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A CROSS-SECTIONAL INVESTIGATION OF SLEEP HABITS AND SELECTED BODY COMPOSITION PARAMETERS AMONG UNIVERSITY STUDENTS

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Abstract:
The study's objective was to compare sleep quality and selected body composition parameters between male and female participants. A cross-sectional study was conducted with five hundred participants (male and female) from different community places. Body composition parameters were measured with the help of a bioelectric impedance device. The sleep habits were determined with the Pittsburgh Sleeps Quality Index that used to evaluate sleep quality over a one-month time interval, and the Epworth Sleepiness Scale (Johns, 1991) was used to measure the level of the daytime sleepiness. The identified variables were statistically analyzed with an independent t-test, and Eta Squared was applied to find effect size. From the whole study population, only 12.2 % of participants are underweight, 51.4 % are healthy, 16.6 % are overweight, and 19.8 % are obese. Pittsburgh Sleep Quality Index is the lowest (7.90 ± 2.18) into the normal, whereas the highest (8.38 ± 2.93) into the underweight participants. Daytime sleepiness is lowest (10.23 ± 4.18) in underweight, whereas the highest (11.28 ± 3.28) in

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obese participants. This study demonstrates females had a higher percentage of body fat than males throughout all categories that lead them towards poor sleep habits, which are mediating factors for good health and quality of life.

Keywords: sleep habits, sleep quality, sleepiness, body mass index, university students

1. Introduction

Sleep is a crucial factor in optimum health. During sleep, our body can rest and stock up for the next few days. Sleep is an excellent indicator of health status in both the general population and also for people with associated diseases [1]. Quality of Sleep is not only useful as a determinant of health but also an essential component of good quality of life [2]. American young adults enhanced the incidence from 15.6% in 1960 to 43% in 2009 for those who sleep less than 7 hours/day (National Sleep Foundation of America).

Furthermore, poor sleep habits lead to social, economic, and health problems. Some of the problems which are faced by lack of sleep are vascular problems, cerebrovascular diseases, development of neurodegenerative, and obesity. American adults reported around 27.5% to 29, 1% short sleep duration [3]. Various studies have examined relationships between sleep and obesity risk in the adult [4].

Noticeable body composition differences have been reported between male and female candidates around the world apart from their ethnicity, region, religion, culture, environment, lifestyle, age, and body size. Females comparatively have a higher percentage (25%) of body fat than males (15%), and males tend to have a higher percentage (43%) of muscle mass than females (36%) [5]. Male is having greater lean mass and a more central fat pattern, whereas females tend to have peripheral fat distribution, which defined as fat deposited in limbs and hips, particularly into the lower body [6].

Male and female experiences sleep differently throughout their lifetimes. They face different challenges to sleep. Females are more prone to insomnia, while males are more likely to suffer from sleep disorders like sleep apnea and snoring. Galland et al. [7] found that 56% of adolescents had poor sleep quality with a higher prevalence in females (63.1%) than in males (44.5%), and sleep hygiene was significantly worse in females. The prevalence of insomnia symptoms increased from 3.4% to 12.2% in females and from 4.3% to 9.1% in males [8]. Ohayon and Zulley [9] reported that the prevalence of global dissatisfaction with sleep increased with age and was higher in females. Significant age differences also find in both habitual sleep patterns and sleep disturbance in adolescents. Sleeping times might be of concern in the context of an obesity epidemic science; several studies have found that sleep duration is inversely associated with body mass index [10]. The studies on sleep and body composition in Saudi Arabia on adolescents found that there is an inverse relationship between reduced sleep duration (less than seven hours per day) and obesity/overweight [11, 12]. Inadequate sleep also detains BMI down, which assists in burning low calories throughout the day, leading to getting fat and an unhealthier body. Earlier research assessing the relationship between obesity and sleep duration mostly used BMI or weight gain as outcomes, and limited research measured body fat or abdominal obesity [13, 14]. Mahfouz et al., [15] conducted a cross-sectional study in Saudi Arabia revealed that female university students have poor sleep quality (69.1%) as they slept a mean of 4.77 hours/night. Epidemiological studies had shown a contrary correlation between body mass index (BMI) and sleep duration [16]. Sleep medicine in Saudi Arabia emphasizing that there is much demand for more sleep research to address the prevalence of various sleep disorders amongst the Saudi population related to the lifestyle and body composition [17].

