

Relationship of food consumption with eating behaviours of professional women

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■ **ABSTRACT** : A cross-sectional study was conducted to study the relationship of food consumption frequency on eating behaviours (cognitive dietary restraint, uncontrolled eating and emotional eating) among women. Food consumption frequency score and eating behaviours were determined among one hundred professional women engaged in teaching (30-59 years old) across five colleges of Jalandhar city of Punjab. The older age groups *i.e.* 40 to 49 and 50 to 59 years reported significantly ($p \leq 0.05$) high scores of disinhibition whereas, young age group (30-39 years) reported high scores for cognitive dietary restraint. Uncontrolled eating had a positive and significant ($p \leq 0.05$, 0.01) correlation with consumption frequency of traditional snacks, western snacks, egg, meat and fish and eating out among the 30-39 years age group. While in the subjects aged 40-49 years, uncontrolled eating was significantly correlated ($p \leq 0.10$, 0.05) with higher consumption frequency of snacks while emotional eating was significantly ($p \leq 0.10$, 0.05) correlated with the higher consumption frequency of snacks, egg, meat and fish as well as frequency of eating out. Cognitive restraint was significantly ($p \leq 0.10$) correlated with lesser consumption frequency of snacks. In 50-59 years group, higher consumption frequency of snacks was significantly ($p \leq 0.10$) correlated with uncontrolled eating and emotional eating while higher frequency of eating out was significantly ($p \leq 0.05$) related to emotional eating. The study concluded that eating behaviours majorly influenced the food choices of adult professional women thus, may predispose them to subsequent weight gain and development of obesity.

■ **KEY WORDS**: Cognitive dietary restraint, Uncontrolled eating, Emotional eating, Food consumption frequency, Eating out

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Eating during hunger is rewarding as well as satisfying (Gibson, 2006). Every day individuals seek to indulge in eating behaviour as a mechanism for survival, thus making decisions about which food to eat, when and in what amount (Vögele and Gibson, 2010). Eating pattern is a major aspect influencing health.

Recent researches have revealed associations between food consumption pattern and mental wellbeing (Christensen and Pettijohn, 2001). The psychological state of mind has an impact on the choice of foods made thus, render the individual susceptible to weight gain. Obesity is influenced by a range of interacting factors,

including genetic, socio-cultural but also behavioural reasons. Food choice is a complex mechanism influenced by numerous aspects which affect the human behaviour (Lindbladh *et al.*, 1996). Depending on various reasons, food choice can affect mood and *vice versa*. The association which links food choice and mood is influenced by the neuro-hormonal and psychological predispositions of an individual. Definite physiological and psychological traits influence individuals to alter the food choices, thus, affecting the eating behaviour (Gibson, 2006). Individuals frequently indulge in eating behaviours comprising cognitive restraint, emotional eating and disinhibition are highly influenced by various psychological aspects.

The term cognitive restraint refers to the conscious restriction of food intake to control body weight or to promote weight loss. Uncontrolled eating or disinhibition refers to the tendency to eat more than usual because of a loss of control over intake and emotional eating refers to inclination to overeat during distressed mood states (Karlsson *et al.*, 2000). The disinhibition and restraint food behaviours are exhibited more in women than men (Lesdema *et al.*, 2012), the disinhibition is a predictor of weight gain over time and development of adiposity (Bryant *et al.*, 2008). Researchers have noted that increased frequency of eating in terms of 'snacking' is regular in the obese where preference for sweets and fat-carbohydrate combinations were highly observed in women (Drewnowski and Hann, 1999). Emotional eating leads to increased food intake especially an increased consumption of sweets to escape from negative and unpleasant experiences (Elfhag *et al.*, 2007). The additional sugars act as an essential medium for fat as sweetness promotes increased fat intake by making the fat more palatable, therefore, energy-dense snack foods appear to reinforce greater effort to obtain it in obese than non-obese women (Saelens and Epstein, 1996). The increasing incidence of obesity in physically lesser active groups may have its roots in the urge for consumption of calorie dense foods hence, the present study was aimed to determine the relationship of eating behaviours with the consumption frequency of different food items among professional women.

