Nutritional Profile of Female Nurses in Kerala

Meera D. K.[1], Suma Divakar[2] and Mini Joseph[1]*
[1]Assistant Professor, Department of Home Science, Govt. College for Women,
Thiruvananthapuram (Kerala), India.
[2]Professor, Department of Community Science, College of Agriculture, Thiruvananthapuram (Kerala), India.

(Corresponding author: Dr. Meera D. K.)*

ABSTRACT: A nurse must be generally healthy to accomplish the duties of their job, which is very demanding. Their food consumption and metabolism are impacted by their stressed lives, which subsequently results in major health issues. This is a cross sectional, comparative study, using purposive sampling technique. The sample consisted of registered female nurses (N=500) aged 25-45 years working in government and private hospitals selected from rural and urban areas of Thiruvananthapuram city. Anthropometry and dietary assessment methods were used to elicit their nutritional status. One sample t test and Chi square test were used for statistical analysis Intake of nutrients was lower among respondents from urban areas compared to rural areas. The important nutrients such as iron, folates, calcium and beta carotene were lower among nurses of all categories which conforms the low intake of these nutrients among Indian women in general, making them highly vulnerable to nutritional anaemia and osteoporosis. There was prevalence of underweight among nurses along with their poor dietary habits. This present study has identified there is a large lacuna in the dietary profile of nurses. There is an urgent need by hospital managements and policy makers to ensure quality nursing service through staff development and training programs.

Keywords: Nurses, shift work, nutritional status, government hospital, private hospital.

INTRODUCTION

The majority (38%) of India's entire health workforce are nurses (Gill, 2011). Nursing is highly demanding profession where the workers should be essentially healthy during performing their job. But most of the time they are working under challenging work environment where they have to face lot of stress professionally and personally. Such stressful life in turn affects their food intake and metabolism which leads to serious health problems later in their life.

Nurses are attending to their profession, ignoring their own health. Nurses frequently report lack of time to prepare and consume healthy meals owing to their long working hours and fatigue from work (Phiri *et al.*, 2014). Nurses are mostly involved in multiple tasks, stress, anxiety and shift timings leading to poor adoption of health habits.

Many studies report that nurses have high prevalence of obesity and insufficient physical activity (Phiri *et al.*, 2014; Blake *et al.*, 2013; Blake *et al.*, 2011). Shift employment can have an adverse effect on the person and may result in an increase in drug use, stress from the job, subpar work performance, insomnia, and disruptions to social and family life.

The present study is an attempt to assess and compare the nutrient adequacy of nurses working in government and private hospitals in rural and urban areas along with analysis of their anthropometric profile.

MATERIALS AND METHODS

Study design and sample: A cross-sectional comparative study using randomised sampling techniques was planned here. Registered nurses working in public and private hospitals in urban and rural Thiruvananthapuram city were randomly chosen to make up the sample population. In order to create a population of 500, a uniform sample size of 250 respondents was selected from Thiruvananthapuram district's public and private hospitals. For the in-depth investigations, a subsample of 25 respondents was selected from both government and private hospitals in Thiruvananthapuram's rural and urban areas (N=100). Only female nurses with a minimum of five years of experience and those between the ages of 25 and 45 were included in the study. All of the respondents who were chosen for the study worked shifts. The data collection was conducted during January 2018 to June 2018.

A pretested schedule was used to elicit the information through interview method. The information regarding demographic characteristics, dietary practices with respect to meal regularity, meal consumption pattern along with daily work pattern were collected. The nutritional status of the respondents also ascertained with the help of standard anthropometric measurements like height, weight, waist circumference using standardized techniques.

After setting up a convenient time with the respondents, the investigator directly contacted the participants with the prior consent of the hospital administration. The interview location and time were chosen by the respondents themselves. Interviews were performed at participants' workplaces if they felt comfortable there, without interfering with their regular workdays, especially at the end of their shift.

The Ethics committee granted its ethical approval. Prior to the interview, the respondents provided their written informed consent.

Assessment of nutrient intake and anthropometric measurements: The nutrient intake information were obtained by recording 24 hour dietary recall method. Investigator recalled and recorded each and every meals in portion sized by using standardized vessels. Details on ingredients used for the preparations were also collected. Information obtained from the respondents were translated into raw weight of ingredients based on standardized recipes. Nutritive value of food items were entered into validated software 'DietCal' Version 8.0 (Profound Tech Solutions; http://dietcal.in/)– a tool for dietary assessment and planning (Dt. Gurdeep Kaur AIIMS, 2014) to calculate various nutrients consumed by each respondants in a day. The nutritive value added in this software is taken from IFCT 2017 and NIN (Diet Cal, software version 8.0, 2014). The intake of 9 nutrients namely-energy, protein, fat, dietary fibre, carbohydrates, folates, beta carotene, iron, and calcium were computed. Nutritive intake were compared with normal RDA for sedentary women (ICMR, 2010).