Male and female are not only diverging in height but also body composition and sleep habits. Research findings regarding gender differences have been inconsistent. Therefore, this study set up to establish whether differences existed in body composition and sleeps habits between male and female participants. We also hypothesized that sleep and body compositions are comparative significant with both genders.

2. Methods

2.1 Design

We conducted a cross-sectional study of five hundred participants. Approval to undertake this study was obtained from the Institutional Review Board (IRB) from the deanship of research of the university, All participants participated in this study voluntarily, and the researchers received consent from the participants before the start of the investigation.

2.2 Participants

The data were collected from 500 males (n=250) and female (n=250) from different community centers as shopping malls, parks, playgrounds, and hospitals. The participants were selected by convenience sampling during 2017-2018. The selected participants were classified into underweight, normal, overweight, and obese categories, according to their Body Mass Index. The exclusion criteria for this study were to include those individuals who were suffering from physical or mental disabilities, cardiac problems, or any chronic illness.

2.3 Anthropometric Measurement

Researchers were responsible for the collection of anthropometric measurements of every participant. Anthropometric data, according to the gender, are available in the below Table 1.

Table 1: Anthropometric measurement of participants

S.No.	Anthropometrics	Total Subjects (N=500)	Males (N=250)	Females (N=250)
1	Age (Years)	19.40 ± 3.07	19.44 ± 3.33	19.35 ± 2.79
2	Weight (kg)	66.57 ± 23.45	76.05 ± 27.14	57.08 ± 13.61
3	Height (cm^2)	162.00 ± 8.66	166.86 ± 8.63	157.14 ± 5.33
4	BMI (kg/cm^2)	25.07 ± 7.27	27.03 ± 8.38	23.10 ± 5.28

2.4 Measuring Instruments

Weighing Scale: Portable electronic calibrated weight scale (Detecto Scale – model 750, U.S.A.) was used for height and weight measurement.

2.5 Bioelectric Impedance (BIA)

Body compositions were calculated with the help of a bioelectric impedance device [18]. The body composition assessment followed the manufactory's instruction of the bioelectrical analysis (BIA) (i0i 253, Jawon Medical, S. Koria). The parameters were determined are Body Mass Index (BMI), Percentage of Body Fat (PBF), Lean Body mass (LBM), Mass of Body Fat (MBF), Soft Lean Mass (SLM), and Total Body Water (TWB). Body composition was assessed at healthy body hydration (dehydration) in similar external temperature (22–24°C) [19]. The bioelectrical impedance used method shows a high correlation (R=0.88) with dual X-ray absorptiometry [20].

2.6 The Pittsburgh Sleeps Quality Index (PSQI)

A self-reported questionnaire PSQI was used to evaluate sleep quality during the past thirty days. Component scores range from 0 (no difficulty) to 3 (severe difficulty) and, when summed, generate a sum score ranging from 0 to 21. Scores > 5 indicate significant disturbance. Excellent psychometric properties have been established [21]. The Cronbach alpha for the PSQI has been previously reported as 0.83 [22], which is identical to the value reported in the original validation study [21].

2.7 Epworth Sleepiness Scale (ESS)

The ESS [23] is a self-reported measure designed to estimate the level of the daytime sleepiness in recent times. The measure consists of eight items on a four-point Likert scale on which respondents rate their response regarding the chance of dozing in each situation, from 0 (would never) to 3 (high chance). Total scores range from 0 to 24, with higher scores represent greater sleepiness. Scores over 10 suggest significant daytime sleepiness, and scores over 15 suggest pathological sleepiness associated with conditions like sleep-related breathing disorders or narcolepsy.

