

Research Article

Impact of nutritional status on stress levels in women of Uttarakhand, Northern India: Age and marital status as predictors

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Abstract: One of the significant aspect, yet partially explored in women of Uttarakhand, India, is the contribution of nutritional status in influencing their levels of stress, specifically in reference to their age and marital status. Hence, the present exploratory research was conducted on 63 women of age range 22-55years in Uttarakhand, firstly, to assess and classify the nutritional status of the women in accordance to their BMI, secondly, to assess the level of stress experienced by women in various categories of BMI and lastly, to study the effect of age and marital status as the possible predictors of variations in stress and BMI. The results revealed an increasing trend in stress with BMI, with women at the risk of obesity having maximum stress. BMI and stress were found to be significantly influenced by increase in the age and changes in the marital status.

Keywords: Age, BMI, Marital status, Nutritional status, Stress

INTRODUCTION

The multifaceted challenges concerning women's health, which in turn, influence and raise other issues like infant mortality, reproductive health, child health, nutritional status, mental health, etc. are interwoven with the several psychosocial variables which are of grave relevance to the women's existence in developing countries [1,2].

In India, it was found that, on one hand, the prevalence of chronic energy malnutrition in tribal women was significantly higher than the rural women, and on the other hand, prevalence of obesity and overweight was higher among rural women than the tribal women and was also observed that due to variations in culture, religion and levels of development among different Indian states, women's health vary from state to state [3]. On comparing the nutritional status of women in Uttarakhand and Madhya Pradesh, the prevalence of Chronic Energy Deficiency (CED) was found to be highest in Brahmin women of Uttarakhand and also demographic variables like age, family size and marital status were found to be having an impact on nutritional status of women [4]. Age has been found to influence stress [5, 6]. It is also reported that Indian women suffered high rates of malnutrition, one reason of which may be the mediating effect of psychological stress, especially in women suffering from domestic violence [7].

In a study conducted on women in Bangladesh, association between age group and proportion of underweight and obese women has been revealed as the

highest percentage of underweight and obese women falling in the age group of 15-19 years and 35-39 years, respectively [8]. In a study involving 10,145 married Bangladeshi women found over one-fourth of the women underweight, almost 58% had normal weight and nearly 14% were overweight [9], whereas, in India the prevalence of chronic energy malnutrition, overweight and obesity in ever-married women from 15-49 years of age is reported to be 31.2%, 9.4% and 2.6% respectively [10]. 42.54% women of 14 villages of Kumaun Himalayas, Uttarakhand from 15-59 years were found to be suffering from various degrees of chronic energy deficiency (CED) and only 0.74% belonged to obesity grade [11].

There are contradictions in studies revealing associations between BMI and experienced stress. A non significant relationship between body mass index (BMI) and stress scores among the Malaysian students was found [12] but at the same time high prevalence of stress has also been reported in the Indian obese students as compared to the normal weight students [13]. Also, there is a paucity of studies unveiling the influence of age and marital status on the stress levels of women and their BMI, especially, in the context of the women in Uttarakhand. Hence, the present study attempts to explore the following objectives:

- To assess and classify the nutritional status of the women in accordance to their BMI.
- To assess the level of stress experienced by women in various categories of BMI.

- To study the effect of age and marital status as the possible predictors of variations in stress and BMI.

METHODOLOGY

The present exploratory study is conducted with the following methodology:

Sampling design: A sample of 63 women were randomly taken from age range 22 years to 55 years from Dehradun, Haldwani, Kashipur, Pithoragarh and Pauri Garhwal areas of Uttarakhand state of India. Women who were pregnant and suffering from any form of physical disability and incomplete questionnaires were excluded from sampling. This reduced the likelihood of obtaining variations in the causes of stress enabling an adequate interpretation of the data.

Tools administered

- Personal Stress Source Inventory (PSSI-sss):** It is developed by Singh et al. [14]. It consists of 35 items and each item had three possible answer options, namely, seldom, sometimes and frequently. The scores describing level of stress are, namely, mild (0-30), moderate (31-79) and high (80 and above). The test-retest reliability of the tool is 0.79 and 0.68 is the concurrent validity.
- Nutritional status:** A self made questionnaire in which information related to variables under study and anthropometric details viz. height, weight were collected for the individuals of Uttarakhand and BMI was calculated as weight (kg)/ height (m²). The classification was done according to Subramanian and Kawachi [15].

Statistical design

Mean scores and percentages were employed to describe the data. T-test and analysis of variance was

applied to assess the significant difference. Pearson product moment and point bi serial correlations were used to measure the relationship between the variables.

