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Research Article

Assessment of Nutritional Status in Relation to Sleeping Patterns in Adolescent Girls (15-19 Years)

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ABSTRACT

The present study aims to assess nutritional status in adolescent's girls in relation to sleeping patterns. A survey was conducted on 150 adolescent girls (15-19 years) from Dr.B.M.N college of Home Science, Matunga and from Virar. Anthropometric measurements, sleeping patterns and lifestyle patterns were assessed through a pre -tested questionnaire. Dietary pattern was assessed using a 24 hour recall method. Analysis was done using SPSS package. Samples were called in a group of 30 and the objectives of the study and their role were explained. A brief introduction of what questionnaire intends to collect was elaborated to the participants. Anthropometric measurements were recorded using standardised techniques. A highly significant correlation was seen between the hours of sleep that girls had and consumption of meals in the study. Girls having breakfast showed a positive and significant correlation with the no of hours of sleep that they get (6-8 hours and 8 & more). No significant correlation was seen among hours of sleep and kind of breakfast they had. Also increase in calcium and iron intake showed an increase in waist to hip ratio in adolescents (p=0.004) whereas other nutrients had no effect on anthropometric measurements.

Keywords: *Sleeping patterns, Meals, Nutrients, Waist to hip ratio*

INTRODUCTION

Adolescence is a time of important physical, cognitive, emotional, and social change when the behaviours in one developmental stage are constantly challenged by new abilities, insights, and expectations of the next stage. Sleep is a primary aspect of adolescent development. Sleep and waking behaviours change significantly during the adolescent years. The way adolescents sleep critically influences their ability to think, behave, and feel during daytime hours. Likewise, daytime activities, changes in the environment, and individual factors can have significant effects on adolescents' sleeping patterns. Over the last 2 decades, researchers, teachers, parents, and adolescents themselves, have consistently reported that they are not getting enough sleep.

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Recently it has also been discussed whether a tendency to sleep too little is becoming a common problem. It is generally believed that people today sleep less than they did 50 years ago (Ferrara & De Gennaro, 2001).) In a Finnish study with more than 12,000 subjects, (Hublin et al., 1996) the prevalence of insufficient sleep, defined as a difference of 1 hour between self-reports of sleep need and sleep length, was 20.4%. (Jewett et al., 1999) Insufficient sleep may affect performance, (Philip et al., 1996) traffic safety, (Groeger et al., 2004) and quality of life in general (Hublin et al., 1996). however, in a recent study, it was concluded that sleep durations in Britain in 2003 were not very different from what they were in 1969 (Kripke et al., 2002). Data from other studies suggest that both short and long sleep durations are associated with increased mortality risk and sleep problems, compared with intermediate sleep durations (Tamakoshi & Ohno, (2004; Grandner & Kripke, (2004; Zvonic et al., 2007).

In adults, sleep of 7 to 8.5 hours is considered fully restorative, although there is a wide variation among individuals. In the elderly people, and in some cultures, total sleep is often divided into a mid-afternoon nap of about one hour, and an overnight sleep for the remaining period. Normal human sleep is divided into non–rapid eye movement (NREM) and rapid eye movement (REM) sleep. The sleep cycle starts with a period of NREM sleep. Rapid eye movement sleep occurs after a short period of NREM sleep. This alteration between NREM and REM takes place about 4-5 times during a normal night's sleep. The first REM period may be less than 10 minutes in duration, while the last one may exceed 60 minutes. Awakening after a full night's sleep is usually from REM sleep. The sleep pattern changes as the child grows. Polycyclic sleep pattern of the newborn changes to a monocyclic adult pattern. In newborns, the total sleep duration can be 14 to 16 hours, in a day of 24 hours.

The below sleep duration recommendations are based on a report of an expert panel convened
by the US based National Sleep Foundation and published in 2015 in their journal Sleep Health.

Table 1: Sleep duration recommendation (US based National Sleep Foundation)

Age	Recommended
Newborns(0-3 months)	14 to 17 hours
Infants(4-11 months)	12 to 15 hours
Toddlers(1-2 years)	11 to 14 hours
Preschoolers(3-5 years)	10 to 13 hours
School-aged children(6-13 years)	9 to 11 hours
Teenagers(14-17 years)	8 to 10 hours
Young adults(18-25 years)	7 to 9 hours
Adults(20-64 years)	7 to 9 hours
Older adults(>65 years)	7 to 8 hours

Even though the majority of adolescents are aware of the important effect sleep has on mood, health, performance, and behaviour, many adolescents do not get the recommended duration of sleep each night (Golley et al., 2013). Several lifestyle factors are contributors to poor sleep conditions because they are believed to disrupt circadian rhythms. Circadian rhythms are believed to be vital to our physiologic functions, including sleep. Alterations in environmental cues through lifestyle factors such as caffeine consumption and timing of sleep may negatively affect circadian rhythms, potentially leading to negative physiologic consequences (National Sleep Foundation, 2013). The most well-represented lifestyle factors in sleep literature include caffeine consumption, cigarette

smoking, electronic media exposure, exposure to bright lights during dark night hours, and timing of sleep.