2.8 Procedure

A total of 567 participants participated in the study. Only 250 males and 250 female participants were selected due to data information errors by the BIA device and incomplete filled questionnaires. Before the administration of the test, prior consent from the participants. Once the consent was taken, all the essential instructions were imparted to all participants that they have to follow while providing their response on the Pittsburgh Sleep Quality Index (PSQI), Epworth Sleepiness Scale (ESS), and during body composition test through the BIA. Participants completed a questionnaire and body composition test in a laboratory setting. To fill both questionnaire participants took 5-6 minutes to complete. To measure body composition, participants asked to stand barefoot over the electrodes of the device. Demographic information entered to the device, and a participant asked to grip hand-hold electrodes and press the button attached with hand-hold electrodes. The participants do not move or talk during the measurement going on. Within 2-3 minutes, the results' printout given by the device.

2.9 Statistical Analysis

The identified variables were statistically analyzed for the proper evaluation of characteristics related to both genders. Descriptive statistics as mean, standard deviation (SD), and percentage were calculated for participants' age, weight, height, and BMI. For the comparative analysis between both genders as per underweight, normal and overweight, and obese category independent t-test was applied. To find the effect of another independent variable into the same group, Eta Squared was also applied. A p-value ≤ 0.05 was taken as statistically significant. The Statistical Package for Social Sciences Version 20 for Windows (SPSS Inc., Chicago, IL, USA) was used to analyze the data.

3. Results

Table 2: Descriptive analysis of Body Composition and Sleep Habits in a different form of BMI

S.No.	Variables	Body Mass Index Status			
		Under Weight (N=61) 12.2%	**Normal Weight (N=257) 51.4%**	**Overweight (N=83) 16.6%**	**Obese (N=99) 19.8%**
1	Gender (M/F)	21 ± 40	113 ± 144	45 ± 38	71 ± 28
2	Gender %	34.43 / 65.57	43.97 / 56.03	54.22 / 45.78	71.72 / 28.28
3	BMI (kg/cm^2)	17.36 ± 0.86	26.44 ± 5.82	27.20 ± 1.58	36.75 ± 7.10
4	PBF (%)	18.11 ± 5.74	21.71 ± 1.72	33.41 ± 4.37	38.07 ± 6.50
5	LBM (kg)	36.73 ± 5.35	14.98 ± 10.06	47.47 ± 8.12	62.17 ± 13.33
6	MBF (kg)	7.88 ± 2.30	38.65 ± 6.54	23.80 ± 3.10	40.74 ± 13.45
7	SLM (kg)	34.13 ± 5.11	30.62 ± 5.92	43.43 ± 7.59	56.41 ± 11.99
8	TBW (kg)	26.10 ± 4.88	44.57 ± 30.51	34.06 ± 5.72	44.10 ± 9.85
9	PSQI	8.38 ± 2.93	7.90 ± 2.18	7.98 ± 2.07	8.33 ± 2.22
10	Daytime Sleepiness	10.23 ± 4.18	10.53 ± 3.91	10.84 ± 4.01	11.28 ± 3.28

