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ABSTRACT

Introduction: *Food culture and behaviour is largely determined by environment and geo-climatic setup. Obesity is an outcome of overconsumption or energy imbalance. Balanced diet or energy intake helps in the prevention of weight gain and obesity. It leads to many health related problems which affect the health care systems and the economy also.*

Aim*: To find out the association of dietary behaviour with overweight or obesity.*

Material and Methods: *A cross-sectional study was conducted on a total of 1000 respondents consisting of 417 males and 583 female who have BMI ≥25 Kg/m^2 and age range between 18-60 years. The sample were drawn from district Sagar of Madhya Pradesh.*

Results: *In the present study it was revealed that the habit of eating non-vegetarians food was higher ~12% among the obese than overweight; further alcoholism, smoking and tobaccoism were found higher (22.8%, 15.7% and 42.3%) respectively among the overweight respondents but it was not similar in case of urban and rural respondents. Similarly, intake of fried and oily, was found higher (~11.3%) among the obese. The mean BMI for overweight was 27.55± 1.34 Kg/m^2 and for obese it was 33.48 ± 3.14 Kg/m^2 and the t-test was significant (t= -40.080 df= 998, P ≤ 0.001).*

Conclusion: *It can be concluded that the dietary behaviour is a determinants for increasing obesity. The consumption of non-vegetarian diet, fried and oily foods have significant association with obesity.*

Keywords: *Obesity, BMI, Smoking, Alcoholism, Foods habits.*

INTRODUCTION

Obesity is becoming a public health problem worldwide especially in recent years. More than 1.5 billion adults were suffering from overweight in 2008 (Alqarni, 2016), which increased to more than 1.9 billion in 2016, while more than 650 million were thought to be obese (WHO,

2000). Overweight and obesity are defined as abnormal or excessive body fat on the body. The World Health Organization (WHO) in 1998 declared that the obesity is a global pandemic **(**WHO 1998**)**. Body Mass Index (BMI) is calculated as; weight in kilogram (Kg) divided by height in square meter (m^2), and it is a simple index to classify, underweight, overweight and obesity (WHO 2000).

Balanced diet or energy intake helps in the prevention of weight gain and obesity (Astrup, 2005). So, it can be stated that high intake of energy is one of the main responsible factors to increase body weight. Furthermore, increasing prevalence of obesity is the crucial problem of contemporary world. It leads to many health related problems which affect the health care systems and the economy also. There are several reasons of increasing prevalence of obesity; such as: sedentary lifestyle, intake of high calorie food, high level of stress (Block et al. 2009), lack of physical activity (Lakerveld and Mackenbach, 2017), lack of sleep (Patel and Hu, 2008), marital status (Tzotzas et al. 2010) education status (Tzotzas et al. 2010) positive family history (Corica, et al. 2018) socioeconomic status, (Wang et al. 2020) etc.

Some studies have supported that consumption of alcoholism (Traversy and Chaput, 2015), habits of smoking (Dare et al, 2015; Park, et al 2022) and chewing of tobacco (Weg et al 2005) may lead to obesity. Syed et al (2020) stated that consumptions of rich in fatty foods and frequency of eating are responsible for it.

In this context, more information is required on dietary behaviour, physical activity and obesity. Therefore, this study aimed to investigate the relationship of eating behaviour, types of vegetarian and non-vegetarian food, smoking, alcoholism, and tobaccoism among overweight and obese respondents belonging to urban and rural areas of district Sagar, Madhya Pradesh, India.

MATERIAL AND METHODS

A cross-sectional study was conducted on a total of 1000 participants comprising of 500 urban and

500 rural who had BMI $\geq$ 25 Kg/m^2. Respondents were taken from both sexes (males 417 and female 583). They belong to age group 18-60 years. The participants were recruited following purposive sampling method. Ethical guideline were followed as per Helshinki Declaration (2008).

An interview Schedule was designed. Before taking Anthropometric measurements, the interview schedule was filled which contained: name, age, sex, food habits related information etc.

