Original Article

Dietary Practices and Nutritional Profile of Female Nurses from Government Hospitals in Delhi, India

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Abstract

Background: Nursing is a demanding profession and nurses face a considerable degree of stress at work that can adversely influence their dietary practices and nutritional status. The current study was designed to conduct a preliminary investigation of the dietary practices and nutritional profile of nurses from government hospitals in Delhi. **Materials and Methods:** A cross-sectional descriptive study was carried out among 80 female nurses aged between 25 and 39 years from government hospitals. Data on demographic profile and dietary practices were gathered using a questionnaire-cum-interview schedule. Nutrient intake of the participants was determined using a 2-day 24-hour diet recall method, and adequacy of intake of nutrients was assessed using the Nutrient Adequacy Ratio approach. Weight, height, and waist circumference were recorded and the body mass index (BMI) and waist-to-height ratio (WHtR) were computed. **Results:** Findings revealed that though majority of nurses were involved in rotating shift duties in their hospitals, more than two-thirds of them had more or less appropriate dietary practices. Intake of most nutrients, except iron, vitamin A, vitamin B_{12}, dietary folate, and riboflavin ranged from fairly adequate to adequate among nearly 85% of the nurses. Approximately 70% of the nurses were categorized as overweight and obese and had a WHtR above 0.52. **Conclusions:** The study indicated that most female nurses in government hospitals in Delhi had appropriate dietary practices and nutrient intakes but still had high BMI and WHtR, which increased their vulnerability to health problems.

Keywords: *Diet, India, nurses, nutrients, nutritional status*

Introduction

Nursing is a round-the-clock profession and most nurses work weekends, holidays, and variable shifts.[1] Various studies have reported that while performing their role, nurses face multiple occupational and personal stressors that may influence their ability to engage in regular exercise and maintain positive dietary habits.[2] Nurses also report lack of time to prepare healthy meals because of long working hours and being overtired from work.[3]

Technological advancements have simplified the work and life of many health professionals leading to reduction in their physical activity levels, resulting in an increasing prevalence of overweight and obesity among them.[4] Buscher *et al.*[5] reported that high prevalence of overweight and obesity and associated health problems may lead to increased sick leaves or premature workforce exit, and hamper nurses' public health role. Moreover, poor health and lifestyle behavior exhibited by nurses may impact the credibility of their health-promotion messages as well as their nursing performance.[6,7]

Nurses represent the largest share (38%) of the total health workforce of India.[8] They are trained to take care of their patients, and very rarely consider that they themselves or others in the profession may need care.[9] It has been seen that nurses working in public hospitals are more stressed and undergo higher level of burnout and emotional exhaustion than their counterparts working in private hospitals.[10,11]

Given that nurses play an extremely crucial role in healthcare delivery and act as role models for their patients, investigating their dietary practices and nutritional status, which will eventually impact their health status will help in providing important information about their ability to carry out their nursing chores satisfactorily as well as in planning suitable interventions for them. National Family Health Survey – 3 has reported that there is an alarming increase in obesity among the Indian urban women,[12] however, there is negligible

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data on this among the Indian nurses. Owing to extreme paucity of data on dietary practices and nutritional profile of nurses in India, an attempt was made in the current study to conduct a preliminary investigation of the dietary practices and adequacy of intake of various nutrients by female nurses working in government hospitals in Delhi, India. The nutritional status of nurses with regard to their anthropometric profile was also assessed.

Materials and Methods

A cross-sectional descriptive study was carried out from October 2015 to February 2016 to gather relevant information from the nurses. There are several government hospitals in Delhi, however, in the current study, seven centrally located hospitals catering to large numbers of patients from within and outside the city employing large numbers of nurses were selected to identify the sample using purposive sampling technique. Nurses working in these hospitals who met the following inclusion criteria were invited to participate in the study; they were married and between 25 and 39 years of age, were in the nursing profession for at least 3 years, and had received their nursing training after completion of Class XII in school. Male nurses, nurses who lived in joint families, and were pregnant/lactating were not included in the study. A total of 80 nurses who consented to participate in the study were finally selected to constitute the study sample using purposive sampling technique.

A questionnaire-cum-interview schedule was designed to elicit information regarding the demographic profile of the participants and their dietary practices such as meal regularity, snacking, missing meals, eating out, and consumption of fast food. It was pilot tested and modified before being administered to the participants in a face-to-face interview by the researcher.