■ RESEARCH METHODS

Selection of subjects:

One hundred female teachers in the age group 30-

59 years from five colleges of Jalandhar who volunteered for the study were selected. All the subjects with similar profession *i.e.* teaching job for 6-8 hours per day were further segregated into three different groups based on their age. The age categories of 30-39 years (Group I), 40-49 years (Group II) and 50-59 years (Group III) comprising of 53, 26 and 21 subjects, respectively. A written consent of the subjects to participate in the study was obtained.

Data collection:

The three-factor eating questionnaire developed by Cappelleri *et al.* (2009) was used to assess the eating behaviours. The TFEQ-R21 asks the participants to respond to 21 questions on a four-point Likert scale for items 1-20 and on an eight-point numerical rating scale for item 21. Responses to each of the items are given a score between 1 and 4. Before calculating domain scores, items 1-16 were reverse coded and item 21 was re-coded as follows: 1-2 scores as 1; 3-4 as 2; 5-6 as 3; 7-8 as 4. Domain scores were then calculated as a mean of all items within each domain *i.e.* cognitive restraint (six items), uncontrolled eating (nine items) and emotional eating (six items) with higher scores being indicative of greater cognitive restraint, uncontrolled eating and emotional eating. Food frequency was assessed through the food frequency questionnaire designed by the Harvard School of Public Health for the health professionals follow-up study which was utilized after modification as per the food pattern of Indians containing 147 items for maximal discrimination of the type of foods consumed. For the interpretation, code "0" was assigned to the response "never" upto the response code "9" which represents "6+ per day" (Harvard School of Public Nutrition, 2014).

Statistical analysis:

Mean and standard deviations for the various parameters were computed. Analysis of variance was employed using Microsoft Excel (2003) Statistical Analysis tool pack. Co-efficients of correlation (r) were also derived to determine the relationship of food frequency with the eating behaviours in professional women.

■ RESEARCH FINDINGS AND DISCUSSION

Eating behaviours comprising uncontrolled eating,

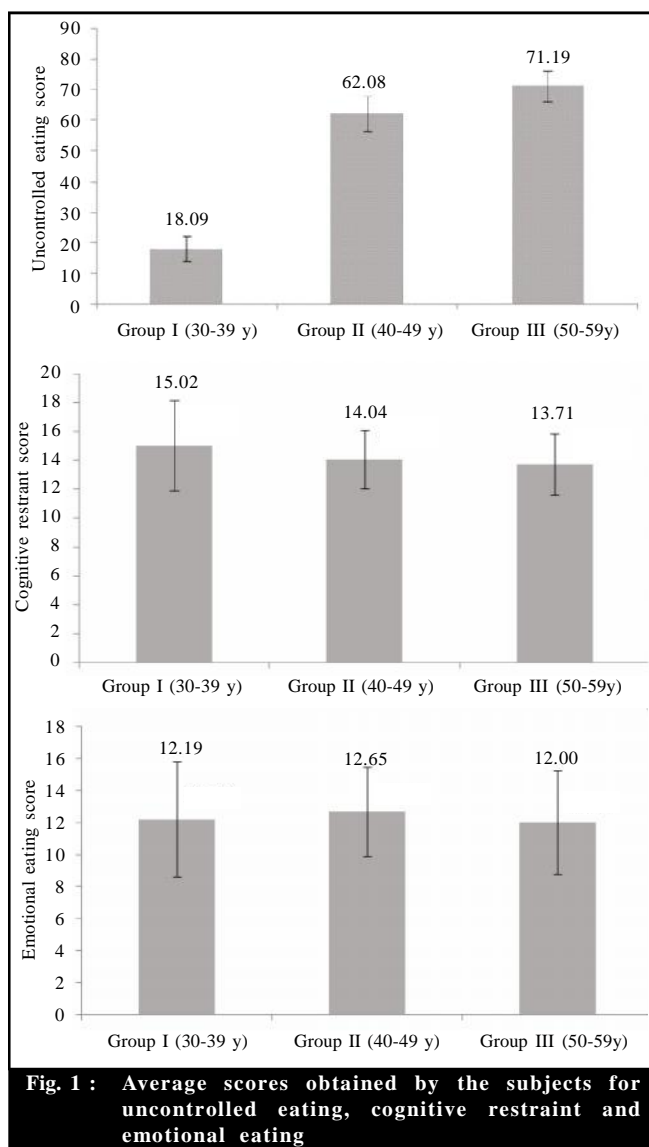
cognitive restraint and emotional eating were assessed using the Three-factor eating questionnaire (Fig. 1). Mean scores of uncontrolled eating were lowest in Group I (18.09) and highest in Group III (71.19). A significantly ($p \leq 0.05$) lower mean value of uncontrolled eating was observed in Group I in comparison to Group II and III. Mean values for cognitive restraint were 15.02, 14.04 and 13.71 for Group I, II and III, respectively. The corresponding values for emotional eating were 12.19, 12.65 and 12.00. The results revealed that cognitive restraint declined with age and uncontrolled eating subsequently increased with an increase in age, thus eating behaviours could contribute to the development of adiposity. Boschi *et al.* (2001) revealed that normal