The Table 2 showed the mean and standard deviation of gender differences, body composition variables, and sleep habits. From the whole study population, only 12.2 % of participants are underweight, 51.4 % are normal, 16.6 % are overweight, and 19.8 % are obese. The data showed that females (65.57 %) are more underweight than males (34.43%). For the next category, females (56.03 %) are also more normal than males (43.97 %). Whereas males (54.22 %) are overweight than female (45.78 %), the obesity level is also higher in males (71.72 %) than the female (28.28 %). The Percentage of Body Fat (PBF) is higher (38.07 ± 7.10) in obese and lowest (18.11 ± 5.74) in the underweight participants. The Lean Body Mass (LBM) is the lowest (14.98 ± 10.06) in the normal and highest (62.17 ± 13.33) in the obese participants. The Mass of Body Fat (MBF) is highest (40.74 ± 13.45) in the obese and lowest (7.88 ± 2.30) in the underweight participants. Soft Lean Mass (SLM) is highest (56.41 ± 11.99) in obese and lowest (30.62 ± 5.92) in the normal participants. Total Body Water (TBW) is highest (44.57 ± 30.51) in normal and lowest (26.10 ± 4.88) into the underweight participants. Pittsburgh Sleep Quality Index (PSQI) is the lowest (7.90 ± 2.18) into the normal, whereas the highest (8.38 ± 2.93) into the underweight participants. Daytime sleepiness is lowest (10.23 ± 4.18) in underweight, whereas the highest (11.28 ± 3.28) in obese participants.

Table 3: Mean differences in body composition and sleep habits between the male and female participants for the underweight group

	Gender	N	Mean	Std. Deviation	Mean Difference	t	Sign. (p-value)	Eta Squared
BMI	Male	21	17.36	.972	-.008	-.032	.974	.000
	Female	40	17.37	.805				
PDF	Male	21	14.20	7.03	-5.960	-4.401*	.000	.247
	Female	40	20.16	3.58				
LBM	Male	21	41.20	6.36	6.822	5.927*	.000	.373
	Female	40	34.38	2.61				
MBF	Male	21	6.30	2.45	-2.405	-4.451*	.000	.251
	Female	40	8.71	1.73				
SLM	Male	21	38.41	6.10	6.537	5.955*	.000	.375
	Female	40	31.88	2.46				
TWB	Male	21	28.67	7.35	3.924	3.204*	.002	.148
	Female	40	24.75	1.88				
PSQI	Male	21	8.81	3.39	.660	.832	.409	.012
	Female	40	8.15	2.69				
Daytime Sleepiness	Male	21	10.24	3.06	0.013	.012	.990	.000
	Female	40	10.23	4.70				

The results of the underweight participants are presented in Table 3. When considering the mean score, female participants showed higher BMI, PBF, MBF, than male participants, while male participants showed more LBM, SLM, TWB, PSQI, and Daytime Sleepiness than female participants. An independent sample t-test was used to associate the score for male and female participants. There was a significant difference in the PBF and MBF scores for male participants (M=14.20±7.03, 6.30±2.45 respectively) and female participants (M=20.16±3.58, 8.71±1.73 respectively t(59) = -4.401 & -4.451, p< 0.05,two-tailed). The magnitude in the difference between the means (MD= -5.960, -2405 95% CI) was large (eta squared=.247, 251). This implies that female participants have significantly higher PBF and MBF than male participants. Significant differences were further found in the LBM, SLM and TWB scores for male participants (M=38.41±6.10, 28.67±7.35) and female participants (M=2.46±26.40, 41.20±6.36, 30.88±2.46, 24.75±1.88, t(59)= 5.11, 5.93, 5.96, and 3.20; p<0.05). The magnitude in the differences between the means (MD=22.61, 6.82, 6.537 and 3.924, 95% CI) was large (eta-squared =.307, .373, .375 and 1.48). This implies that male participants have a higher significant difference than female participants, whereas no significant differences were found among male and female participants for the BMI, PSQI, and Daytime sleepiness in the underweight group.

Table 4: Mean differences in body composition and sleep habits between the male and female participants for the normal group

	Gender	N	Mean	Std. Deviation	Mean Difference	t	Sign. (p-value)	Eta Squared
BMI	Male	113	21.93	1.58	.394	1.832	.068	.013
	Female	144	21.54	1.81				
PDF	Male	113	23.82	7.14	-4.666	-6.948*	.000	.159
	Female	144	28.49	3.32				
LBM	Male	113	46.92	7.06	4.188	1.092	.276	.005
	Female	144	42.73	40.25				
MBF	Male	113	13.24	3.16	-3.099	-2.475*	.014	.023
	Female	144	16.34	13.01				
SLM	Male	113	43.44	6.64	8.562	13.683*	.000	.423
	Female	144	34.88	3.11				
TWB	Male	113	34.79	6.28	7.436	12.790*	.000	.391
	Female	144	27.35	2.71				
PSQI	Male	113	7.88	2.04	-.032	-.115	.908	.000
	Female	144	7.92	2.29				
Daytime Sleepiness	Male	113	10.92	3.77	.705	1.438	.152	.008
	Female	144	10.22	4.00				