Nutrient Adequacy Ratio (NAR) was computed to determine the adequacy of the macro and micronutrient intake of the participants. The following formula was used to estimate the NAR of a particular nutrient: NAR = Actual intake of nutrient by the participant/Participant's Recommended Dietary Allowance (RDA) for that nutrient. The adequacy/inadequacy of a particular nutrient intake by the participants was classified as:

Inadequate intake: NAR <0.66 (intake being less than 66% of the RDA), Fairly adequate intake: NAR = 0.66 < 1.00 (intake of 66% to <100% of RDA), Adequate intake: NAR ≥1.00 (intake being ≥100% of the RDA).

An NAR of >0.66 for a particular nutrient reflects dietary adequacy because that intake meets at least two-third of the RDA. To compute the intake of energy, protein, total fat, and carbohydrates and adequacy of nutrients such as protein, calcium, iron, vitamin A, vitamin C, thiamin, riboflavin, niacin, dietary folate, and vitamin B_{12},

information regarding nutrient intake of each participant was obtained by noting down their 24-hour dietary recall for 2 days, one each for a working and a nonworking day. The participants were asked to recall and report details of dishes consumed in each meal along with their portion sizes in household measures and ingredients used in them. Standardization of various food items/dishes was carried out to obtain information about the amounts of food ingredients used in different recipes and in different portion sizes. Information obtained from the participants was translated into raw weights of food ingredients using standardized recipes, following which their total intake of various nutrients was calculated using the Indian food composition database given by the Indian Council of Medical Research (ICMR).[13] Thereafter, NAR formula was applied to determine the adequacy of intake of various nutrients by the participants and they were classified as having inadequate, fairly adequate, and adequate intakes in relation to their RDA given by the ICMR.[14] Energy intake by the participants in terms of percentage of RDA was also calculated.

Nutritional status of each participant was assessed with the help of anthropometric measurements such as weight, height, and waist circumference (WC) using standardized techniques. The participants were weighed bare feet with minimum clothing, facing straight ahead, standing relaxed, with body weight distributed evenly on both feet using a digital flat scale (Seca 813). For height measurement, a portable stadiometer (Seca 213) was used, and the participants were made to stand barefoot on the floor plate of the stadiometer, with the back of their head, shoulders, buttocks, and feet touching the measuring rod, and arms hanging loosely at the sides. The head plate of the stadiometer was moved to touch the head of the participants and the height was noted on the measuring rod. Waist circumference of the participants was measured around the smallest area below the rib cage and above the belly button using an ergonomic measuring tape (Seca 201). Based on these measurements, body mass index (BMI) and waist-to-height ratio (WHtR) of the particpants were determined. Lower BMI cutoffs have been given for Asians as they have a greater risk of noncommunicable diseases,[15] and in the current study, the classification of BMI by Misra *et al*.[15] was used to categorize the participants as underweight, normal, overweight, and obese. WHtR is considered as an effective anthropometric index to identify central obesity, even among subjects categorized as "normal" according to BMI and WC cut-offs.[16] It has been used and found to be a better predictor of metabolic complications in various studies.[16-18] WHtR is calculated as waist circumference divided by height, both measured in the same units. A single value of WHtR >0.52 irrespective of gender and area of residence can be used as a universal screening tool for identification of individuals at high risk for the development of metabolic complications;[19] and in

the current study, participants were categorized for their risk of developing metabolic complications based on this WHtR cutoff.

The data obtained from the participants were subjected to quantitative and qualitative analysis. The frequency and percentages were calculated for demographic profile, dietary practices, and NAR, BMI, and WHtR categories of the participants. Mean and standard deviations were also calculated for anthropometric measurements. Statistical Package for Social Sciences (SPSS) version 20.0 developed by IBM Corporation was used for the analysis of data.

Ethical considerations

Approval to carry out the study was obtained from the Institutional Ethics Committee (IHE/2016/2875). All the participants were given information regarding the study and they signed an informed written consent.

Results

The demographic profile of the participants has been presented in Table 1. The mean age of the participants in the study was 35.63 (4.11) years, and maximum number were Hindus. Sixty five percent of the participants lived in nuclear families and the remaining lived in extended families with their husband's father, mother, or in some cases brother/sister. Nearly three-fourths of the participants had a Diploma in General Nursing and Midwifery, and a similar percentage also reported to be working as Staff Nurses in the hospitals. The monthly family income of maximum participants was between 731–1097 USD, and data indicated that all participants belonged to middle and upper middle-income families and could afford to have a decent lifestyle. Nearly 62% of the participants had been married for more than 10 years, and a high percentage of participants had been working as nurses for more than 15 years (46.30%) or for 10–15 years (32.5%). Approximately 58.8% and 36.2% of the participants worked in the hospitals for 5 and 6 days per week, respectively, and 93.80% performed rotating shift duties, which included both day and night shifts.