weight and overweight women had higher values for cognitive restraint than the obese. Overeating has been associated with higher disinhibition scores and binge eating in the obese.

Various researches suggest that appetite control is highly influenced by disinhibition and cognitive restraint behaviours (Bryant *et al.*, 2010) where high disinhibition and low restraint scores reveal overeating and vice versa (Lindroos *et al.*, 1997). Modifications in the eating behaviour such as increased disinhibition scores is a cause as opposed to a consequence of body weight gain and adiposity (Fogelholm *et al.*, 1999).

The cereal consumption frequency was observed to be high in Group II in comparison to Group I and III although the difference was non-significant (Table 1). Drewnowski and Hann (1999) reported the frequencies of food consumption of university young women belonging to different ethnicities of age 20-41 years with the mean value of 19.0 for the consumption of dark breads including whole wheat, rye etc. and 17.9 and for the consumption of white bread, crackers etc. The consumption frequency score of legume items was almost similar in the three age groups, the values being 24.08, 24.24 and 24.14, respectively. Agrawal *et al.* (2014) reported the consumption frequencies of different food items in subjects belonging to the age group of 20-49 years covered under NFHS-3, 52.7% women consumed pulses and beans on a daily basis whereas 11.3% never consumed these food items.

The subjects in Group III had significantly ($p \leq 0.05$) higher consumption of roots and tuber items in comparison to the subjects in Group I. The consumption frequency score of green leafy vegetables items was higher in Group III (25.48) in comparison to Group I and II *i.e.* 21.68 and 21.77, respectively, however, the difference was non-significant. The subjects in Group III had significantly ($p \leq 0.05$) higher consumption frequency of other vegetables in comparison to Group I and II. The maximum consumption frequency score of fruits was the highest in Group III, however the difference was found to be non-significant (Table 1). Brug *et al.* (1995) reported more than half of the subjects had total vegetable consumption less than 200g each day and 32% consumed less than 150g. Average consumption of fruits was observed to be two pieces everyday and 56% reported to consume less than the same each day. Only 8% of the subjects consumed salads every day. In



a study by Agrawal *et al.* (2014), it was observed that 64.6% of Indian women consumed green leafy vegetables regularly, although 6.9% women never consumed it. Only 12.9% of the women consumed fruits everyday whereas 3.9% never consumed it. According to Tzeng *et al.* (1999) mean scores of daily vegetable consumption frequency among Taiwanese women were 2.6, 2.6 and 2.4 for the age groups 19-44, 45-64 and 65+ years, respectively and the mean scores of fruit consumption frequency were 1.1, 0.9 and 0.7 for the similar age categories.

The consumption frequency scores for animal foods such as egg, poultry, fish etc. were 2.98, 2.46 and 3.95 for the Groups I, II and III, respectively. While that of nuts and oilseeds were 15.62, 19.23 and 18.33, respectively. No significant difference in the consumption frequency scores of milk, milk products, egg, poultry, fish, nuts and oilseeds have been observed in the three age groups. Drewnowski and Hann (1999) reported the frequency of food consumption of university young women belonging to different ethnicities of age 20-41 years with the mean value of 19.4 for skim milk or buttermilk, 15.0 for cheese and 8.4 for yogurt. According to Tzeng *et al.* (1999), the average intake of milk was 0.4-0.8 times each day among Taiwanese women. Agrawal *et al.* (2014) revealed the consumption frequency of food items consumed by the women of 20-49 years covered under NFHS-3 with 40.5% women consuming milk and curd regularly, whereas, 11.3% women never consumed it. Only 3.5% women consumed eggs regularly whereas 28.9% consumed it weekly and 34.8% women reported that they never consumed it.