For the results independent sample t-test was conducted to compare the score for male and female participants. There was a significant difference in the PBF and MBF scores for male participants (M=23.82±7.14 and 13.24±3.16) and female participants (M=28.49±3.32 and 16.34±13.01, t(155) = -6.95 and -2.48, p <0.05). The magnitude in the differences between the means (MD = -4.67 and -3.10, 95% CI) was lower (eta squared = .159 and 0.23). This implies that female participants have significantly higher PBF and MBF than male participants. Significant differences were further found in the SLM and TBW score for the male participants (M= 43.44±6.64, and 34.79±6.28) and for female participants (M= 34.88±3.11, and 27.35±2.17, t(155)= 13.68 and 12.79, p < 0.05 respectively).

The magnitude in the differences between the mean (MD=17.79, 8.56, and 7.44, 95% CI) was greater (eta squared = .423 and .391). This implies that male participants have a higher significant difference than female participants, whereas no significant differences were found among male and female participants for the BMI, LMB, PSQI, and Daytime sleepiness as in the normal group.

The results of the overweight participants are presented in Table 5. When considering the mean score, female participants showed higher PBF than male participants, while male participants showed higher BMI, LBM, MBF, SLM, TWB, PSQI, and Daytime Sleepiness than female participants. An independent sample t-test was used to compare the score for male and female participants. There was a significant difference in the PBF scores for male participants (M=31.45±4.74) and for female participants (M=35.73±2.32 t(81) = -5.07, p <0.05). The magnitude in the differences between the means (MD = -4.28, 95% CI) was lower (eta squared = .24). This implies that female participants have significantly higher PBF than male participants. Significant differences were further found in the LBM, SLM and TBW score for the male participants (M=51.58±8.72, 47.29±8.16, and 36.92±6.17) and for female participants (M=42.60±3.27, 38.86±2.99, and 30.685±2.35, t(81)= 6.00, 6.02, and 5.88, $p < 0.05$ respectively).

Table 5: Mean differences in body composition and sleep habits between the male and female participants for the overweight group

	Gender	N	Mean	Std. Deviation	Mean Difference	t	Sign. (p-value)	Eta Squared
BMI	Male	45	27.41	1.68	.472	1.362	.177	.022
	Female	38	26.94	1.43				
PDF	Male	45	31.45	4.74	-4.280	- 5.073*	.000	.241
	Female	38	35.73	2.32				
LBM	Male	45	51.58	8.72	8.980	5.995*	.000	.307
	Female	38	42.60	3.27				
MBF	Male	45	23.85	3.34	.094	1.37	.891	.000
	Female	38	23.75	2.84				
SLM	Male	45	47.29	8.16	8.424	6.024*	.000	.309
	Female	38	38.86	2.99				
TWB	Male	45	36.92	6.17	6.238	5.877*	.000	.299
	Female	38	30.68	2.35				
PSQI	Male	45	8.00	1.68	.053	.115	.909	.000
	Female	38	7.95	2.48				
Daytime Sleepiness	Male	45	10.91	3.93	.148	.166	.868	.000
	Female	38	10.76	4.16				

The magnitude in the differences between the mean (MD=8.98, 8.42, and 6.24, 95% CI) was greater (eta squared = .307, .309 and .2.99). This implies that male participants have a higher significant difference than female participants, whereas no significant differences were established between male and female participants for the BMI, MBF, PSQI, and Daytime sleepiness as in the overweight group.