The data on dietary practices of the participants is presented in Table 2. Approximately two-thirds of the sample was nonvegetarian and consumed 3–4 meals daily that comprised breakfast, lunch, evening tea, and dinner. Nearly 40% of the participants each either "always" or "sometimes" maintained regularity of meals. The small number of participants who reported that they could "never" have regular meal timings were those who felt stressed due to their rotating shift duties and could never manage to eat their meals at a fixed time every day. Skipping multiple meals was reported by one-quarter of the sample due to their busy schedules, heavy workload, and shift duties, which led to erratic meal timings. Of these, 65% of the participants reported skipping breakfast, whereas lunch and

Table 1: Demographic profile of the participants

Characteristic	Category	Frequency	Percentage
Age (years)	25-29	10	12.5
	30-34	20	25.0
	35-39	50	62.5
Religion	Hinduism	46	57.5
	Christianity	31	38.7
	Sikhism	3	3.8
Family type	Nuclear	52	65.0
	Extended	28	35.0
Educational qualification	Diploma course	59	73.8
	Bachelors degree	14	17.5
	Masters degree	7	8.7
Designation	Staff Nurse	59	73.8
	Nursing Sister	16	20.0
	Assistant Nursing Superintendent	5	6.2
Monthly family income (USD*)	366 to <731	6	7.6
	731 to <1097	53	66.2
	≥1097	21	26.2

*United States Dollars

Table 2: Dietary practices of the participants

Characteristic	Category	Frequency	Percentage
Type of food consumed	Vegetarian	22	27.5
	Nonvegetarian	51	63.7
	Ovovegetarian	7	8.8
Meal pattern	<3	26	32.5
	3-4	51	63.7
	>4	3	3.8
Regularity of meals	Never	12	15.0
	Sometimes	33	41.2
	Always	35	43.8
Skipped meals	Yes	20	25.0
	No	60	75.0
Diet to maintain/lose weight	Favored	24	30.0
	Did not favor	56	70.0
Ate outside food	Yes	72	90.0
	No	8	10.0
Snacked in between main meals	Yes	63	78.8
	No	17	21.2
Carried packed meals to workplace	Yes	71	88.8
	No	9	11.2
Frequency of fast food consumption	Weekly	21	52.5
	Monthly	12	30.0
	Rarely	7	17.5
Consumption of tea/coffee for combating stress	Yes	48	60.0
	No	32	40.0

dinner were skipped by a similar number of participants each (45%). Furthermore, 60% of the participants reported that they skipped meals once or twice a week, followed by 30% who skipped meals more often. A little more than one-quarter of the sample favored going on a diet to maintain or lose weight. Of these, 75% reported that they avoided

deep fried foods whereas 25% avoided junk foods such as chips, sweetened beverages, ice cream, confectionary, and baked products. Majority of the participants reported that they consumed outside food. However, more than half of these did so rarely (51.4%), followed by approximately 36.1% who ate out at least once a month. Approximately 80% of the participants also snacked in between the main meals, mostly after lunch or in evening. Most of them reported to be consuming fruit or fruit-based snack items or biscuits and cookies in between the main meals to satiate their hunger.

Majority of the participants carried packed meals to workplace rather than eating in the hospital canteen or in eating outlets as they preferred eating homemade food for its healthfulness and for saving money on buying outside food. More than 50% of the participants also reported that they consumed fast foods only once a week. Tea/coffee was consumed by approximately 60% of the participants to combat their work-related stress, however, the frequency of consumption was quite low by majority of them (87.4%), i.e., once or twice a day, which could be considered almost as good as normal intake. A small percentage of participants (12.6%) who consumed tea/coffee three or more times a day to combat work stress comprised those who suffered fatigue and headaches at work. Nearly two-thirds of the participants (63.7%) felt that shift duties interfered with their eating patterns and they were not always able to maintain fixed meal timings resulting in missing of meals and having digestion problems. Some participants also reported that the breaks they got between their work were too short to consume any meals properly at the workplace.