The consumption frequency of fish on a regular basis was noted to be 6.5% in women, whereas 22.2% women consumed it regularly and 36.9% women had never consumed it. Only 0.8% women consumed poultry on a daily basis whereas 34.7% never consumed it.

The consumption frequency score of tea with milk and coffee with milk were 7.68, 9.23 and 8.57 in groups I, II and III, respectively (Table 2). The consumption frequency score for tea and coffee was found to be higher in Group II (9.23) followed by Group III (8.57) and Group I (7.68). Though there was no significant difference in the consumption frequency score of green tea, lemon and honey as well as fruit juice among the three groups, however, the results suggested that these products were more popular among the younger age group in comparison to the two older age groups. The consumption frequency scores of summer drinks namely *Shikanjee*, ice tea, *Aam panna*, *Jal jeera*, *Kanji*, *Sharbat* and coconut water were highest in Group II (10.07) followed by Group III (8.81) and Group I (8.55). The Indian summer drinks are usually high in sugars, hence, may be a factor contributing to obesity. According to Tzeng *et al.* (1999) the mean scores of weekly sweetened beverage consumption among Taiwanese women were 1.0 and 0.6 for the age groups 19-44 and 45-64 years, respectively. The difference in preference for tea or coffee were also based on gender where women mostly consumed less than two cups of both tea and coffee as reported by Hanspal (2010). According to a study by CMEE (2014) conducted in Lucknow, 34% subjects consumed green tea daily and 83% subjects preferred packaged fruit juice over fresh juice (66%).

Table 1 : Consumption frequency score of cereals, pulses, vegetables and fruit of the subjects

Food product	Food items (no.)	Group I	Group II	Group III	Overall (n = 100)	Critical difference at 5%	
		(30 – 39 yrs) n = 53	(40 – 49 yrs) n = 26	(50 – 59 yrs) n = 21			
Mean±SD							
Cereals	22	29.28±7.86	32.11±8.27	29.47±7.57	30.06±7.92	NS	
Legumes	10	24.08±7.05	24.42±6.55	24.14±4.62	24.18±6.42	NS	
Vegetables	Roots and tubers	10	32.88±5.13	33.57±6.71	36.81±4.54	33.89±5.64	3.88
	Green Leafy	8	21.68±7.43	21.77±6.74	25.48±4.89	22.5±6.91	NS
	Other	19	53.17±8.51	51.15±8.57	61.52±13.20	54.4±10.30	6.85
Fruits	26	72.85±19.91	71.00±22.26	80.57±24.03	73.99±21.50	NS	
Milk	2	5.32±2.83	5.23±2.70	5.61±1.98	5.36±2.62	NS	
Milk products	4	12.49±3.60	12.11±3.9	13.00±4.01	12.50±3.74	NS	
Eggs, poultry, fish etc.	3	2.98±4.21	2.46±3.56	3.95±3.76	3.05±3.95	NS	
Nuts and seeds	7	15.62±9.04	19.23±9.96	18.33±7.97	17.13±9.14	NS	

Values are Mean±SD

NS=Non-significant

The consumption frequency score of traditional Indian sweet items was maximum in Group III (13.05) followed by Group II (11.35) and Group I (10.43). Contrary to this, the highest consumption frequency score for traditional snacks and western foods was maximum in Group I (13.61 and 13.32) followed by Group II (12.11) and Group III (10.52 and 10.11). The results clearly indicated that the subjects in older age category had preference for traditional sweet items while younger age group preferred traditional savoury snacks as well as

western foods. Frequency score for eating out was significantly ($p \leq 0.05$) higher in the youngest age group, the consumption frequency score being 6.01 as compared to Group II (4.31) and III (2.90). According to a study conducted by CMEE (2014) in Lucknow, 25% of the respondents went eating out every day.