Data on height and bodyweight were obtained using by Anthropometer rod in standing position without footwear to the nearest 0.1 cm. Similarly, bodyweight was measured to the nearest 0.01 Kg following (Gibson, 1990).

Inclusion criteria

Following inclusion criteria were followed:

(i) BMI ≥ 25 Kg/m^2.

(ii) Age range between 18- 60 years,

(iii) Residence urban or rural areas

Exclusion criteria

Physically and mentally disabled individuals and pregnant women were excluded.

Data management & Statistical Analysis

After data collection, the schedule were edited and a MS- excel worksheet was customised for data entry. To ensure error free data, each column and cells were validated. After data entry, it is filtered to remove error, if any. Thereafter data were analysed using SPSS (version 20). The result of the eating behaviour was expressed in terms of frequency, total, percentage, and mean± standard deviations. Cross tabulations with Pearson's Chi-square and Students T-tests were used to look for a statistically significant association between the variables. The alpha level was set at 0.05 to determine statistical significance.

RESULTS

Table 1 reveals a comparative information on height, weight, BMI, and age of overweight and obese respondents of urban and rural area. As per for urban dwellers the mean of height vertex was found 160.71± 9.36 cm for overweight 158.25± 9.14 cm for obese, and the difference is significant (t=2.60, df=498, p≤0.005). Similarly among rural, respondents, the mean of height vertex was 157.18± 9.23 cm for overweight and 156.93± 9.11cm for obese and the difference was found insignificant (t= -0.309, df= 498, p≥ 0.05). For the pooled data, the overweight respondents were taller as compared to their obese counterparts. The mean of height vertex was found 158.95±9.45 cm for overweight and 157.59±9.14 cm for obese, and the difference was found significant (t= 2.311, df= 998, p≤ 0.05); but it was not similar between the urban and rural dwellers.

As for urban respondents the mean of bodyweight was found higher 83.26 ± 11.94 Kg for obese than overweight 72.14 ± 9.02 Kg and the difference was found significant (t=-11.858, df= 498, p ≤ 0.001). Similar it can be witnessed among the rural dwellers too, the mean of bodyweight was found higher 79.92±11.74 Kg for obese and 70.05± 9.34 Kg for overweight and the

difference is significant (t= -10.464, df= 498, p≤ 0.001). For the pooled data, the mean of bodyweight was found higher for obese 81.58± 11.95 Kg as compared to overweight 71.10± 9.23 Kg, and the difference was found statistically significant (t=-15.647, df= 998, p≤ 0.001). Among urban dwellers, the mean BMI for obese individuals was 33.57 ± 3.11 Kg/m^2, while for overweight individuals, it was 27.52±1.35 Kg/m^2, and the variance was statistically significant (t= -29.075, df= 498, p≤ 0.001). Likewise, among rural dwellers, the mean BMI was found to be higher for obese individuals (33.4±11.74 Kg/m^2) compared to overweight individuals (27.57±1.33 Kg/m^2), and this difference was also statistically significant (t= -27.586, df= 498, p ≤ 0.001). As per pooled data, the mean BMI was found to be higher among obese individuals (33.48±3.14Kg/m^2) compared to overweight individuals (27.55± 1.34 Kg/m^2), and this difference was found to be statistically significant (t= -40.08, df= 998. p≤ 0.001).

Table 1: Central tendency and deviation of age, height, body weight and BMI among overweight and obese respondents.

Variables	Overweight		Obese		t- value
	Mean	S D	Mean	S D	
Urban					
Age	42.67	10.11	44.61	10.09	-2.146*
Height Vertex	160.71	9.36	158.25	9.14	2.960**
Body Weight	72.14	9.02	83.26	11.94	-11.858***
BMI	27.52	1.35	33.57	3.11	-29.075***
Rural					
Age	42.29	10.97	44.73	10.03	-2.576*
Height Vertex	157.18	9.23	156.93	9.11	0.306
Body Weight	70.05	9.34	79.92	11.74	-10.464***
BMI	27.57	1.33	33.4	3.17	-27.586***
Pooled Data					
Age	42.48	10.54	44.67	10.05	-3.347***
Height Vertex	158.95	9.45	157.59	9.14	2.311*
Body Weight	71.10	9.23	81.58	11.95	-15.647***
BMI	27.55	1.34	33.48	3.14	-40.08***

