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Nutritional Status of Slum Population Based on Body Mass Index (BMI) of Jammu City, J&K

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ABSTRACT

The expansion of cities has at all times come up with the growth of slums. In the developing nations, more than 900 million people are residing in slums. In India, almost one in every six urban residents lives in a slum. The census of 2011 reveals that about 1.37 crore households or 17.4 percent of urban Indian households lived in slums. It is usually assumed that slum residents have poorer health status. The present study has been conducted in the slums of Jammu city. The main objective of this paper is to examine the anthropometric characteristics and analyze the nutritional status of slum population based on Body Mass Index (BMI).

KEYWORDS: - Slums, Urban, Residents, Anthropometric, Nutritional status, Body Mass Index.

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1. INTRODUCTION

Urbanization poses numerous socio-economic troubles for cities in India and one amid them is the increase of slums. A slum is a municipal dwelling; portray substandard living and working environment, deficient in cleanliness, safe drinking water and other basic services. It is usually presumed that urban slum inhabitants have poorer quality of health conditions when compared with other urban people. Slums are characterized by deteriorated, congested, unhygienic or perilous structures that put in danger community wellbeing. Slums are generally inhabited by poor and diverse people. Life in a slum setting can comprise negative impact on dwellers' health status, together with apparent weaken nutritional status. Insufficient earnings, poor housing setting, teeming environment, pitiable sanitation, job-related risk and distressing circumstances are unpleasant to the fitness of residents in the slums.

The census of India 2011 revealed that about 65.5 million people lived in slums as compared to 42.6 million in 2001. This comprised 17.4 percent of the urban residents of the states/ union territories in 2011. The slum population is not uniform among the states of India. The leading among them is Maharashtra which accounted for 11.8 million slum residents which is 18.1 percent of the total slum population of the country followed by Andhra Pradesh (10.2 million), West Bengal (6.4 million) and Uttar Pradesh (6.2 million). At the same time, the states of Andhra Pradesh, Chhattisgarh, Madhya Pradesh, Maharashtra, Odisha, West Bengal, Sikkim, Jammu & Kashmir and Haryana had higher percentage of slum residents than the national average. In addition, these nine states have registered high slum concentration than urban concentration[1].

The Slum free city action plan of J&K defined slum as an adjacent area with 10-15 households having Slum resembling distinctiveness recognized as :-

I. Major roof material should be other than concrete.
II. Accessibility of drinking water facility should not be within premises of the census house.
III. The availability of latrine is not within the premises of the census house.
IV. No drainage facility or open drainage.

The urban population of Jammu and Kashmir State has registered unparalleled increase of 98.4 percent as compared to the national average of 64.2 percent through the previous two decades. Jammu and Kashmir is the highly urbanized state among the hilly states of India with 81 notified urban areas. The cities of Srinagar and Jammu are the central spots of urbanization. This increase in urban population puts larger pressure on urban infrastructure, particularly housing area along with other civic facilities. In Jammu division, 100 percent of slums are situated on private property whereas in Kashmir division, about 93 percent of slums are found on private land and 7 percent of slums are placed on other public land. An additional significant reality is that 89 percent of slums in

Urban J&K are bounded by residential areas while only 66 percent of slums at all India level are enclosed by residential areas. In Jammu division 60 percent of Slums are encircled by residential areas and 40 percent of slums are bounded by industrial areas and at the same time, in Kashmir division, 92.5 percent of slums are surrounded by residential areas and nearly 7.5 percent of slums are enclosed by commercial areas[2].

Shukla et al. (2002) examined the body mass index of the urban adult population in Mumbai. The participants for the study include 99598 adults and found that 19 percent of men and women were thin and about 19 percent of men and 30 percent of women were overweight[3]. Anuradha et al. (2011) studied prevalence of overweight and obesity among women aged 20 years and above in an urban slum of Chennai. The results showed that the occurrence of overweight was 27.7 percent and prevalence of obesity was 19.8 percent[4].Hassan & Shukla (2013) investigated the nutritional status of women living in slums of Allahabad city of Uttar Pradesh. They found that incidence of thinness is high in slum women (31.7 percent) in addition to 71.2 percent of slum women are anemic and suggested that an proper diet package should be provided to improve the nutrition status of the slum communities[5].