RESULTS

The nutritional status of the subjects was assessed in terms of BMI and the women participants were classified into 5 groups namely Group A, B, C, D and E representing underweight, normal, at risk of overweight, overweight and obese subjects, respectively. Out of 63 women participants, 20.6% were found to be underweight (BMI<18.5kg/m²), 46 % were normal (BMI 18.5-22.9kg/m²), 12.7% were at risk of overweight (BMI 23-24.9 kg/m²), 17.5 % were overweight (BMI 25-29.9 kg/m²) and 3.2 % were obese (≥30 kg/m²). The mean ±SD stress scores of underweight, normal, at risk of overweight, overweight and obese subjects were 28.08± 7.35, 43.24±17.44, 54.6±15.10, 39.18±15.8 and 29±9.8, respectively. A significant difference in BMI for all the 5 groups was observed whereas for stress level a significant difference between group A and group C as well as group E and group C was seen denoting that group A and E had significantly lower stress than group C. The maximum stress scores were observed for subjects who were at risk of overweight, followed by normal subjects, overweight subjects, obese subjects and underweight subjects.

To see the effect of BMI on stress, the stress scores in all the groups were compared with scores of normal BMI subjects. The t-test results showed that Group A had significantly lower score than normal ie. underweight subjects had significantly lower stress. Comparison of Group C, D and E with Group B (normal BMI subjects) did not show statistically significant difference. Thus an increasing trend in level of stress with an increase in BMI was seen which further showed a decreasing trend with overweight and obese subjects (Table 2).

Table 1: Description of subjects according to BMI and their corresponding stress scores

Group	BMI range (kg/m ²)	Number of subjects	BMI* (kg/m ²)	Stress Scores*	Mean age	Marital status (%)	
						Unmarried	Married
A	< 18.5	13	17.24±0.69	28.08±7.35	23.31	84.6	15.4
B	18.5-22.9	29	20.55±1.14	43.24±17.44	29.86	44.8	55.2
C	23-24.9	08	23.8±0.57	54.63±15.10	36.12	12.5	87.5
D	25-29.9	11	25.72±0.564	39.18±15.8	37.9	9.1	90.9
E	≥30	02	31.2±0.0	29±9.8	47.5	0	100
CD at5%			1.47	24.63			

*mean±SD, CD= Critical difference at p<0.05

Table 2. Stress in various categories of BMI in comparison to the normal BMI subjects

Group	BMI* (kg/m ²)	Stress Scores*
A	17.24±0.69	28.08±7.35 ^a
B	20.55±1.14	43.24±17.44 ^b
C	23.8±0.57	54.63±15.10 ^b
D	25.72±0.564	39.18±15.8 ^b
E	31.2±0.0	29±9.8 ^b

*mean±SD, The figures with different superscript show statistically significant difference.

In order to uncover the possible reason for bell shape deviation in level of stress with increase in BMI, age and marital status of the subjects were further studied as possible predictors. It was seen that as the age of the subjects increased, the BMI increased. Also the higher stress score was observed for the subjects in the age range of 30-38 years. This is the age when Indian women undergo lot of transformation in their life and needs to make maximum adjustments. Various activities viz. marriage, adjustment with new environment, parenthood, adjustment with in-laws, financial stress etc. may be factors contributing to the stress in this age group.

With the augmentation in percentage of married women, the BMI increased. A high percentage (84.6%) of unmarried women reported significantly lower level of stress scores. The stress level increased as the proportion of married women increased, but decreased in the Group E, probably due to attainment of stability in life as these women reported more than 20 years of marriage.

The correlation of age and marital status with BMI as well as stress level was studied and a significant positive correlation was revealed for age and BMI as well as stress. The marital status also significantly influenced the BMI and stress (Table 3).

Table 3: Association of BMI and Stress with age and marital status

	Age(r)	Marital status(r _{pb})
BMI	0.648**	0.5**
Stress	0.3394**	0.39**

** Significant at < 0.01 %

DISCUSSION

In the present study we have evaluated that underweight subjects had significantly lower stress, which increased as the BMI increased, with maximum stress level for women who were at the risk of being overweight. The observations are in line with other study [13] in which a similar association between BMI and stress was seen.

Further age and marital status were studied as the possible factors influencing the BMI and stress levels. The increase in BMI with increase in age was observed which may be due to increase in weight with time [16] and also the increase in BMI with increase in marital status was seen which was alike to the observations by another study [17]. The increase in BMI with marital status was attributed to increase in social activities and decrease in physical activities after marriage [18]. A research [19] revealed that married subjects and subjects in the age range of 31-35 experienced higher stress than unmarried and those in the age range of 26-30 as well as 36-40 years. This is in support of our results in which the level of stress was highest for the women subjects in the age group of 30-36, which further decreased in the age range of 38-48, probably because women in the age range of 40-60 were found to be better in coping strategies as compared to women in the younger age [20]. Married women with children at home, experience higher level of stress which is true as in our study as the Group A with highest percentage of unmarried women with no children faced lowest degree of stress [21]. Older (more than 30 years) and married people suffer more degree of stress due to work/home conflict [22] and greater responsibilities [23].

CONCLUSION

The current study revealed that BMI has an impact on level of stress in women. The women at risk of being overweight had highest level of stress. The underweight women had significantly lower score for stress than women with normal BMI. Both age and marital status of women significantly influenced the BMI and stress level. However since this has been an exploratory research, further researches are required to validate the findings with larger sample. Moreover paucity of researches pertaining to BMI and stress levels in Uttarakhand region opens new avenue for conducting studies in this arena in the region.