For all (t) value:
**(p ≤ 0.05)*
***(p≤ 0.005)*
****(p≤ 0.001)*
df= for pooled data (998), urban and rural (498)

It is evident that among the urban respondents that the obese have higher mean age as compared to overweight (obese 44.61±10.09years, overweight 42.67±10.11 years) and the difference is significant (t= -2.146, df= 498, p≤ 0.05). Similar, findings can be seen among the rural respondents too as obese have mean age of 44.73±10.73 years and overweight have 42.29±

10.97 years and the difference was found significant (t= -2.576, df= 498, p≤ 0.05). For pooled data the mean age for overweight was 42.48±10.54 years and for obese 44.67±10.05 years (t= -3.347, df= 998, p≤ 0.001). The difference was found significant.

It was found that the age and obesity were associated i.e. the elder respondents have more risk of getting obese as compared to the youngsters. Further the mean of age is higher (~2 years) among obese as compared to overweight respondents. Although it is not similar for urban and rural respondents as among the urban respondents the obese are ~3 years elder than the overweight whereas among rural respondents that the mean of age is ~2 years higher among obese respondents than the overweight.

Furthermore, overweight respondents were found taller as compared to obese the difference of mean stature is 1.4 cm. Further there is variation in urban and rural respondents in this respect. Contrarily, the obese respondents have higher mean bodyweight (~10.5 Kg) than the overweight. Similarly, the mean of BMI was found higher (~ 6 Kg/ sq. m) among the obese respondents as compared to overweight.

Table 2: Distribution of respondents as per eating of animal products.

Food habits (Animal Product)	Overweight		Obese	
	N	%	N	%
Urban				
Egg eaters	153	30.6	132	26.4
Chicken eaters	123	24.6	119	23.8
Meat eaters (red meat)	116	23.2	87	17.4
Fish eaters	113	22.6	110	22
Rural				
Eggs eaters	151	30.2	134	26.8
Chicken eaters	78	15.6	102	20.4
Meat eaters (red meat)	70	14	78	15.6
Fish eaters	72	14.4	96	19.2
Pooled Data				
Eggs eaters	304	30.4	266	26.6
Chicken eaters	201	20.1	221	22.1
Meat eaters (red meat)	186	18.6	165	16.5
Fish eaters	185	18.5	206	20.6

Egg Eaters

It is apparent from Table 2 that among urban respondents the overweight are almost equal eggs eater as compared to obese. Among urban dwellers, the prevalence of egg-eaters were found 26.4% and 30.6% respectively for overweight & obese.

Similarly, among the rural respondents, the prevalence of egg-eaters were found 30.2% and 26.8% respectively for overweight and obese.

In the pooled data, the prevalence of egg-eaters among overweight were 30.4%; whereas 26.6% among the obese.

Chicken Eaters

Among urban dwellers, the prevalence chicken eaters were found 24.6% and 23.8% for overweight and obese respondents respectively. Further, among rural respondents, the prevalence of chicken eaters were found higher i.e. 20.4% among the obese than the overweight (15.6%).

In the pooled data, the prevalence of chicken-eaters were found higher 22.1% among the obese as compared to 20.1% among the overweight (Table 2).

Meat Eaters

Among urban dwellers, the prevalence of meat-eaters were found (23.2% and 17.4%) respectively for overweight & obese; which is higher than the rural respondents, as among them the prevalence of meat eater were found 14% and 15.6% respectively for overweight and obese.

For the pooled data, the prevalence of meat eaters were 18.6% and 16.5% respectively for overweight & obese (Table 2).

Fish Eaters

Among the urban dwellers, the prevalence of fish eaters were almost equal among overweight and obese (22.6% and 22.0%). Although it not similarly, among rural dwellers, the prevalence of fish eaters were found 19.2% and 14.2% respectively for overweigh and obese.