It is important to recognize the social and behavioural aspects related to human sleep reduction. Social pressures such as work-related stress and over commitment may lead to intentional sleep reduction. The timing of sleep may be an important factor to consider when encountering individuals with complaints of poor sleep. Late bedtimes have been associated with increased intake of energy-dense, nutrient-poor foods in children and adolescents (Archer et al., 2014) as well as in adults [14]Intentionally delaying sleep was shown to alter the transcription of DNA associated with various physiologic processes (Nedeltcheva et al., 2009).

Observations of increased caloric intake with short sleep duration were reported in both children and adults. In obese preschool-aged children, increased sleep duration was associated with lower calorie consumption in a weight-loss intervention (Nedeltcheva & Kilkus, 2009). More calories were consumed during the night by adults with short sleep duration than by adults with normal sleep duration (Brondel et al., 2010; St-Onge et al., 2011). Several sleep reduction studies ranging from 1 to 14 nights of 4–5 h of sleep reported significantly increased caloric intake by participants (Hays & Roberts, 2008; Spiegel et al., 2003) these changes in diet composition may be related to disinhibited eating behaviour. This behaviour is characterized by responding to various external stimuli, such as stressful situations or an abundance of appetizing foods, with an inclination to overeat (Spiegel et al., 2003).

A longitudinal study in 276 adults revealed that short sleep duration compared with average or long sleep duration increased the risk of weight gain and increased waist circumference over 6 y; On the other hand, increasing nightly sleep duration from 6.5 to 8.5 h/night for 2 wk led to significant decreases in overall appetite and desire for salty and sweet foods in 10 overweight adults.

Thus keeping these factors in mind the present study was designed to see the effects of sleep on nutritional status and stress levels of adolescents.

MATERIALS AND METHODS

Adolescent's girls (15-19 years) were taken as samples from Dr.B.M.N college of Home Science (100) and also a few from Virar city (50) through purposive random sampling method. Data was collected using a pre tested questionnaire from 150 students. Samples were called in group of 30 and the objective of the study was explained before collecting the data. A brief introduction of what questionnaire intends to collect was given to the participants. The questionnaire included questions regarding personal information (age, community, occupation, parent's occupation anthropometric measurements (height, weight, BMI, waist circumference, hip circumference, waist to hip ratio), dietary information (24 hour diet recall and food frequency questionnaire) and lifestyle based questions (sleeping patterns, stress).

Results were analysed through SPSS (STATISTICAL PACKAGE OF SOCIAL SCIENCES), where in various statistical test is applied. The test applied were Pearson Correlation, T-test, Pearson chi-square, mean and standard deviation.

RESULTS AND DISCUSSION

The purpose of the study aimed to assess nutritional status in adolescent's girls (15-19 years) in relation to sleeping patterns. Data collected from 150 adolescents girls were assessed through a pre tested questionnaire. The result analysis showed that the mean age of the adolescents was 17.87(S.D= 7.301) and majority of the adolescents' girls belonged to the Hindu community and were students. Monthly income of parents was around Rs.15000/- and belonged to lower and lower middle class category of the population.

Table 2: Correlation of Nutrient Intake with Anthropometric Measurements

	Height	Weight	BMI	Waist circ.	Hip circ	Waist to hip ratio
Energy	-0.11	-0.08	-0.019	-0.056	0.12	-0.119
Proteins	0.27	0.14	-0.014	-0.017	-0.044	-0.019
Calcium	-0.047	-0.098	-0.047	-0.010	-0.068	0.004
Iron	0.06	0.079	0.122	0.166	0.132	0.03

(http://www.cdc.gov/healthyweight/assessing/bmi/childrens_bmi/about_childrens_bmi.html)

On correlating nutrient intake with anthropometric measurements, a positive highly significant correlation was found with the waist to hip ratio i.e. with increase in calcium intake there was decrease in weight, BMI, Energy intake showed a negative correlation with the weight, BMI and waist circumference i.e. with increase in energy intake there was decrease in weight, BMI and waist circumference.

Iron intake showed a positive significant correlation with the height, weight and waist to hip ratio i.e. it showed to increase height, weight and waist to hip ratio.

