≥ 90 cm in men was as high as 64.0% in women and 60.0% in men. Total 62.0% subjects had abdominal obesity. When further analyzed, age and gender both were creating significant difference regarding mean waist circumference of the subjects (p=0.000).

Blood pressure

Overall, subject's blood pressure level was also found to be lower than the given figures although they were found to be consuming too much sodium. It has been also predicted from the table that there was increasing trend in SBP and DBP along with increasing age decade. Blood pressure of the women subjects was found to be lower than the given range for systolic and diastolic blood pressure (Table 3).

Table 3: Mean systolic and diastolic blood pressure of the subjects

S No	Parameters	25-35 Yrs (Men) n = 49	35-45 Yrs (Men) n = 51	25-35 Yrs (Women) n = 61	35-45 Yrs (Women) n = 39	Total subjects n = 200
1	Systolic blood pressure (mmHg)	122.1 ±9.6	123.4 ±10.3	109.7 ±9.9	113.4 ±13.9	116.9 ±12.3
2	Diastolic blood pressure (mmHg)	79.1 ±6.4	81.6 ±6.5	74.6 ±8.8	77.3 ±8.6	78.0 ±8.0

More than half (53.0%) of the subjects had blood pressure higher than the normal range. The latest guidelines of hypertension categorizing patients as having either Elevated (120-129 and less than 80) or Stage 1 hypertension (130-139 or 80-89). While previous guidelines classified 140/90 mm Hg as Stage 1 hypertension, this level is classified as Stage 2 hypertension under the new guidelines (Whelton *et al.*, 2018). After stabilizing the criteria-wise data, it was observed that 16.0% of subjects had elevated blood pressure, 27.0% of them had stage 1 and 10.0% had stage 2 hypertension. Thus it can be estimated as 37.0% prevalence of hypertension by taking the criteria of stage 1 and stage 2 hypertension. Studies have reported that higher prevalence of hypertension is likely to be due to demographic and epidemiological transition, changing lifestyles, increased intake of dietary fat and salt, physical inactivity and trend of increasing body weight and abdominal obesity (Gupta *et al.*, 2016; Gupta and Gupta, 2017).

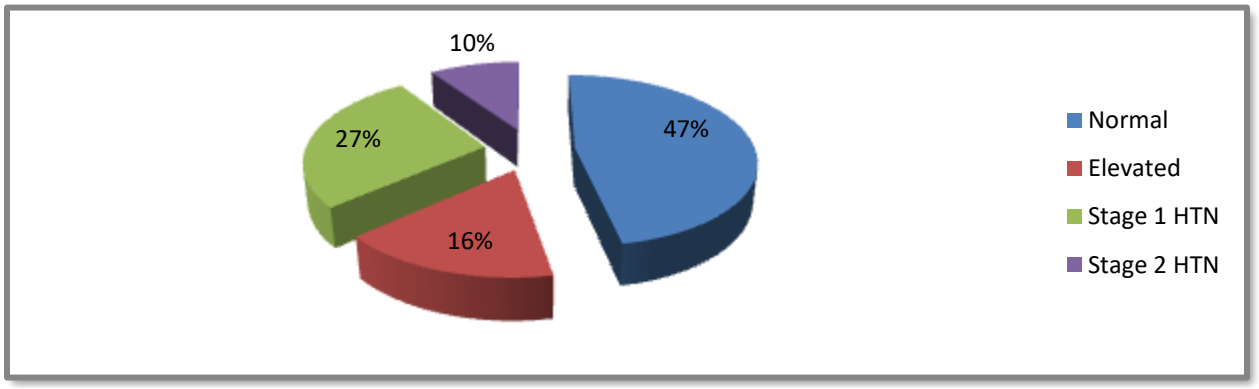
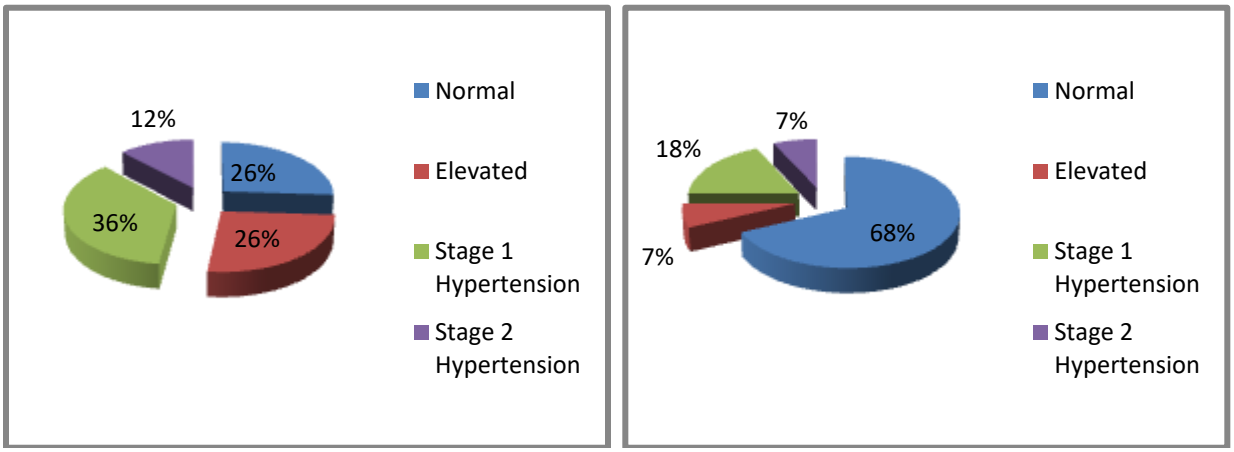