Haque et al. (2014) assessed the nutritional status of the women dwelling in Monipur slum of Dhaka city of Bangladesh by interviewing 95 participants. The study showed that 13.68 percent respondents were underweight, 82.11 percent were normal and 4.21 percent were overweight[6]. Ahmed etal. (2017) studied association of body mass index with some of the risk factors of cardiovascular diseases in the age group of 45 years and above in urban slums of Dibrugarh town of Assam. They observed that hypertension was higher in females which is about 46.3 percent than males having 43 percent, while diabetes was predominant amongst males 18 percent than females 12.04 percent. A BMI of 18.5 -22.9 was found among 33.17 percent of the study participants[7].

Anthropometric assessment is an almost compulsory instrument in every research to evaluate health and nutritional status and body mass index (BMI) is a valuable anthropometric indicator of determining nutritional conditions of the people. Therefore, there is an imperative necessity to assess the nutritional status of the slum population. Thus, the current study is an attempt to examine the nutritional status of slum dwellers of Jammu city by using body mass index. Physical measurements like body weight and height have been widely used to describe health and nutritional condition of the population.

2. STUDY AREA

Jammu city also known as the city of temples is located in the south western part of Jammu and Kashmir State. The city extends between 32° 44' and 32° 73' North latitude and 74° 52' and 74°

87' East longitude. The total area of Jammu district is 2,492 sq. km. It lies in sub- mountainous area at the foothills of the Himalayas with altitude varies from 320 metres to 1675 metres above sea level. Administratively, the district encompasses four tehsils namely, Jammu, Ranbir Singh Pura, Akhnoor and Bishnah. Jammu city is located on the bank of Tawi river at an elevation of 1030 feet above mean sea level[8].

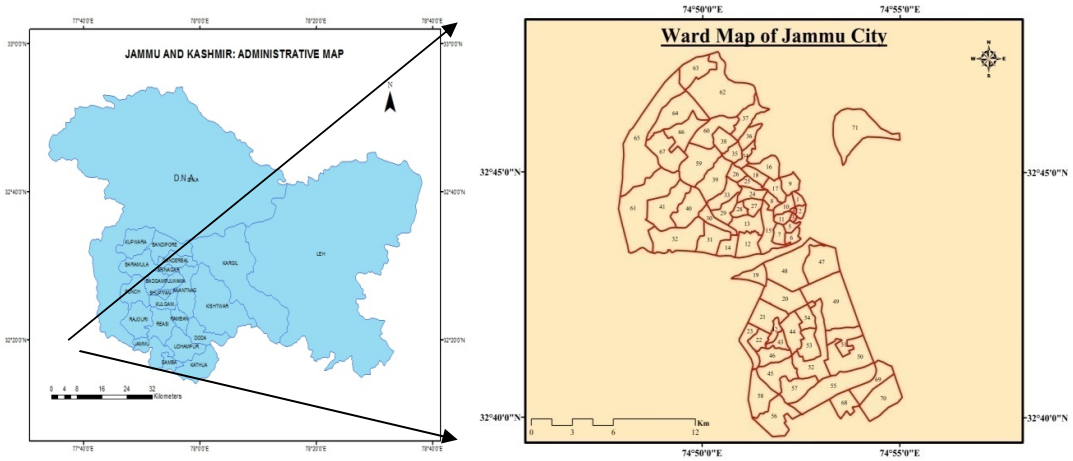

Fig. 1 Location of study area

3. OBJECTIVES

i. The current study is an attempt to assess the nutritional status of residents of two chosen slums of Jammu city based on body-mass index.

ii. To estimate the occurrence and severity of thinness and overweight among participants.

4. MATERIAL AND METHODOLOGY

The present study is purely based on primary survey. The respondents were surveyed by door to door visit. Eligible persons were clarified about the purpose of the study and permission was sought from every participant before interview and physical examination. A predesigned schedule has been used to collect information on socio- demographic and anthropometric variables. A cross sectional study was conducted on a sample of 152 slum dwellers of Qasim Nagar and Kalka colony of Jammu city consisting of 73 men and 79 women above 15 years of age. Data concerning height, body weight, age, education and religion was obtained by predesigned schedule. Anthropometric measurements were recorded by collecting data on height and weight. Portable weighing machine has been used for recording weight and height was computed by a measuring tape. The Body Mass Index (BMI) was calculated by following formula given by WHO[8]:-

$$BMI = \frac{\text{Weight (Kg)}}{\text{Height (mt}^2\text{)}}$$

After calculating Body Mass Index (BMI) of the participants, the nutritional status was determined by BMI classification of World Health Organization (WHO) and respondents were categorized into underweight, normal, overweight and obese.