The correlation co-efficients (r) between eating behaviours and food frequency were assessed (Table 3). In the youngest age group (Group I), uncontrolled eating had a positive and a significant ($p \leq 0.05$, 0.01)

Table 2 : Consumption frequency score of beverages, sweets and snacks and eating out frequency of the subjects

Food products	Food item (no.)	Group I (30 – 39 yrs)	Group II (40 – 49 yrs)	Group III (50–59 yrs)	Overall (n = 100)	Critical difference at 5%
		n = 53	n = 26	n = 21		
Mean±SD						
Tea and coffee	3	7.68±3.42	9.23±3.42	8.57±2.98	8.28±3.69	NS
Summer drinks*	7	8.55±6.41	10.07±5.51	8.81±5.02	9.84±5.88	NS
Green tea	1	2.15±2.57	2.19±2.12	1.95±2.59	2.12±2.44	NS
Lemon and honey	1	1.11±2.28	0.88±1.84	0.95±2.15	1.02±2.13	NS
Fruit juice	1	2.81±1.94	2.46±1.88	2.05±1.66	2.56±1.88	NS
Traditional sweets	8	10.43±5.71	11.35±4.28	13.05±7.36	11.22±5.81	NS
Traditional savoury snacks	8	13.61±5.53	12.11±4.48	10.52±4.26	12.57±5.13	NS
Western foods	7	13.32±6.22	12.11±3.79	10.19±3.11	12.35±5.24	NS
Eating out	8	6.01±5.86	4.31±3.14	2.90±2.78	4.92±4.87	3.36

Values are Mean±SD

NS=Non-significant

* Summer drinks included *shikanjee*, ice tea, *Aam panna*, *Jal jeera*, *Kanji*, *Sharbat* and coconut water

Table 3 : Correlation co-efficients (r) among eating behaviours and food consumption frequency among professional women

Parameter	Correlation co-efficients (r)
Group I (30-39 years)	
Uncontrolled eating	Traditional snacks (r=0.29*)
	Western snacks (r=0.52**)
	Egg, meat and fish (r=0.36***)
	Eating out (r=0.40***)
Cognitive restraint	
Emotional eating	-
	Snacks (r=0.30**)
	Egg, meat, fish (r=0.32**)
Group II (40-49 years)	
Uncontrolled eating	Snacks (r=0.33*)
Cognitive restraint	Snacks (r=-0.34*)
Emotional eating	Snacks (r=0.40**)
	Egg, meat, fish (r=0.32*)
	Eating out (r=0.31*)
Group III (50-59 years)	
Uncontrolled eating	Snacks (r=0.40*)
Cognitive restraint	Snacks (r=-0.34*)
Emotional eating	Snacks (r=0.51**)
	Eating out (r=0.44**)

*, ** and *** indicate significance of values at P=0.10, 0.05 and 0.01, respectively

correlation with consumption frequency of traditional snacks, western snacks, egg, meat and fish and eating out. Emotional eating was positively and significantly ($p \leq 0.10$, 0.05) correlated with consumption frequency of snacks and eating out. According to Lindroos *et al.* (1997), within the obese sample, strong associations were seen between energy intake and disinhibition and hunger. The association between energy intake and restrained eating was negative and weaker. Lahteenmaki and Tuorila (1995) reported that desired consumption of mostly sweet and fat-containing foods were associated with external cues. Elfhag *et al.* (2007) revealed increased consumption frequency of fruits and vegetables corresponds to high cognitive restraint scores in adults whereas emotional eating associated with a preference for sweets and soft drinks. In Group II, the uncontrolled eating was significantly correlated ($p \leq 0.10$, 0.05) with higher consumption frequency of snacks while emotional eating was significantly ($p \leq 0.10$, 0.05) correlated with the higher consumption frequency of snacks and egg, meat and fish as well as with frequency of eating out. On the other hand, cognitive restraint was significantly but negatively ($p \leq 0.10$) correlated with consumption frequency of snacks. In Group III, higher consumption frequency of snacks was significantly ($p \leq 0.10$) correlated with uncontrolled eating and emotional eating while higher frequency of eating out was significantly ($p \leq 0.05$) related to emotional eating. Cognitive restraint to eating was negatively but significantly ($p \leq 0.10$) correlated with snack consumption frequency. According to Lahteenmaki and Tuorila (1995), restraint eaters tend to reduce the consumption frequency of fat-containing foods such as spreads, mayonnaise and high-fat dairy products as well as low sugar-containing foods and preferred more of low-fat dairy products. High disinhibition favoured the consumption of cream and butter. Ruth *et al.* (2003) reported that due to urbanization people have changed their lifestyles and feed mostly on snacks. In addition, they use high amounts of fat and sugar, which predisposes them to obesity. The present study concluded that eating behaviours majorly influenced the food choices of adult professional women thus, may predispose them to subsequent weight gain and development of obesity. Customized interventions with an objective to alter behaviours would be promising for long term weight maintenance.

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