Anthropometric measurements were taken for the assessment of nutritional status. Height, weight and waist- hip circumference were measured using standardised techniques. Based on these measurements BMI and waist –hip ratio were calculated.

Classification of BMI given by ICMR, 2010 was used to categorize the respondents as underweight, normal and overweight. For identifying the abdominal obesity waist- hip ratio is an effective method. The classification of WHR by Dipika (2016) was used to categorize the respondents as normal and abdominal obesity.

Statistical analysis: One sample t-test was used to test the nutrient intake with standard values (Table 2 &3). To verify the normality of the data, Levene's test for equality of variances were used, t test was used to compare the means of two independent groups in order to determine whether there was statistical evidence that the associated population means were significantly different (Table 4). Chi square test was carried out for analysing the quantitative categorized variables (Table 5). The considered level of significance was $p < 0.05$ and $p < 0.01$.

RESULTS AND DISCUSSION

As revealed in the Table 1, majority of the respondents of government hospitals (34.8%) belonged to the age group 40-45 years while in private sector, majority of the respondents (50%) belonged to the age group 30-35 years. Majority of the respondents in government hospital (83.2%) and private hospitals (87.6%) were married. Thirty three percentage of respondents in government hospitals had an experience below 5 years while in private hospitals, majority of the respondents (62.4%) had 5 to 10 years of experience. Majority of the respondents of government hospitals (32.8%) belonged to the salary package between Rs 30001-40000/- while in private sector, majority of the respondents (78.8%) belonged to the salary package between Rs. 20001-30000/-.

Table 1: Demographic profile of the respondents.

Particulars	Category	Government Hospital N=250		Private Hospital N=250	
		Rural N=125(%)	Urban N=125(%)	Rural N=125(%)	Urban N=125(%)
Age (yrs)	25-30	26(10.4)	16(6.4)	38(15.2)	45(18.0)
	30-35	27(10.8)	58(23.2)	64(25.6)	61(24.4)
	35-40	20(8.0)	16(6.4)	17(6.8)	14(5.6)
	40-45	52(20.8)	35(14.0)	6(2.4)	5(2.0)
Marital status	Married	114(45.6)	94(37.6)	115(46.0)	104(41.6)
	Unmarried	9(3.6)	31(12.4)	89(2)	19(7.6)
	Widowed	1(0.4)	0(0.0)	0(0.0)	1(0.4)
	Divorced	1(1)	0(0.0)	0(0.0)	1(0.4)
	Separated	0(0.0)	0(0.0)	2(0.8)	0(0.0)
Year of experience (yrs)	Up to 5 years	36(14.4)	47(18.8)	19(7.6)	24(9.6)
	> 5 - 10 years	34(13.6)	47(18.8)	71(28.4)	85(34.0)
	> 10 - 15 years	18(7.2)	14(5.6)	26(10.4)	15(6.0)
	> 15 years	37(14.8)	17(6.8)	9(3.6)	1(0.4)
Salary (Rs)	5000 – 10000	3(1.2)	6(2.4)		
	10001 – 15000	25(10.0)	8(3.2)	3(1.2)	4(1.6)
	15001 – 20000	3(1.2)	13(5.2)	29(11.6)	17(6.8)
	20001 – 30000	29(11.6)	19(7.6)	93(37.2)	104(41.6)
	30001 – 40000	30(11.6)	52(20.9)		
	Above 40000	35(14.1)	27(10.8)		

(Figure in the parenthesis indicate percentage)

Analysis of nutrient intake of respondents from private hospitals: When data of nutrient intake of

respondents from private hospitals of rural areas were analysed, it was seen that their mean intake of energy

(1810.4Kcal), carbohydrates (228.6gm), fibre (25.6gm), beta carotene (913.2mg), calcium (464.7mg) and iron(10.3mg) were below the RDA specified. Intake of other nutrients like protein (76.8gm) and fat (63.2gm) were higher than the prescribed RDA. The intake of folate was found to be sufficient. T test analysis showed that difference in intake of protein, fat, carbohydrates, beta carotene, calcium and iron were significant at 1 % level of significance while the difference dietary fibre intake were significant at 5% level of significance.