Table No. 1: **BMI classification by WHO**

BMI classification	BMI category
Underweight	< 18.5
Normal	18.5-24.9
Overweight	24.9-29.9
Obesity	> 29.9

Source: WHO, 1995

Sample size and sampling method

About 152 samples were selected purposively to carry out the present study. A sample of 10 percent has been chosen for the current study. The following table depicts the gender composition of the sample size.

Table No. 2: Sample size of the study group

Slum	Sample Size (n)	Sex wise distribution	
		Males	Females
Qasim Nagar	73	32	41
Kalka colony	79	41	38
Total	**152**	**73**	**79**

Source: - Primary survey, 2018

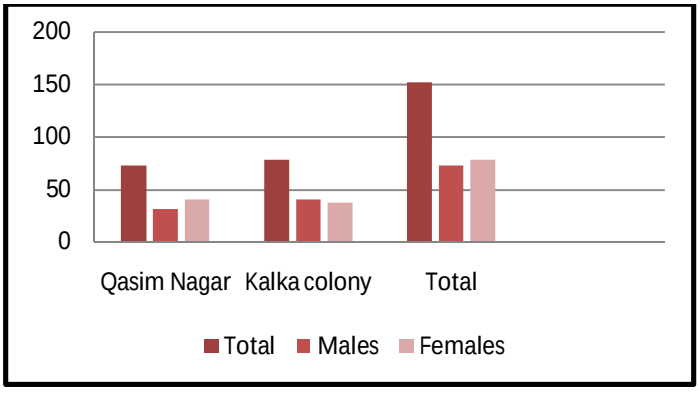

Fig. 2 Sample size of the study group

5. RESULTS AND DISCUSSIONS

The study population of 152 respondents encompasses 48.02 percent males and 51.97 percent of females. The majority of the participants were Hindu by religion (68.42 percent) and rests of the respondents were Muslim (31.57 percent).

Table No. 3: Socio- demographic profile of participants

Variables		Frequency	Percentage
Sex	Male	73	48.02
	Female	79	51.97
Religion	Hindu	104	68.42
	Muslim	48	31.57
Literacy Level	Illiterate	66	43.42
	Primary	28	18.42
	Middle	27	17.76
	High	24	15.78
	Higher Secondary	6	3.94
	Graduate & Above	1	0.65
Per capita Income(Rs.)	No income	56	36.84
	Less than 5000	32	21.05
	5000- 10000	57	37.5
	More than 1000	7	4.60

Source: - Primary survey, 2018

As far as literacy of the participants is concerned, nearly 43.42 percent of the respondents were illiterate. About 56.57 percent participants were literate out of which 18.42 percent had primary school education, 17.76 percent had middle school education and 15.78 percent of the respondents had high school education. The percentage for higher secondary school education was 3.94 percent and only one respondent was reported as graduate, which was 0.65 percent of the total studied population. It is clear from the data that illiteracy is prevalent among the slum dwellers and the higher percentage among literate population come from primary education which is 18.42 percent. The number of respondents goes on decreasing towards higher education. This is mainly due to low income, which leads to poverty. The slum dwellers are mostly migrated people hailing from different states of India in search of livelihood. Their main purpose is to get a source of income rather than education.

Table No. 4: State wise distribution of respondents

State	Sex	Frequency	Total
J&k	M	24	45
	F	21	
Bihar	M	9	23
	F	14	
Punjab	M	1	5
	F	4	
Delhi	M	2	9
	F	7	
Chhattisgarh	M	7	15
	F	8	
Madhya Pradesh	M	1	1
	F	-	
West Bengal	M	1	6
	F	5	
Maharashtra	M	1	3
	F	2	
Haryana	M	12	16
	F	4	
Odisha	M	-	1
	F	1	
Assam	M	1	2
	F	1	
Rajasthan	M	6	8
	F	2	
Uttar Pradesh	M	2	4
	F	2	
Tamil Nadu	M	3	4
	F	1	
Myanmar	M	3	10
	F	7	
Total			**152**

Source: - Primary Survey, 2018

To study the economic status of the participants, the monthly income of the respondents has been categorized into no income, income less than 5000, between 5000-10000 and above 10000. Table no. 3 showed that about 36.84 percent of the participants have no source of income and this group consists of aged parents and housewives who had migrated with their husbands. A total of 32 participants have an income of less than 5000 which is 21.05 percent of the total studied population. About 37.5 percent and 4.60 percent participants had an income of 5000-10000 and above 10000 per month respectively. The lower percentage for income above 10000 is largely due to the fact that most of them are working as unskilled laborers in industries.