REFERENCES

1. Paul VK, Sachdev HS, Mavalankar D, Ramachandran P, Sankar MJ, Bhandari N, Sreenivas V et al.; Reproductive health, child health and nutrition in India: Meeting the challenge, *Lancet*, 2011; 377(9762): 332-349.
2. D'Souza MS, Karkada SN, Somayaji G; Factors associated with the health- related

- quality of life among Indian women in mining and agriculture. *Health and Quality of Life Outcomes*, 2013; 11(9). From: <http://www.hqlo.com/content/11/1/9>.
3. Rao MK, Balakrishna N, Arlappa N, Laxmaiah A, Brahmam GNV; Diet and nutritional status of women in India. *J. Hum. Eco.*, 2010; 29(3): 165-170.
 4. Gautam RK, Thakur R; Biosocial correlates of nutrition and chronic energy deficiency among adult females of two ecological zones in Madhya Pradesh and Uttarakhand, India, *Mal. J. Nutr.*, 2009; 15(2): 137-153.
 5. Balakrishnamurthy C, Shankar S; Impact of age and level of experience on occupational stress experienced by non gazetted officers of the central reserve police force, *Industrial Psychiatry Journal*, 2009; 18(2): 81-83.
 6. Balasubramanian V, Chokalingam M; A study of stress and depression experienced by women IT professionals in Chennai, India, *Psychology Research and Behavior Management*, 2009; 2: 81-91.
 7. Ackerson LK, Subramanian SV; Domestic violence and chronic malnutrition among women and children in India, *Am J Epidemiol.*, 2008; 167(10): 1188-1196.
 8. Hossain MG, Bharti P, Aik S, Lestrel PE, Abeer A, Kamarul T; Body mass index of married Bangladeshi women: Trends and association with socio-demographic factors, *J. Biosoc. Sci.*, 2012; 44(4): 385-399.
 9. Kamal SMM, Islam MA; Socio-economic correlates of malnutrition among married women in Bangladesh, *Mal. J. Nutr.*, 2010; 16(3): 349-359.
 10. Bharti S, Pal M, Bhattacharya BN, Bharti P; Prevalence and causes of chronic energy malnutrition and obesity in Indian women, *Hum. Bio.*, 2007; 79(4): 395-412.
 11. Pant BR; Women and nutrition in Himalayan region: A case study, *ENVIS Bulletin: Himalayan Ecology*, 2008; 16(1): 23-32.
 12. Saat NZM, Ishak I, Lubis SH, Wen SH, Suriyane Mohd SNL, Zakaria NS, Ee TX, et.al.; Stress and its relationship with body mass index among biomedical science students in Kuala Lumpur, Malaysia, *ASEAN Journal of Psychiatry*, 2010; 11(2). From: www.aseanjournalofpsychiatry.org/pdf/ASEAN_110209.pdf
 13. Chitnis P, Rane N, Vij V, Gupta VK; Influence of stress on obesity, *International Journal of Pharmacy and Biological Sciences*, 2013; 3(1): 355-359.
 14. Singh AK, Singh AK, Singh A; Personal Stress Source Inventory (PSSI-sss), National Psychological Corporation, Agra, 2005.
 15. Subramanian SV, Kawachi T; Income inequality and the double burden of under- and overnutrition in India, *J. Epidemiol. Community Health*, 2007; 61(9): 802-809.
 16. Reas DL, Nygard JF, Svensson E, Sorensen T, Sandanger I; Changes in body mass index by age, gender and socio-economic status among a cohort of Norwegian men and women (1990-2001), *BMC Public Health*, 2007;7: 269
 17. Lipowicz A, Gronkiewicz S, Malina RM; Body mass index, overweight and obesity in married and never married men and women in Poland, *Am. J. Hum. Biol.*, 2002; 14(4): 468-475.
 18. Averett SL, Sikora A, Argys LM; For better or worse: Relationship status and body mass index, *Econ. Hum. Biol.*, 2008; 6(3): 330-349.
 19. Chandra Mohan A, Balaji KD, Kishore Kumar T; An empirical study on stress levels among software professionals in the city of Chennai India, *Abhinav*, 2013; 2(5): 33-40.
 20. Chaturvedi M, Purushothaman T; Coping behavior of female teachers: Demographic determinants, *Industrial Psychiatry J.*, 2009; 18(1): 36-38.
 21. Luecken LJ, Suarez EC, Kuhn CM, Barefoot JC, Blumenthal JA, Siegler IC, Williams RB; Stress in employed women: impact of marital status and children at home on neurohormone output and home strain, *Psychosomatic Medicine*, 1997;59(4): 352-359.
 22. Vokic NP, Bogdanic A; Individual differences and occupational stress perceived: a Croatian survey. FEB- working paper series paper no. 07-05, University of Zagreb, Croatia, 2007.
 23. Beena C, Poduval PR; Gender differences in the work of executives. In: Nayak J; Factors influencing stress and coping strategies among the degree college teachers of Dharwad city, Karnataka, Masters' thesis submitted to the Department of Family Resource Management, College of Rural Home Science, University of Agricultural Sciences, Dharwad, 2008: 10.