The mean macronutrient intake by the participants is presented in Table 3. Energy intake by 77.5% of the participants was more than 70% of the RDA of 1900 kcal for sedentary Indian women,[14] while 12.5% had energy intakes between 60% and 70%, and 6.3% had an energy intake of less than 50% of the RDA. The total fat intake constituted 28.3% of the mean energy intake of 1789 kcal by the participants, and the percentage calories derived from carbohydrates was 59.8%. Based on NAR, as presented in Table 4, inadequate intake of iron, vitamin A, and vitamin B_{12} was observed among more than 60% of the participants. Riboflavin and dietary folate intake was also inadequate among one-fourth of the participants. These nutrient inadequacies were mainly due to low intake of food items rich in these specific nutrients as well as due to low bioavailability of some of these nutrients in the Indian diets.[14] Vitamin C and thiamin intakes were adequate among more than 75% of the participants due to sufficient intake of green leafy vegetables, citrus fruits, and cereals by them. The intake of other nutrients such as protein, calcium, and niacin ranged between fairly adequate to adequate for more than 83% of the participants.

Table 3: Mean macronutrient intake by the subjects

Nutrient	RDA*	Mean Intake (SD)	Range
Energy (kcal)	1900	1789 (562)	657-4199
Protein (g)	55	53.0 (15.8)	22.0-94.8
Total Fat (g)	30en%**	56.4 (20.8)	10.5-131.2
Carbohydrates (g)	60en%**	267.3 (85.4)	96.4-660.0

*Recommended dietary allowances for sedentary adult woman, **Energy percent

Table 4: Distribution of subjects by their Nutrient Adequacy Ratio (NAR) for various nutrients

Nutrient	RDA*	Nutrient Adequacy Ratio Frequency (Percentage)		
		<0.66 Inadequate	0.66-<1.0 Fairly adequate	≥1.0 Adequate
Protein (g)	55	11 (13.8)	35 (43.8)	34 (42.4)
Calcium (mg)	600	13 (16.3)	36 (45.0)	31 (38.7)
Iron (mg)	21	51 (63.8)	23 (28.8)	6 (7.4)
Vitamin A (µg)	600	63 (78.8)	11 (13.8)	6 (7.4)
Vitamin C (mg)	40	5 (6.3)	12 (15.0)	63 (78.7)
Thiamin (mg)	1.0	2 (2.5)	17 (21.2)	61 (76.3)
Riboflavin (mg)	1.1	19 (23.8)	44 (55.0)	17 (21.2)
Niacin (mg)	12	12 (15.0)	39 (48.7)	29 (36.3)
Dietary folate (µg)	200	24 (30.0)	36 (45.0)	20 (25.0)
Vitamin B_{12} (µg)	1.0	66 (82.4)	11 (13.8)	3 (3.8)

*Recommended dietary allowances for sedentary adult woman

The mean weight, height, BMI, and WHtR of the participants is presented in Table 5. A wide variation among the participants was observed with regard to all anthropometric parameters. Approximately 70% of the participants were in "overweight" or "obese" category as per BMI classification by Misra et al.,[15] and the same percentage (70%) also had WHtR above 0.52, which indicated that these participants were at a greater risk of developing chronic degenerative and metabolic complications [Table 6].

Discussion

The present study made a preliminary attempt to determine the dietary practices and nutritional status of female nurses working in government hospitals of the capital city of India as there is very limited information available on these aspects. Several studies from other parts of the world have hypothesized that nurses' working patterns predispose them to faulty eating habits,[1-4] however, the present study demonstrated that though majority of nurses working in government hospitals in Delhi were involved in rotating shift duties in their hospitals, more than two-thirds of them had more or less appropriate dietary practices as they followed a regular meal pattern daily comprising three to four meals, did not skip meals or favored going on a diet to lose weight, and carried home-cooked meals to workplace as they considered home-cooked meals to

Table 5: Anthropometric profile of the participants

Anthropometric parameter	Mean (SD)	Range
Weight (kg)	63.09 (10.52)	37.00-91.00
Height (cm)	158.10 (5.73)	142.80-175.00
BMI* (kg/m^2)	25.20 (4.10)	16.40-40.20
WHtR**	0.55 (0.08)	0.39-0.79

*Body mass index, **Waist to height ratio

Table 6: Distribution of participants according to BMI and WHtR classification

Anthropometric index	Category	Frequency (Percentage)
BMI* (kg/m^2)	Underweight (<18.0)	2 (2.5)
	Normal (18.0-22.9)	22 (27.5)
	Overweight (23.0-24.9)	15 (18.8)
	Obese (>25.0)	41 (51.2)
WHtR**	≤0.52	24 (30.0)
	>0.52	56 (70.0)