For the present study WHO categories have been used to analyze the nutritional status of the participants. Table 5 clearly depicts that 13.0 percent respondents were underweight, 60.0 percent of the study participants had a normal body mass index of 18.5 -24.9. While 19.0 percent of respondents were overweight and 8.0 percent were obese. The reasons for underweight may be

attributed to low level of economic activity which results in less income and as a consequence, slum people do not take nutritious diet which ultimately affects their health status.

Table No. 5: Distribution of respondents according to BMI classification

BMI Category	No. of Respondents	Percentage
Underweight	20	13.0
Normal	91	60.0
Overweight	29	19.0
Obesity	12	8.0
Total	**152**	**100**

Source: - Primary Survey, 2018

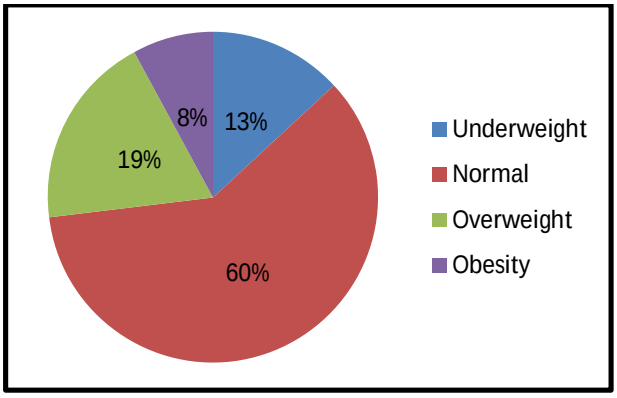

Fig. 3: BMI status among study group

On the other hand, table 6 showed that among males (n= 73), 17.80 percent were underweight, 61.64 percent were normal, 17.80 percent were overweight and 0.02 percent were obese. At the same time, among the female participants (n=79), 8.86 percent were underweight which is lower than the males percentage. Thus the present study shows that under nutrition was notably more widespread in males than females. The percentage for normal BMI among females was 58.22 percent. Overweight females comprise about 20.25 percent, higher than the males and nearly 12.65 percent females were obese. The study showed that there is increasing incidence of overweight and obesity amongst the slum women. The reasons for obesity can be attributed to less physical activity, insufficient fruit intake and television viewing for larger period. Gender based BMI showed that larger percentage is shared by normal category. In addition, females had higher percentage for obese category as compared to men.

Table No.6: Sex wise distribution of respondents according to BMI classification

BMI classes	Males %	Females %
< 18.5	17.80	8.86
18.5- 24.9	61.64	58.22
24.9-29.9	17.80	20.25
>29.9	0.02	12.65

Source: - Primary Survey, 2018

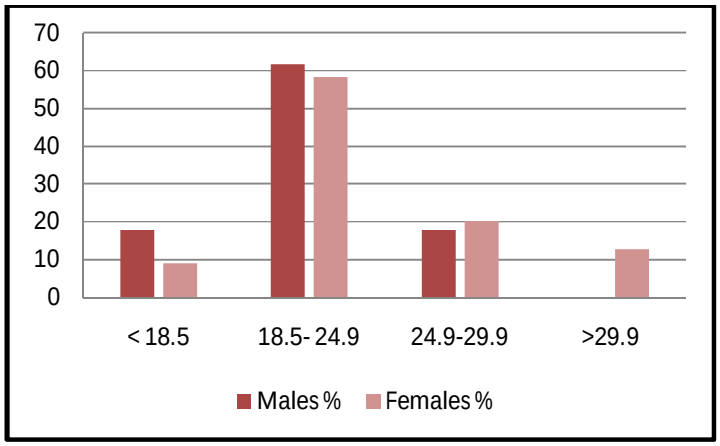

Fig. 4: BMI among Males and Females

Table No.7: Percentage prevalence of underweight, normal, overweight and obesity among Qasim Nagar slum population.