The results of the obese participants are presented in Table 6. When considering the mean score, female participants showed higher PBF and daytime sleep scores than male participants, while male participants showed higher BMI, LBM, MBF, SLM, TWB, and PSQI than female participants. An independent sample t-test was conducted to compare the score for male and female participants. There was a significant difference in the PBF scores for male participants (M=36.66±6.95) and for female participants (M=41.65±3.08 t(97) = 13.83, $p < 0.05$). The magnitude in the differences between the means (MD = -4.99, 95% CI) was moderate (eta squared = .121). This implies that female participants have significantly higher PBF than male participants. Significant differences were further found in the BMI, LBM, MBF, SLM and TBW score for the male participants (M=37.77±7.53, 6749±11.55, 42.85±14.14, 61.30±10.26 and 47.66±9.12) and for female participants (M=34.16±5.15, 48.70±6.00, 35.40±9.85, 44.01±5.20, and 35.06±4.32 t(97)= 2.33, 8.53, 8.48, and 6.99, $p < 0.05$ respectively).

Table 6: Mean differences in body composition and sleep habits between the male and female participants for the obese group

	Gender	N	Mean	Std. Deviation	Mean Difference	t	Sign. (p-value)	Eta Squared
BMI	Male	71	37.77	7.53	3.614	2.331*	.022	.053
	Female	28	34.16	5.15				
PDF	Male	71	36.66	6.95	-4.994	-3.654*	.000	.121
	Female	28	41.65	3.08				
LBM	Male	71	67.49	11.55	18.791	8.167*	.000	.407
	Female	28	48.70	6.00				
MBF	Male	71	42.85	14.14	7.444	2.529*	.012	.063
	Female	28	35.40	9.85				
SLM	Male	71	61.30	10.26	17.286	8.480*	.000	.426
	Female	28	44.01	5.20				
TWB	Male	71	47.66	9.12	12.595	6.993*	.000	.335
	Female	28	35.06	4.32				
PSQI	Male	71	8.45	2.39	.415	.837	.405	.007
	Female	28	8.04	1.69				
Daytime Sleepiness	Male	71	11.11	3.35	-.602	-.821	.413	.007
	Female	28	11.71	3.10				

The magnitude in the differences between the mean (MD=3.61, 7.44, 17.29, and 12.60, 95% CI) was higher (eta squared = .053, .407, .426, and .335). This implies that male participants have a higher significant difference than female participants, whereas no significant differences were found between male and female participants for the PSQI and Daytime sleepiness as in categories obese group.

4. Discussion

The purpose of the present research was to compare body composition and sleep quality between both genders. The findings of this research show that the Percentage of Body Fat (PBF) is higher in obese and lowest in the underweight participants. The Lean Body Mass (LBM) is lowest in the normal and highest in the obese participants. The Mass of Body Fat (MBF) is highest in the obese and lowest in the underweight participants. Soft Lean Mass (SLM) is the highest in obese and lowest in the normal participants. Total Body Water (TBW) is highest in normal and lowest into the underweight participants. Pittsburg Sleep Quality Index (PSQI) is lowest into the normal, whereas the highest of the underweight participants.

The results of the study indicate that 19.2% of the participants were underweight, 51.5% have normal weight, 23.1% overweight, and only 3.8% were obese. Ahmed et al. [24] provide data on obesity prevalence in Hail, KSA. The study revealed that 71% of females and 56% of the male are obese in the region. Furthermore, overall, 63.6% of obesity prevalence was indicated. Al-Hazzaa et al. [25] conduct a study on the prevalence of obesity, overweight and abdominal obesity among Saudi adolescents residing in urban areas (Al-Khobar, Jeddah, and Riyadh), they indicate that prevalence of obesity equal 24% and 14% and overweight equals 19.5% and 20.8% in male and female respectively. In England and Spain, adult men reported being more overweight than women [26, 27]. Oh, et al. [28] examine a study with 775 females and 658 males into Korea and finds high prevalence of obesity in females (31.3%) compared to males (19.6). Reports of the study conducted by Unnithan and Syamakumari [29] among adolescents, has warned an increasing trend in the percentage of overweight in adolescent males compared to that of females. Observations of Bouchard and Peter [30] regarding gender on the global prevalence of obesity showed that in most of the countries, a more significant proportion of females are obese than males, whereas there is a higher proportion of males who are overweight than female. In the present study also, there is a higher proportion of overweight males than females during this age ranged. This may be because males engage in sedentary work and mostly busy with the latest electronic gadget and dependence on mechanized transportation which bereave them of their opportunities for physical activity.