For the pooled data, the prevalence of fish-eaters among the overweight respondents were found 18.5%, whereas 20.6% among the obese (Table 2).

Alcoholism

The distribution of overweight and obese respondents with different habits i.e. Alcohol consumption, tobacco smoking and chewing is evident from Table 3. The alcohol consumption was found higher (28.4 %) among the urban overweight as compared to obese (20.4%).

Among rural respondents, the prevalence of alcohol consumption was quit low among the overweight as 17.2% of them were found as drinker. Although, the prevalence of drinker among rural obese (19.8%) was almost similar to urban respondents.

For the pooled data, the prevalence of alcohol drinkers for overweight was found 22.8% and for obese 20.1% (Table 3).

Smoking

Smoking practices among overweight and obese of urban and rural area shows that the urban respondents were slightly more smoker than rural one.

Among urban dwellers 16.7% overweight were found smoker as compared to 12.4% of obese; whereas, among the rural respondents that the prevalence of smoking habits among overweight were 14.7% as compared to 10.1% of obese. Although, for pooled data, the prevalence of smoking habits for overweight was 15.7% and for obese 11.3%. Hence, it apparent that the overweight were more smoker than obese, similarly the urban respondent were more smoker than their rural counterpart (Table 3).

Tobacco Chewing

Tobacco chewing was a prevalent practice among the respondents, irrespective of the residence (urban vs. rural) although it is lower among obese respondents as compared to overweight.

Among urban overweight the prevalence of tobacco chewer were 43.6% as compared to 32.4% of obese. Almost similar prevalence can be witnessed among the rural respondents. For pooled data the prevalence of tobacco chewer for overweight was 42.3% and for obese 33% (Table 3).

Table 3: Alcoholism, Smoking and Tobaccoism among overweight and obese respondents

Drinking and Smoking	Overweight		Obese	
	N	%	N	%
Urban				
Alcohol Consumer	78	28.4	46	20.4
Tobacco Smoker	46	16.7	28	12.4
Tobacco Chewer	120	43.6	73	32.4
Rural				
Alcohol Consumer	47	17.2	45	19.8
Tobacco Smoker	40	14.7	23	10.1
Tobacco Chewer	112	41	76	33.5
Pooled				
Alcohol Consumer	125	22.8	91	20.1
Tobacco Smoker	86	15.7	51	11.3
Tobacco Chewer	232	42.3	149	33

Present findings stated that habits of alcoholism smoking and tobaccoism are higher among the overweight respondents but it is not similar in case of urban and rural respondents. Further, the prevalence of alcoholism was higher ~2.7% among the overweight respondents as compared to obese. Similarly, the prevalence of smokers and tobacco chewers was found higher ~ 4.4% and ~9.3% respectively, among the overweight respondents as compared to obese.

Street Food

The preference of street food among the respondents are presented in Table 4. It is apparent that the prevalence of overweight individuals were higher 17.2% in the category of regular

preference of street food as compared to obese (12.5%). Whereas, the prevalence of obese respondents were higher 45.7% in the category of occasionally preference of street food as compared to overweight (31%). While, the prevalence of overweight respondents were higher 51.9% in the category of avoided preference of street food as compared to obese (41.8%). And the chi- square tests is significant (χ^2= 11. 595, df = 2, $p \leq 0.005$).

Among rural respondents, regular preference of street food was found almost equal (10.3% and 9.3%) for overweight and obese respondents. Similarly, the prevalence of occasionally and avoided category have equal prevalence. And the chi-square tests is insignificant (χ^2= 0.148, df= 2, $p \geq 0.05$).