Analysis of nutrient intake of respondents from private hospitals from urban areas, indicated that the mean intake of energy (1701.9Kcal), dietary fibre (19gm), carbohydrates (203.3gm), folates (176.5mg), betacarotene (1390.6mg), calcium (504.1mg), iron (9.2mg) were below RDA. The nutrients like fat (71.2gm) were higher than RDA. The intake of protein were found to be sufficient. Statistically the difference in intake of nutrients like fat, fibre, carbohydrates, beta

carotene and iron were significant at 1% level of significance. So we can conclude that the intake of nutrients, was low in urban subjects compared to rural subjects except for fat, beta carotene and calcium (Table 2).

Analysis of nutrient intake of respondents from government hospitals: On analysing nutrient intake of respondents in government hospitals of rural areas, the mean intake of energy (1824.4Kcal), dietary fibre (21.5gm), carbohydrates (231.6gm), folates (180.5mcg), beta carotene (434.2mg), calcium (394.1mg) and iron (9.8mg) were below RDA. Intake of other nutrient fat (65.7gm) were higher than RDA. Statistically it was found that the difference in intake of nutrients protein, fat, fibre, carbohydrates, beta carotene, calcium and iron were significant at 1 % level of significance.

Table 2: Nutrient intake of nurses of private hospitals.

Nutrients	Area	N	Mean	RDA	Percent of RDA met	t-value(p-value)
Energy (Kcal)	Rural	25	1810.4	1900	95.3	-1.12 (.28)
	urban	25	1701.9			-1.99 (.06)
Protein (gm)	Rural	25	76.8	55		4.01 (<.01)**
	urban	25	61.6		139.6	1.27 (.217)
Fat (gm)	Rural	25	63.2	20		9.34 (<.01)**
	urban	25	71.2		316	6.28 (<.01)**
Dietary fibre (gm)	Rural	25	25.6	30		-2.30 (<.05)*
	urban	25	19.1		85.3	-6.10 (<.01)**
Carbohydrates (gm)	Rural	25	228.6	285		-6.36 (<.01)**
	urban	25	203.3		80.2	-9.15 (<.01)**
Folates (mcg)	Rural	25	210.1	200		.73 (.473)
	urban	25	176.5		105.1	-1.68 (.106)
Beta carotene (mg)	Rural	25	913.2	4800		-13.40(<.01)**
	urban	25	1390.6		19	-6.64 (<.01)**
Calcium (mg)	Rural	25	464.7	600		-4.06 (<.01)**
	urban	25	504.1		77.5	-1.94 (.064)
Iron (mg)	Rural	25	10.3	21		-15.16(<.01)**
	urban	25	9.2		49	-16.06(<.01)**

**significant at 1% level of significance   * significant at 5% level of significance

Table 3: Nutrient intake of nurses of government hospitals.

Nutrients	Area	N	Mean	RDA	Percent of RDA met	t- value (p-value)
Energy (Kcal)	Rural	25	1824.4	1900	89.6	-97(.343)
	Urban	25	1586.9			-3.50(<.01)**
Protein (gm)	Rural	25	71.9	55		3.643 (<.01)**
	Urban	25	66.8		112	1.830 (.08)
Fat (gm)	Rural	25	65.7	20		6.16(<.01)**
	urban	25	45.3		356	6.06(<.01)**
Dietary fibre (gm)	Rural	25	21.5	30		21.52(<.01)**
	urban	25	21.5		63.7	21.50(<.01)**
Carbohydrates (gm)	Rural	25	231.6	285		-5.57(<.01)**
	urban	25	223.0		71.3	-4.10(<.01)**
Folates (mcg)	Rural	25	180.5	200		-1.04(.309)
	urban	25	182.7		88.3	-1.02(.319)
Beta carotene (mg)	Rural	25	434.2	4800		-9.97(<.01)**
	urban	25	668.4		29	-1.98(<.01)**
Calcium (mg)	Rural	25	394.1	600		-5.82(<.01)**
	urban	25	465.0		84	-2.91(.008)
Iron (mg)	Rural	25	9.8	21		-3.10(<.01)**
	urban	25	9.1		43.8	-5.14(<.01)**

**significant at 1% level of significance   * significant at 5% level of significance

Except for the intake of fat, mean intake of energy (1586.9Kcal), fibre (21.5gm), carbohydrates (223gm), folates (182.7mcg), beta carotene (668.4mg), calcium (465mg) and iron (9.1mg) were below RDA. T test analysis revealed that difference in energy, fat, fibre, carbohydrates, beta carotene, calcium and iron was significant at 1% level of significance. From the above (Table 3) we can conclude that the intake of nutrients was low in urban areas compared to rural subjects except for beta carotene.