Figure 3(a)



(b) **(c)**

Figure 3: (a) Categorization of total subjects on the basis of their blood pressures; (b) Categorization of men; (c) Categorization of women

The differences in prevalence percentage between men and women were noted in the study. In contrast to 26.0%, only 7.0% of the women had elevated blood pressure. Stage 1 hypertension prevalence was found just double in men than women (36.0% v/s 18.0%). Seven percent of total women had stage 2 hypertension, whereas 12.0% of the men had stage 2 hypertension (Figure 3). The difference could be explained by the higher anthropometric measurement, physical inactivity and probable tension of earning among men compared to women. Studies also reported higher prevalence of hypertension in men as compared to women (Gills and Sullivan, 2016; Ghosh *et al.*, 2016; Youngbum and Seunghee, 2015; Gupta *et al.*, 2013).

Age was found to be an important risk factor for hypertension. As the age was advancing so did the prevalence of hypertension among both the genders. Men aged 25-35 years had 11.0% prevalence of stage 1 hypertension, whereas elder age group had 25.0%. Stage 2 hypertension prevalence was more (7.0%) in elder group than the younger ones (5.0%). Women also showed same trend (8.0% v/s 10.0% for stage 1 hypertension and 2.0% v/s 5.0% for stage 2 hypertension) with advancing age group. Similar findings were reported by few other studies also where advancing age was positively related to hypertension (Tabrizi *et al.*, 2016; Thankappan *et al.*, 2013; Erem *et al.*, 2009). With increasing age, the aorta and arteries walls become stiffened and contribute to the high prevalence of hypertension (Abebe *et al.*, 2015).

Sodium consumption among subjects

Mean sodium intake reported by studied subjects was 3840.6±1810.1 mg/day obtained through 24 hours dietary recall method for three consecutive days. A statistical significant difference was obtained among age groups. No any significant difference was observed among gender groups. When compared with recommended intake of sodium (2000 mg/day) as given by WHO (2007), 179% to 197% of sodium intake was narrated by subjects in all age and gender groups (Figure 4).

Sodium consumption during working days of a week and during holiday was compared to identify any possible variations in its consumption. The sodium consumption during working days was reported as 3657.2±1124.9 mg/day and 3928.2±1146.2 mg/day in two respective age groups among men. The same was figured out as 3739.7±98.8 and 3849.4±1163.9 mg/day among two respective age groups of women. Slight elevation in sodium consumption was observed during weekend/holiday (Table 4). The results illustrated a non-significant difference regarding sodium consumption in weekdays and weekend (Table 5).