Table 4: Preference of street food among overweight and obese respondents

Street Food Frequency	Overweight		Obese		χ^2
	N	%	N	%	
Urban					
Regular	47	17.1	31	13.8	12.372**
Occasionally	85	30.9	104	46.2	
Avoided	143	52	90	40	
Rural					
Regular	28	10.3	21	9.3	0.148^{NS}
Occasionally	127	46.5	106	46.7	
Avoided	118	43.2	100	44.1	
Pooled Data					
Regular	75	13.7	52	11.5	6.193*
Occasionally	212	38.7	210	46.5	
Avoided	261	47.6	190	42	

For all (χ^2) value, df= 2
*($p \leq 0.05$)
**($p \leq 0.005$)
NS= Insignificant

As per pooled data, the preference of street food among the respondents. The prevalence of regular preference was found higher among overweight 13.7% as compared to obese (11.5%); whereas, the prevalence of occasionally preference was low 38.7% among overweight as compared to obese (46.5%). Moreover, the prevalence of avoided category of street food were higher 47.6% among overweight as compared to obese (42%). And the chi-square tests is significant (χ^2= 6.193, df= 2, $p \leq 0.05$)**.**

It was found that the preference of street food was associated with the overweight respondents as compared to obese. Although, it was not similar among urban and rural respondents. Further, the prevalence of regular preference of street food was higher ~2.2% among overweight respondents as compared to obese.

Vegetarian vs. Non-vegetarian

The distribution of respondents on the basis of food habits i.e. vegetarian, egg-eaters and non-vegetarian are presented in Table 5. It is apparent that among urban respondents the prevalence of vegetarians were higher 40.7% among overweight as compared to obese (37.3%). Similarly, the prevalence of eggs-eaters were higher 13.8% among overweight as compared to obese (9.3%); whereas, the prevalence of non-vegetarian were found higher (53.3%) among obese than overweight (45.5%). And the Chi-square tests was found insignificant (χ^2= 4.041, df 2, p≥ 0.05).

Table 5: The distribution of respondents on the basis of food habits

Food habits	Overweight		Obese		χ^2
	N	%	N	%	
Urban					
Vegetarians	112	40.7	84	37.3	4.041^{NS}
Egg-eaters	38	13.8	21	9.3	
Non-vegetarians	125	45.5	120	53.3	
Rural					
Vegetarians	105	38.5	79	34.8	16.556***
Egg-eaters	87	31.9	44	19.4	
Non-vegetarians	81	29.7	104	45.8	
Pooled Data					
Vegetarians	217	39.6	163	36.1	18.327***
Egg-eaters	125	22.8	65	14.4	
Non-vegetarians	206	37.6	224	49.6	

For all (χ^2) value, df= 2
*** (p≤ 0.001)
NS= Insignificant

Among rural dwellers, the prevalence of vegetarian were slightly higher 38.5% among overweight as compared to obese (34.8%). Similarly, the habits of eggs-eating were higher 31.9 % among overweight than obese (19.4%). While, the prevalence of non-vegetarian were higher 45.8% among obese as compared to overweight (29.7 %). And the chi-square tests is significant (χ^2= 16.556, df 2, p≤ 0.001).

As per pooled data, the prevalence of vegetarians were higher among the overweight (39.6%) than obese (36.1%). Moreover, the prevalence of egg-eaters were higher 22.8% among overweight as compared to obese (14.4%); similarly, the prevalence of non-vegetarians were found higher 49.6% among obese as compared to overweight (37.6%) (Fig 1). And, the chi-square tests is significant (χ^2= 18.327, df 2, p≤ 0.001).

It is evident from chi-square test that eating of non-vegetarians food was significantly associated with obesity as it was ~12% higher among them; whereas the prevalence of vegetarians as well as the eggetarians (who eat eggs and avoid other non-veg items) were more (~3.5% and 8.4%) among the overweight respondents.