Analyzing the difference between body composition and sleep suggests that the female participants showed higher PBF, MBF, and PSQI than male participants. An observation was reported by Arroyo et al. [31] (2004). The percentage of body fat was found to increase considerably during late adulthood, and females had a higher percentage of body fat than males throughout all age groups. According to the reports of a study done by Meeuwsen et al. [32], body fat and percent fat are higher in female than male and age were positively related with body fat percent in both genders. Gibson [33] states that, on average, the fat content of women is higher than that of men representing 26.9 percent of the total body weight compared with 14.7 percent for men. Kesavachandran et al. (2009) stated that even though physical activity alone cannot maintain BMI and percentage of body fat, it can reduce the risk of overweight and high body fat percent in the population. The same trend has been observed in the present study also. Meeuwsen et al. [34] state that increases in the percentage of body fat with age is predominantly due to a steady increase in fat mass and a smaller reduction in lean mass (fat-free mass). Knutson and Lauderdale [35] had reported that the odds ratio for overweight in adolescents using time-diary sleep times was not significantly affected by sleep duration.

In contrast, the odds ratio for overweight was significantly increased with reduced sleep duration when sleep duration was self-reported. The male participants showed more BMI, LBM, SLM, TWB, and Daytime Sleep than female participants for the normal group. According to Meeuwsen et al. [32], lean mass declines as the percentage of total body mass following the increase in the percentage of body fat. Altair et al. [36] have been carried out a study differentiating between the genders in the Saudi population with obstructive sleep apnea. They found that controlling for energy balance, depression, and demographic variables did not mitigate the relationship between sleep and overweight.
The result of the present study revealed that the female participants showed higher PBF and daytime sleepiness scores than male participants. According to Martin et al. [26] in

modern society, a low level of physical activity combined with changes in eating habits is the main reason for the prevalence of overweight or obesity. The National Health and Nutrition Examination Survey (NHANES) data, the difference between male and female also found in the association between sleep duration and BMI, with the female being progressively more likely to be obese as sleep duration was reduced below 7 hours per night, whereas male was more likely to be obese with six or fewer hours of sleep per night. Conversely, there is a negative correlation between body fat, body mass, and sleep duration in a study [37]. Carter, III & Wetenpaugh, [38]; Lytle et al., [39] and Turco et al., [40] studies acknowledged the presence of a notable difference between genders related to sleep quality. It indicated that both genders had disturbed sleep behaviors with shorter sleeping hours per day, even they tend to take a nap. A study revealed lower fat in males and females who reported sleep 7-8 hours per night compared to those show-up 5-6 hours of sleep per night [41]. Ganswisch et al. [42] have stated that BMI was lower in male and female who slept more than 7 hours per night compared to those slept 7 hours or less only in individual age ranged 32-49. Rontoyanni[1] [43] reported in his research a negative correlation between sleep duration and fat percentage in the healthy female, supporting the Idea that sleep duration is significantly associated with body fat. Daytime sleepiness is the lowest in underweight, whereas the highest in obese participants.

5. Conclusion

It is evident from the data presented in this study; females had a higher percentage of body fat than male throughout all categories that leads them towards poor sleep habits which are mediating factors for good health and quality of life to the community. More research needed to determine the degree of error introduced by biased sleep reporting into the association between body composition and sleep habits.

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