Comparison of nutrient intake of respondents from government and private hospitals: Mean nutrient intake of nurses of private hospitals revealed that, energy (1756.17Kcal), fibre (22.35gm), carbohydrates (215.97gm), folates (193.29mcg), beta carotene (1151.90mg), calcium (484.43mg) and iron (9.73mg) were below RDA. Intake of fat (67.16) was higher than the prescribed RDA.

Mean intake of energy (1705.66Kcal), fibre (21.51gm), carbohydrates (227.31gm), folates (181.60mg), beta carotene (551.33mg), calcium (429.57mg) and iron (9.43mg) were below RDA among the nurses of government hospitals. Nutrient intake of fat (55.48gm) was higher than RDA. The nutrient intake of nurses from government hospitals nurses were lower than nurses from private hospitals except for protein and calcium. There was no significant difference in nutrient intake between private and government hospitals except for intake of beta carotene (Table 4).

Anthropometric profile of the respondents: Majority of subjects from both government (82%) and private hospitals (94%) were under weight as per BMI classification by ICMR (2010). Most of the subjects from government (88%) and private (74%) had abdominal obesity, which indicated that the subjects were at risk of degenerative diseases and non-communicable disease.

Majority of nurses from government (88%) and private (74%) had abdominal obesity where in their waist hip ratio was equal or more than 0.85. Numerous studies have revealed that Asian populations have greater body fat than White populations relative to weight (although not in absolute terms) (Deurenberg-Yap *et al.,* 2000; Misra, 2003; Dudeja *et al.*, 2001). Statistically the associations of BMI and waist hip ratio with the different sectors were not found to be significant.

Asian populations have a higher risk of developing comorbidities such as cardiovascular diseases and type 2 diabetes ever at BMIs lower than 25 kg/m^2, which is the WHO's cut off point for overweight and, in addition, association between BMI and body fat percentage is different from that for Europeans (WHO Expert consultation, 2004) (Table 5).

Table 4: Comparison of nutrient intake of nurses of government and private hospitals.

Nutrients	Organisation	N	Mean	RDA	Std. Error Mean	t- value (p-value)
Energy (Kcal)	Private	50	1756.17	1900	63.78	.57
	Govt.	50	1705.66		61.17	(.571)
Protein (gm)	Private	50	69.20	55	3.87	-.03
	Govt.	50	69.37		3.95	(.975)
Fat (gm)	Private	50	67.16	20	4.67	1.80
	Govt.	50	55.48		4.46	.074
Dietary fibre (gm)	Private	50	22.35	30	1.37	.41
	Govt.	50	21.51		1.49	(.680)
Carbohydrates (gm)	Private	50	215.97	285	6.48	-1.12
	Govt.	50	227.31		7.78	(.266)
Folates (mcg)	Private	50	193.29	200	10.05	.73
	Govt.	50	181.60		12.53	(.468)
Beta carotene (mg)	Private	50	1151.90	4800	293.67	2.00
	Govt.	50	551.33		55.90	(<.05)*
Calcium (mg)	Private	50	484.43	600	29.58	1.32
	Govt.	50	429.57		29.31	(.191)
Iron (mg)	Private	50	9.73	21	0.51	.39
	Govt.	50	9.43		0.58	(.697)

* significant at 5% level of significance

Table 5: Distribution of respondents according to BMI and WHR.

Particulars	Govt. Hospital		Total	p-value	Private Hospital		Total	p-value
	Rural	Urban			Rural	Urban		
BMI Under weight (<18.4) Normal (18.5-22.9) Over weight(23-24.9)	20(40.0) 5(10.0) 0(0.0)	21(42.0) 3(6.0) 1(2.0)	41(82.0) 8(16.0) 1(2.0)	.467	25(50.0) 0(0.0) 3(6.0)	22(44.0) 3(6.0)	47(94.0) 3(6.0)	.74
WHR Normal(<0.85) Abdominal adiposity(≥0.85)	4(8.0) 21(42.0)	2(4.0) 23(46.0)	6(12.0) 44(88.0)	.348	5(10.0) 20(40.0)	8(16.0) 17(34.0)	13(26.0) 37(74.0)	.333

CONCLUSION

Intake of nutrients was lower among respondents from urban areas compared to rural areas except for fat, beta carotene and calcium. The mean intake of nutrients among both government and private hospital nurses were lower than the prescribed RDA except protein and fat. The low intake of energy and other nutrients indicates that the intake of food was not sufficient. The important nutrients such as iron, folates, calcium and beta carotene were lower among nurses of all categories which conforms the low intake of these nutrients among Indian women in general, making them highly vulnerable to nutritional anaemia and osteoporosis. Anaemia is a major nutritional problem in India, high levels of anaemia is reported among women in India (53% of all women have anaemia as per the National Family Health Survey 2015–2016) which is of great concern. The National Health Policy (2017) tabled by the Ministry of Health and Family Welfare, Government of India, acknowledges this high burden.