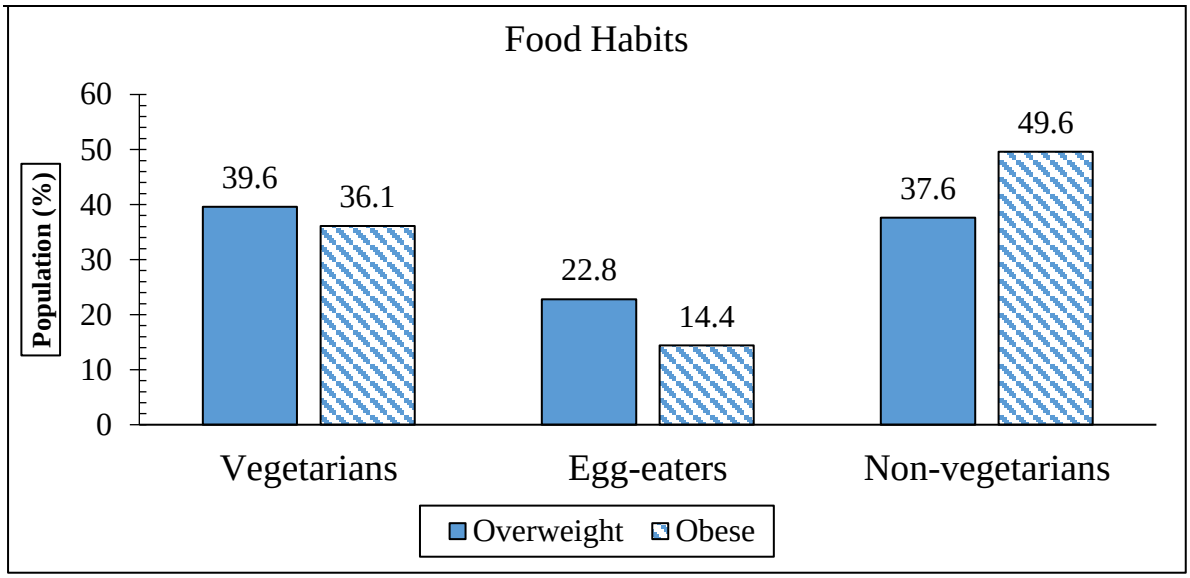

Fig. 1: Comparative bar diagram of Food habits among Overweight and Obese respondents

Oily and Fried Food

The distribution of respondents on the basis of intake of oily or fried food i.e. high, normal and avoided presented in Table 6. It is apparent that among urban respondents the prevalence of oily or fried food was found 37.5% and 43.6% respectively for overweight & obese; whereas, the prevalence of normal intake of such food were higher 47.3% among overweight as compared to obese (42.7%). However, the prevalence of avoided of such food were 15.3% among overweight as compared to 13.8% among the obese. And, the chi-square tests was found insignificant (χ^2= 1.916, df 2, p≥ 0.05).

Among the rural respondents the intake of fried and oily food were higher 26.9% among obese as compared to overweight (10.3%). Although, normal intake of such food was higher (78%) among overweight respondents as compared to obese (62.6%); whereas, avoidance of such food was almost equal (11.7% and 10.6%) among overweight and obese respondents. And, the chi-square tests is significant (χ^2= 23.546, df 2, p≤ 0.001).

For pooled data, the distribution of respondents who reported high intake of oily foods among overweight respondents were lower (23.9%) as compared to obese (35.2%); whereas, normal intake of such food were higher 62.6% among overweight than obese (52.7%). Among overweight respondents 13.5% were reported avoidance of such food as compared to 12.2% of obese (Fig. 2). And, the chi-square tests is significant (χ^2= 15.404, df 2, p≤ 0.001).

Table 6: The distribution of respondents on the basis of intake of fried/oily foods					
Intake of fried/oily foods	Overweight		Obese		χ^2
	N	%	N	%	
Urban					
High	103	37.5	98	43.6	1.916^{NS}
Normal	130	47.3	96	42.7	
Avoided	42	15.3	31	13.8	
Rural					
High	28	10.3	61	26.9	23.546***
Normal	213	78	142	62.6	
Avoided	32	11.7	24	10.6	
Pooled Data					
High	131	23.9	159	35.2	15.404***
Normal	343	62.6	238	52.7	
Avoided	74	13.5	55	12.2	