QASIM NAGAR	Underweight %age	Normal %age	Overweight %age	Obese %age
J&K	13.04	60.86	21.73	4.34
Punjab		60.0		**40.0**
Delhi		75.0	20.0	
Bihar		77.77	11.11	11.11
Madhya Pradesh		**100.0**		
Chhattisgarh	**36.36**	63.63		
West Bengal	16.66	66.66		16.66
Maharashtra		**100.0**		
Myanmar		60.0		
Odisha			**100.0**	
Total % age	**10.95**	**65.75.**	**16.43**	**6.84**

Source: - Primary Survey, 2018

The nutritional status by BMI among the slum dwellers of Qasim Nagar by belonging state had been shown in the table 7. The overall percentage of underweight was 10.95 percent and higher percentage of underweight had been recorded among the respondents of Chhattisgarh state (36.36 percent), followed by West Bengal (16.66 percent) and J&K (13.04 percent). Nearly 65.75 percent of participants had normal BMI. The participants of Madhya Pradesh and Maharashtra had recorded 100 percent normal BMI. In the overweight category, about 16.43 percent respondents had a BMI of 24.9 -29.9.Odisha recorded 100 percent overweight respondents and it was lowest among the participants of Bihar (11.11 percent). About 6.84 percent of the respondents were obese having BMI of above 29.9 and higher number had come from Punjab state (40.0 percent).

Table No. 8: Percentage prevalence of underweight, normal, overweight and obesity among Kalka Colony slum dwellers.

KALKA COLONY	Underweight %age	Normal % age	Overweight %age	Obese %age
J&K	18.18	40.90	22.72	**18.18**
Delhi	20.0	60.0	20.0	
Bihar	7.14	**78.57**	7.14	7.14
Chhattisgarh	**50.0**	50.0	--	
Assam	--	50.0	**50.0**	
Rajasthan	25.0	25.0	37.5	12.5
Uttar Pradesh	--	75.0	25.0	
Tamil Nadu	--	75.0	25.0	
Haryana	6.25	62.5	25.0	6.25
Total %age	**13.92**	**55.69**	**21.51**	**8.86**

Source: - Primary Survey, 2018

Table 8 clearly reveals that more than 50 percent respondents had a normal BMI of 18.5-24.9. The respondents from Bihar state had recorded higher number of normal BMI which was nearly 78.57 percent. These people are mostly engaged in those activities which demand more physical activity resulting in the normal BMI. The data also showed that about 13.92 percent respondents of the Kalka colony were underweight and Chhattisgarh state had the higher respondents in underweight category. This may be due to poor diet resulting in BMI of less than 18.5. It is cleared from the table that 21.51 percent participants were overweight and Assam had highest overweight respondents (50 percent). Bihar state had lower percentage of overweight respondents (7.14 percent). As far as obesity is concerned, about 8.86 percent respondents were obese and J&K state had the largest share of obese population (18.18 percent).

Table No. 9: Comparison of BMI Status of Respondents of Qasim Nagar and Kalka Colony

Slum	Underweight %age	Normal % age	Overweight %age	Obese %age
Qasim Nagar	10.95	65.75.	16.43	6.84
Kalka Colony	13.92	55.69	21.51	8.86

Source: - Primary Survey, 2018

A comparison was also made between the two selected slums of Jammu city as shown in table no. 9 and it clearly depicts that the percentage of normal BMI respondents was higher in Qasim Nagar colony as compared to Kalka Colony. In all other categories of BMI, the percentage was little higher in Kalka colony.

8. CONCLUSION

The present study intended to assess the nutritional status of the slum dwellers of Jammu city by using Body Mass Index (BMI). Generally, it is assumed that slum populations have shoddier living conditions when compared with other population of rural and urban areas. They are usually incapable of satisfying their fundamental needs like meal, clothing, shelter, clean water and toilet

facilities etc. Results from the present study showed that about 59.86 percent respondents had normal BMI. The study also revealed that underweight was more prevalent in males as compared to females which is quite contrary to the earlier studies in which females are more underweight than males. In addition, females had higher percentage for both overweight and obesity due to less physical activity, inadequate fruit intake and watching television for longer duration of time. At the same time, the comparison of BMI status between two slums also revealed that underweight, overweight and obesity was more prevalent in Kalka colony slum as compared to Qasim Nagar slum whereas the percentage of normal BMI was higher in Qasim Nagar. The findings from the present study propose that health measures must be incorporated through various plans for improving the nutritional status of the slum dwellers and make available diet supplements for undernourished population.

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