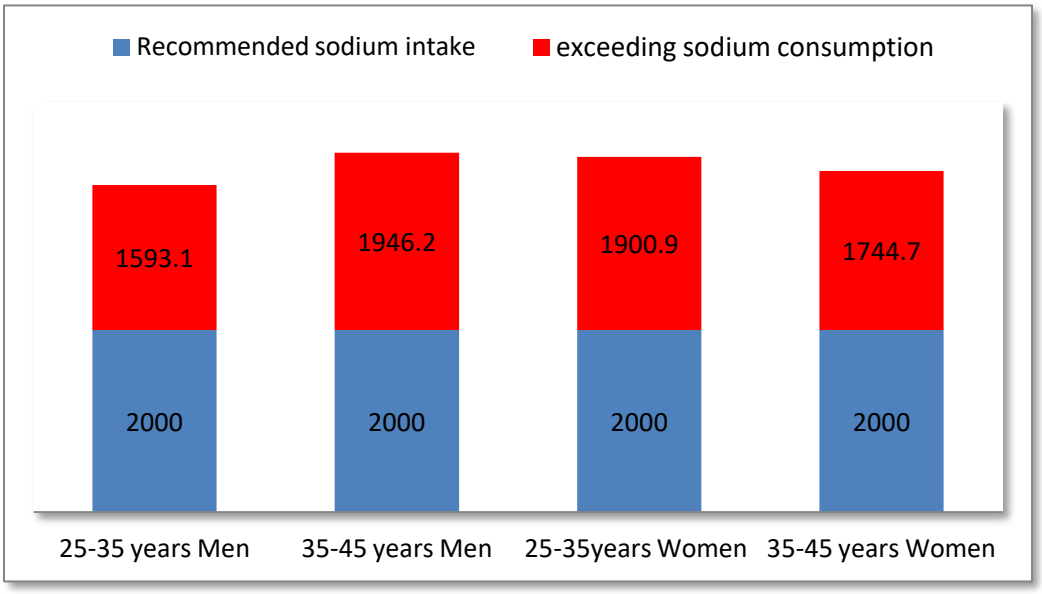


Figure 4: Exceeding sodium consumption in comparison to recommended intake

Table 4: Sodium consumption during week days and weekend of the subjects

S. No.	Variables	25-35 yrs (Men) n=49	35-45 yrs (Men) n=51	25-35 yrs (Women) n=61	35-45 yrs (Women) n=39	Total n=200
1.	**Sodium consumption: week days (mg/day)**	3657.2 ±1124.9	3928.2 ±1146.2	3739.7 ±982.8	3849.4 ±1163.9	3792.9 ±1094.6
2.	**Sodium consumption: weekend (mg/day)**	3708.7 ±1199.5	4016.4 ±1221.2	3781.8 ±1162.8	3943.9 ±1262.6	3859.6 ±1204.3

Table 5: Comparison between sodium consumption during week days and weekend

S. No.	Variables	Mean ±SD	t value	Level of significance
1.	**Sodium consumption: week days (mg/day)**	3792.9 ±1094.6	-1.510	0.133NS
2.	**Sodium consumption: weekend (mg/day)**	3859.6 ±1204.3		

NS: Non-significant.

A significant correlation was observed between the sodium consumption during weekdays and weekend (r= 0.855; p=0.000). It would mean that sodium consumption among subjects was higher throughout the week irrespective of working or holiday. Further analysis revealed that mean sodium naturally present in

food was 749.2±177.8 mg/day, whereas salt (NaCl) was contributing 3091.4±900.7 mg/day of sodium. It means 80.5% of sodium was coming from salt added in food during cooking or on the table (Fig. 4). The sodium contribution from table salt (74.7%) followed by soy sauce (15%) (Xu *et al.*, 2014).