For all (χ^2) value, df= 2
*** ($p \leq 0.001$)
NS= Insignificant

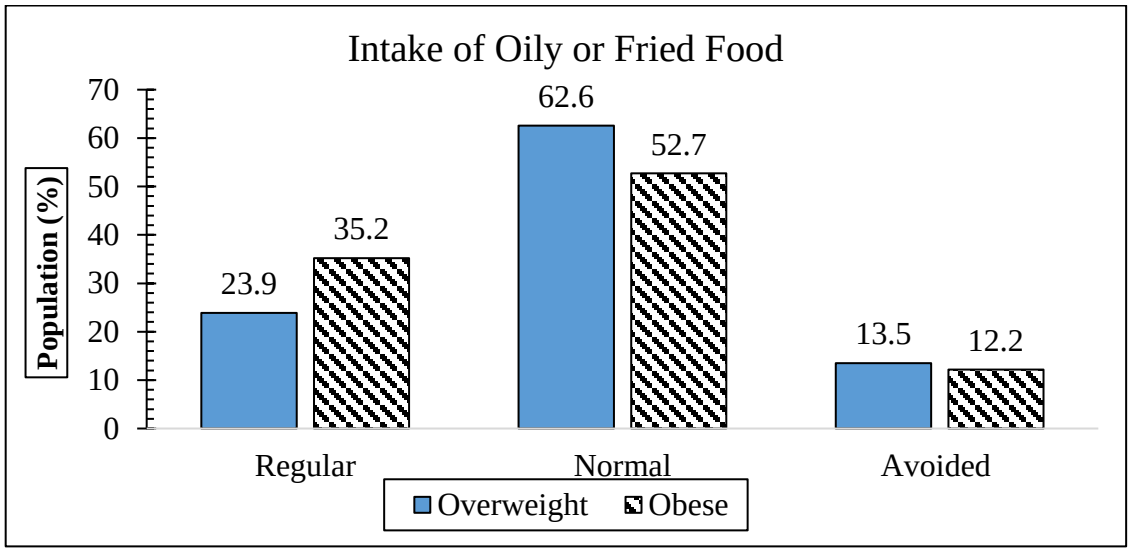

Fig.2: Comparative bar diagram of oily or fried food among Overweight and Obese respondents

DISCUSSION

The aim of this study was to achieve a better understanding about dietary behaviour of overweight and obese respondents. According to Tripathy and colleagues (2016) urban lifestyle is being passing out in rural areas. They stated that there were no significant differences of dietary habits, physical activity and obesity in the contemporary urban and rural dwellers.

According to World Health Organisation (WHO), dietary behaviour is a determinant is for increasing body weight, hence resulting into overweight and obesity (WHO 2015). Intake of spicy and fried or oily foods works as a mediator for obesity (Steyn et al 2011; Guallar-Castillón et al. 2007; Yang et al 2019). High consumption of fruits and vegetables were associated with a lower risk of being overweight and obese and it was confirmed that dietary patterns are responsible for developing obesity (Guallar-Castillón et al. 2007; Croezen et al 2007; Steyn et al 2011; Han et al 2010; (Alshanqiti, 2019); Xu et al 2019; Marathe et al., 2020; Tripathi, & Gautam, 2022).

Furthermore, the culture of street food is growing very fast which was one of the reasons for increasing obese conditions (Steyn et al 2011; Sousa et al 2021). Basically, the street food culture promotes high calorie foods such as: soft drinks, junk food (fine flour, Cheese, butter-made products etc), sweets/ candies/chewing gums/chocolates, potato chips/popcorn/ etc. which are very harmful for the metabolism and which results into overweight and obesity (Whitney and Rolfes 2007; Marathe et al., 2020).

In the present study, it was found that obese respondents are ~12% more non-vegetarian as compared to the overweight (Table 5). According to Newby et al (2005) the vegan respondents have less risk of increasing overweight and obese as compared to omnivorous. But, here the non-vegetarian are not a vegan. They consume many animal products like milk, butter, curd, honey etc. only they avoid to eat chicken, fish and meat due to religious or other taboos.