On assessing the eating patterns through a food frequency questionnaire, it was found that maximum girls (48%) consumed 4 meals a day. Poha and milk were found to be the most preferred breakfast as around 38% and 26.7 % of the adolescents which was high as compare to other breakfast options. Minimum of 1 fruit consumed in a day by majority of girls. Fried products (38.7%) were found to be the most frequently consumed snack items among the girls.

About 50.7% of adolescents have their breakfast intake on regular basis and also vegetable intake (66% of adolescents). Dessert (79.3%) was seen to be consumed only sometimes with the meals by the adolescents. Majority of adolescents were found to have outside (44%) and restaurant food (86.7%) on weekly basis (i.e once a week). Carbonated beverage consumption was found to be once in a month among the adolescents (48%).

Thus observing from above discussion, it can be said that girls do not have a good eating pattern which can be due to various reasons such as low socio economic status, misconceptions of foods and also lifestyle behaviour having an impact on their day to day dietary pattern.

Statistical data on sleeping patterns of girls showed that 50% of adolescents had a good sleep pattern of 6 to 8 hours and about 31.3 % were receiving an average of 4 to 6 hours. Few adolescent girls had reported less than 4 hours of sleep in the night. About 65.3 % of girls experienced satisfactory sleep during night. Though dreams were found to affect about 30% of adolescents sleep during night, majority of girls (82.7%) were found to be happy with the sleep quality that they get during the night.

In terms of waking up patterns, it was seen that majority of adolescents (63.3%) had a good awakening pattern (fresh) as compared to the others who reported feeling sleepy (6.7%), little disturbed ,moody (23.3%) and other reasons such as headaches as when assessed through a standardised sleep questionnaire. About 30.7% girls showed to have an average of 30 min of sleep during day.

Table 3: Correlation of Sleep with Nutriernt Intake in Girls

	Quantity of sleep (t-test)	Kind of sleep (t-test)	Quality of sleep (t-test)
Energy	0.06	0.4	0.3
Iron	0.04	0.4	0.48

On correlating sleep with nutrient intake, it was found that energy intake in girls were highly significant with quantity of sleep (i.e. hours of sleep of 4-6 hours) they use to get each night. Also iron intakes have shown significant correlation with quantity of sleep (4-6 hours).

A highly significant correlation was seen between the hours of sleep that girls had and consumption of meals in the study. Girls having more than 4 meals a day showed a good sleeping pattern in terms of hours of sleep they had during night (6-8 hours)(p=0.000).Girls having breakfast showed a positive and significant correlation (p=0.02)with the hours of sleep that they get (6-8 hours and 8 & more).Beverage especially milk and tea consumption with breakfast showed a significant correlation with the hours of sleep (6-8 hours).(p=0.07). Type of food (fruit juice) consumed by the girls showed a highly significant correlation with the hours of sleep (more than 8 hours)(p=0.004)

On assessing the meals with the sleep it was seen that less than 4 meals (p= 0.004) showed a significant correlation with the disturbed sleep in the girls. Girls having outside food such as vada pav, samosa etc also showed a significant correlation with disturbed sleep during night.(p=0.05) Carbonated beverage and canteen food too did not have any significant correlation with the kind of sleep in the study.

Further analysing nutrient intake with quality of sleep, a highly significant correlation was seen between quality of sleep (good sleep) and breakfast intakes by the girls. Fruit consumption on daily basis also showed a significant relation with good sleep during night in the study.

Similarly, girls having breakfast on daily basis showed a highly significant correlation in awakening patterns where they said they feel fresh.

No significant correlation was seen in case of exercise and food consumed before and after exercise by the girls in the study.

A highly significant correlation with disturbed waking up patterns was seen among girls who do not exercised in the morning. Whereas those who exercised and consume food (fruit juice) post exercise had good bedtime sleep. (p=0.03)

CONCLUSION

Thus we can conclude from the present study that sleep duration showed a significant association with the meal and breakfast consumption among the adolescent girls. Also girls consuming fruit on daily basis showed a satisfactory sleep during the night whereas consumption of outside food and snacks showed an irregular sleeping pattern among the adolescent girls.

Sleep duration was also seen to be affected by nutrient intake among the girls where the calorie and iron intake showed to increase with the decrease in hours of sleep and there was no significant association found with other nutrients such as calcium and protein.

Majority of anthropometric parameters showed no significant association with the nutrient intake. Only increase in calcium and iron intake showed to increase in waist to hip ratio in adolescent girls (p=0.004) whereas other nutrients had no effect on anthropometric measurements.

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