*Body mass index, **Waist to height ratio

be healthier than food cooked outside. Most of the nurses snacked on healthy fruit-based items between their main meals, and their frequency of eating outside food as well as fast foods was not high. These findings were in contrast with those of a recent study on hospital nurses in Seoul, South Korea,[20] which reported that unhealthy dietary behaviors such as skipping breakfast and eating late night snacks were common among nurses involved in rotating shift schedules, and more than three-quarters of the nurses ate their meals irregularly. Another recent study by Varli and Bilici[21] on nurses in Turkey reported that mean daily number of main meals consumed by nurses in shift duties was 2.3 (0.5) and 69.6% of them skipped meals. On comparing the habits of nurses in day shifts with those in rotating shifts, they found that the frequency of eating at fast-food restaurants was higher in rotating shift workers (7.1%) than in day workers (5.6%), and that the day workers ate away from home more often in a week as compared to shift workers (5.5 times/week and 4.6 times/week, respectively). Nurses in the current study could be following healthier dietary practices due to their greater adherence to traditional, religious, and cultural values, which dissuaded them to adopt unhealthier eating practices despite their work environment and the related stress, however, this needs to be further explored.

The intake of most nutrients by the majority of nurses was also found to be fairly adequate to adequate. Iron, vitamin B$_{12}$, and dietary folate intakes were low among the nurses, which conforms to the low intake of these nutrients by the Indian women in general, making them highly vulnerable to nutritional anemia. Anemia is considered a major health problem in India, and its prevalence among females aged 15–49 years, as reported by the National Family Health Survey-3[12] is 55%. Vitamin A, another problem nutrient, which makes its deficiency a public health problem in India,[22] was also consumed in inadequate amounts by a large number of nurses. The diets of Indians are predominantly vegetarian which are either deficient or have poor bioavailability of these nutrients.[14] Therefore, it was not surprising that even the female Indian nurses had low adequacy related to these nutrients. Riboflavin intakes were also inadequate among nearly one-quarter of the nurses, which could be attributed to consumption of diets having high amounts of milled and processed food grains and low amounts of animal foods.

It was heartening to note that an extremely small number of nurses in the present study were underweight, though it was also equally worrisome to find that 70% of the nurses were categorized as overweight and obese. Similar findings were reported by Kyle et al.[23] in their study among Scottish nurses where 69.1% of the nurses were overweight or obese and the prevalence of these problems was higher among the nurses as compared to other healthcare professionals. Poor diet and low levels of physical activity are known risk factors for overweight and obesity,[24] which in turn often lead to chronic health conditions such as diabetes and cardiovascular diseases.[1] Both high BMI as well as high WHtR among 70% of the nurses in this study also indicated their greater risk to developing chronic degenerative problems. A systematic review found that shift work is associated with poorer nutritional intake and increased BMI,[25] and the findings of the present study also suggested an alarming situation where more than two-thirds of the nurses were overweight and obese though their self-reported eating practices were not unhealthy. Albert et al.,[26] in their study on nurses in Ohio, also found that 50% of the nurses had moderately healthy diets but were insufficiently active. Lack of appropriate amount of physical activity might be the cause of overweight and obesity increasing the nurses' susceptibility to health problems but more research is required to substantiate this among the Indian nurses.

The present study had a few research limitations. The sample size was small and purposive sampling technique was used for sample selection due to logistical and time constraints; therefore, the results obtained could not be generalized to the nurses working in government hospitals in Delhi. However, the limitations of this study suggested possible directions for future research in the area of dietary practices and nutritional profile of nurses.

Conclusion

Nursing is a stressful profession and nurses require perfect functioning of the mind and body to provide appropriate care to the patients. Unless nurses themselves have appropriate dietary practices and consume nutrients in adequate amounts, they would not be able to convincingly convey the same to their patients. Though the current study indicated that a high percentage of nurses in

government hospitals in Delhi had appropriate dietary practices and adequate intake of most nutrients, they still had high BMI and WHtR, which made them vulnerable to various health problems. This study was a preliminary investigation regarding the nutritional profile of nurses and a more detailed investigation of dietary practices and nutritional status of nurses working under different conditions and having different characteristics is required to draw any generalizable conclusions. However, it is extremely important for the nutrition professionals to design interventions to help the nurses acquire healthier dietary behaviors and maintain optimal nutritional status, which would lead to improvement in productivity in their occupational chores.

Conflicts of interest

There are no conflicts of interest.

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