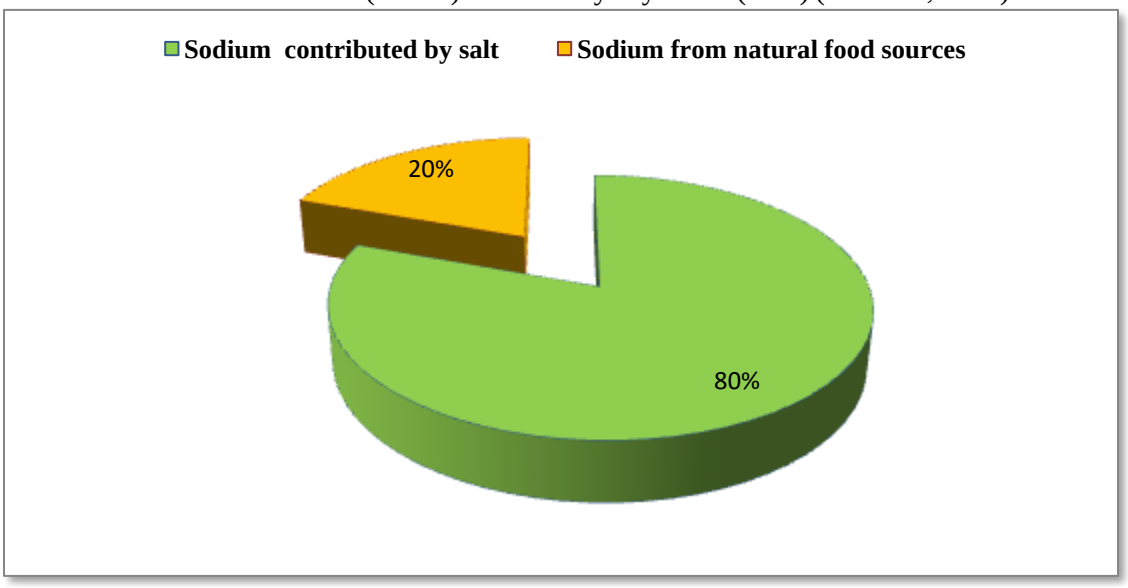


Figure 4: Contribution of sodium by different sources

Salt consumption among subjects on the basis of monthly household consumption of salt

As salt consumption is a sensitive issue and there was a probability of over or under reporting, the monthly consumption of salt was also recorded as reported by the subjects. Recorded salt consumption was then divided by adult consumption unit to get the consumption at individual level (NNMB, 2012). It was interpreted from outcomes that subjects were consuming on an average 1607 ±1617 gm (1.6 kg) of salt per month at household level. When further individual salt consumption was calculated on consumption unit basis (NNMB, 2012), overall average consumption was around 8.4 ±2.6 gm/day. Figures were exceeding the recommended consumption in terms of salt, i.e. 5 gm/day. Further, when the values were converted to sodium, it would be equivalent to 3371.4 ±1036.4 mg/day. Sodium intake obtained by dietary method was 3840.6±1810.1 mg/day.

Table 6: Comparison between sodium intakes obtained by dietary method and monthly household consumption of salt

S.No.	Variables	Mean ±SD	t value	Level of significance
1.	**Sodium intake obtained from salt assessed by dietary method (mg/day)**	3091.4±900.7		
2.	**Sodium intake obtained by monthly household consumption of salt (mg/day)**	3371.4 ±1036.4	-2.77	0.006**

***Significant at 0.01 level.*

A significant difference was observed between means of two variables (Table 6) as obtained by paired t test. A significant correlation was obtained between sodium calculated on the basis of household consumption of salt and salt consumption obtained by dietary method (r=0.63; p=0.000).