Besides low intake of beta carotene leads to many other nutritional problems which leads to the other major nutritional problem in India. There was a high prevalence of under nourishment and central obesity among nurses in both sectors. The intake of nutrients in nurses were lower than RDA and this might be the reason for the high prevalence of under nourishment among them. Due to the lack of time, they were not getting sufficient time to have meals and mostly they skipped their meals and depended on light snacks and drinks.

Studies have reported that abdominal obesity is more in Asian population when compared to white population because of more body fat relative to weight. In the present study also, it was found so. Respondents belonged to more underweight category with high percent of abdominal obesity. Central obesity has been recognised as an independent risk factor for cardio-metabolic diseases and better predictors of cardiovascular risk than overall obesity (Bastien *et al.,* 2014; Cameron *et al.*, 2012). Central obesity of the nurses indicates the poor participation in physical activities. Majority of nurses after their pregnancy and delivery were not able to reduce their abdominal expansion which might be another reason for the abdominal obesity. Both underweight and central obesity is another indication of poor nutritional status of nurses.

FUTURE SCOPE

This study is a first attempt in this part of the country with an intensive coverage on the nutrtional aspects of the nursing profession, which is relevant not only for the nurses but also for policy makers, health education promoters and research.

REFERENCE

Bastien, M., Poirier, P., Lemieux, I. and Despres, J. P. (2014). Overview of epidemiology and contribution of obesity to cardiovascular disease. *Prog Cardiovasc Dis, 56*(4), 369–381.

Blake, H. and Harrison, C. (2013). Health behaviours and attitudes towards being role models. *Br J Nurs, 22*(2), 86-94.

Blake, H., Malik, S., Mo, P. K. and Pisano, C. (2011). Do as say, but not as I do': are next generation nurses role models for health?. *Perspect Public Health, 131*(5), 231-9.

Cameron, A. J., Magliano, D. J., Shaw, J. E., Zimmet, P. Z., Carstensen, B., Alberti, K. G., Tuomilehto, J., Barr, E. L., Pauvaday, V. K., Kowlessur, S and Söderberg, S. (2012). The influence of hip circumference on the relationship between abdominal obesity and mortality. *Int J Epidemiol, 41*(2), 484–494.

Deurenberg-Yap, M., Schmidt, G., Staveren, W. A. and Deurenberg, P. (2000). The paradox of low body mass index and high body fat percentage among Chinese, Malays and Indians in Singapore. *Int J Obes Relat Metab Disord, 24*(8), 1011-1017. doi: 10.1038/sj.ijo.0801353.

Dipika, K. (2016). Body mass index, waist hip ratio and it's correlation among urban women of Sambalpur city in Odisha. *Asian Journal of Home Science, 11*(1), 142-150. doi: 10.1093/ije/dyr198.

Dudeja, V., Misra, A., Pandey, R. M., Devina, G., Kumar, G. and Vikram, N. K. (2001). BMI does not accurately predict overweight in Asian Indians in northern India. *Br J Nutr, 86*(1), 105-112.

Gill, R. (2011). Nursing shortage in India with special reference to international migration of nurses. *Soc Med, 6*(1), 52–59.

Misra, A. (2003). We need ethnic-specific criteria for classification of BMI. Progress in Obesity Research. *Proceedings of the 9ᵗʰ International Congress on Obesity, Sao Paulo, Brazil London: John Libbey Eurotext Ltd.,* 547–553.

National Health Policy, 2017. New Delhi: Ministry of Health and Family Welfare, Government of India, 2017 retrieved from *https://cdsco.gov.in/opencms/export/sites/CDSCO_WEB/Pdf-documents/Consumer_Section_PDFs/National-Health-Policy.pdf*

Phiri, L. P., Draper, C. E., Lambert, E. V. and Kolbe-Alexander, T. L. (2014). Nurses' lifestyle behaviours, health priorities and barriers to living a healthy lifestyle: a qualitative descriptive study. *BMC nursing, 13*(1), 38.

WHO Expert Consultation (2004). Appropriate body-mass index for Asian populations and its implications for policy and intervention strategies. *Lancet (London, England), 363*(9403), 157–163.