Increasing bodyweight and obesity is determined by several factors viz. Gender (Mickle, et al 2006; Thakur and Gautam 2015; Kumar and Gautam 2015; Cooper et al 2021; Pan et al 2021; Sen and Guatam 2022), Age (Mc-Tigue, et al 2006; Díaz et al 2009; Canning, et al 2013; Tripathi, and Gautam, 2022; Sen and Gautam 2022)sleep patterns (Gupta et al 2002; Taheri et al 2004; Tremblay andChaput 2008; Baron et al 2011; Patel et al 2014), depression and psychosocial problems (Roberts et al 2003; Herva et al 2005; Askari et al 2013; Blasco et al 2020), chronic diseases and use of drugs (Fujioka 2002; Warren and Gold 2007; Morrish et al 2011;) change in occupation and income (Asiseh and Yao 2016; Eum and Jung 2020; Li et al 2021; Pan et al 2021; Sen and Gautam 2022). Traversy and Chaput (2015) have reported that too much eating and drinking habit may results in gluttony.

The prevalence of alcohol consumption for overweight was found 22.8 % higher as compared to obese (20.1%). Sakurai et al (1997); Holloway et al (2011) concluded that drinking of alcohol and obesity are not associated. However, obesity and alcoholism are associated (Croezen et al 2007; Alcácera et al 2008; Wang, 2010 Traversy and Chaput 2015: Golzarand et al 2021 and Kim et al. 2021).

Further, the habits of smoking and tobaccoism were statistically associated with overweight but not with obesity (Ginawia et al 2016; Sturm 2002). Quitting of smoking is still responsible for the gain of weight (Williamson et al 1991 and Bush et al 2016) Obesity was most prevalent among the ex-smoker as compared to current smoker (Rodu et al., 2004). Here, in the present investigation, it was found that the prevalence of smoking habits was found higher 15.7 % for overweight respondents as compared to obese (11.3 %). Similar findings were seen in case tobacco chewer, as it was higher among overweight (42.3%) than the obese (33%).

However, in the present study, it was observed that the individuals with overweight was taller (158.95±9.45 cm) as compared to the obese (157.59±9.14 cm) the t-test had found statistically significant ($t= 2.311$, $df= 998$, $p\leq 0.05$). Findings from some other studies also indicated that the short-stature is associated with obesity (Adak et al 2006; Gautam et al 2006; Bosy-Westphal et al. 2009; Sperrin et al. 2015; Ferreira, et. al. 2017;) as well as, the BMI and sitting height were significantly correlated with each other (Norgan, 1994; Bogin& Beydoun, 2007, Abou-Hussein et al 2011; Marcato et al 2014; Kumar and Guatam 2015). The finding of present study corroborate with previous studies. Eating behaviours are found associated with obesity.

CONCLUSION

In this present study, it was found that the aged respondents were more prone to obese as compared to their young counterparts. The study also revealed that overweight participants were taller than obese. Consumption of alcohol, smoking and chewing of tobacco were more prevalent among overweight participants in urban areas. A small percentage of overweight (13.7%) and obese (11.5%) participants are regularly consume street foods, which is also statistically significant. The study shows, participants who consume non-vegetarian diet, fried and oily foods are more prone to be obese.

Ethical statements:

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3) **Availability of data and Materials:** The data and material is available with the first authors' and would be produced whenever it is required.

4) **Authors' Contribution:** The study was conducted in the supervision of senior author RKG. The design of study and its statistical part was devised and taken care by him. The logistic and mediator for data collection in district Sagar, Madhya Pradesh state, India was managed by RKG and BKS. The data collection analysis and preparation of first draft was carried out by BKS. Plan of analysis and the draft of the manuscript was devised by RKG and finally it is approved by both the authors (RKG and BKS).

5) **Conflict of Interest:** There is no conflict of interest.

6) **Consent of publication:** This manuscript do not contain any such material/data/information which require publication consent.

7) **Ethical Approval:** This study is approved by Institutional Ethical Committee (IEC) of Dr. Harisingh Gour Vishwavidyalaya (A Central University), Sagar Madhya Pradesh, India vide Approval Number: ***DHSGV/IEC/2021/08 Dated.11/07/2022***.

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