Table 7: Multinomial regression for association of BMI, waist circumference and sodium consumption with blood pressure including age and gender as covariates

Variables	SBP			DBP		
	Chi-Square value	Pseudo R-Square	Significance	Chi-Square value	Pseudo R-Square	Significance
Intercept	0.000	0.998	-	0.000	0.890	-
BMI	90.228		0.000**	65.5		0.001**
Waist circumference	46.223		0.341	48.6		0.063
Age	69.371		0.007**	69.1		0.001**
Gender	73.535		0.003**	55.7		0.015
Sodium	744.279		1.000	52.4		0.030*

**Significant at 5% level of significance; ** Significant at 1% level of significance*

Association of high sodium intake with hypertension and further cardiovascular diseases is well established. Results of multiple regression analysis for association of SBP with sodium excretion, BMI and WC reflected that age and gender both along with BMI significantly associated with SBP at 1% level of significance (Table 7). Diastolic blood pressure was correlated statistically with BMI and age at 1% level of significance. Sodium consumption as found to be associated more with the diastolic blood pressure rather than systolic blood pressure ($p<0.05$).

DISCUSSION

The results interpreted that the sodium intake was exceeding throughout the week among the normotensives of Jaipur city, irrespective of working or holiday. Slight elevation in sodium consumption was observed during weekend/holiday, however difference was statistically non-significant. A significant correlation (r= 0.855; p=0.000) between the sodium consumption during week day and week end illustrated that the consumption pattern among the subjects was remaining same irrespective of the day of the week. Further analysis of the data to obtain the sources of sodium revealed that discretionary salt was the direct source of 80.5% of the sodium among subjects, added either during cooking or added at the table.

Association of high sodium intake with hypertension and further cardiovascular diseases is well established. Results of multiple regression analysis for association of SBP with sodium excretion, BMI and WC reflected that age and gender both along with BMI significantly associated with SBP at 1% level of significance (Table 7). Diastolic blood pressure was correlated statistically with BMI and age at 1% level of significance. Sodium consumption as found to be associated more with the diastolic blood pressure rather than systolic blood pressure ($p<0.05$). A reliable dose-response association between salt intake and blood pressure was reported by number of studies within the range of 3 to 12 g of salt per day.

Studies reported that blood pressure can be decreased by 3.6 to 5.6/1.9 to 3.2 mm Hg in hypertensive subjects and 1.8 to 3.5/0.8 to 1.8 mm Hg in normotensive subjects by reducing 3 gram of salt per day. Decrease in blood pressure can be up to .11/3.88 mm Hg in hypertensive individuals and 3.57/1.66 mm Hg in normotensive individuals with reduction of 6 g/d salt at least for 4 or more weeks. It was concluded that incidence of hypertension can be led to 35% by a modest reduction of 2 g salt/day over a period of 8 months. Results were generated after 7-year follow-up. For hypertensive individuals, a reduction by 4.6 g/d of salt yielded a mean reduction in blood pressure of 5.06/2.70 mm Hg (Frisoli *et al*., 2012; He and MacGregor, 2004).

The prevalence of high blood pressure in India (old and new both cases) among men and women (≥18 years) was 38.5% and 29% respectively (NNMB, 2017). In respect to current rate of age-specific cardiovascular disease mortality rate, there will be a 42% increase in number of deaths in the productive working age group by 2030, due to demographic changes alone. For India, reducing salt intake would be a challenge because there is no reliable data on the consumption amount. Efforts should be made towards the direction to find out the area wise consumption level and then a tailor-made effort has to be done according to the need. The study provided evidence regarding sodium consumption in the region as there was no any data was available from the region.

Conclusion

The results of the present study concluded the higher sodium consumption in the region irrespective of the working or holiday. Maximum of the sodium was contributed by the added salt either during cooking or at the table. The results created an alarming situation regarding sodium consumption. In Indian scenario, it requires targeting specifically the Indian kitchens that contribute most of the sodium by adding extra salt. Despite of strong evidence for health implications of excessive salt consumption, public health efforts to reduce sodium consumption have been still limited at planning level only. People are still unaware of the detrimental effects of excessive sodium or salt consumption. Even they don't know much about sources of sodium in their diet. Efforts should be done on practical platform. Tailor made planning and efforts are required at local level along with global strategy to reduce sodium at population level. Education should also be given to maintain the diet quality lifelong despite of holidays or festivals to improve overall health status.

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