Assessment of dietary patterns and sleep quality in middle-aged Gujarati community

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Abstract:

Background: Globally, Gujaratis are estimated to comprise around 33% of the Indian diaspora worldwide. According to Central Intelligence Agency (CIA) world factbook demographic statistics, India's highest percentage comprises 25 to 64 years of age. In earlier times, sleep was thought to be complaisant and dormant in daily lives. Gujaratis are esteemed entrepreneurs, industrialists and brokers and homemakers. This manifests much independence and responsibility, which might result in stressful living. This causes brains to be very active during sleep, which affects sleep quality and dietary patterns.
Aim: To correlate dietary patterns and sleep quality of middle age in the Gujarati community.
Methodology: The study was carried out on 100 middle-aged Gujarati men and women residing all over India. Participants were selected by the purposive convenience sampling method. A hybrid mode was used to collect the data. The structured questionnaire was administered through google form and a 24-hours dietary recall was collected through phone calls, google meet. Data was analysed using SPSS software version 25.
Results: Nutrients such as energy, protein, zinc and copper were low in both genders and also fat intake was low in females and vitamin C in males when compared with RDA. While intake of carbohydrates, tryptophan was higher in both the genders wherein fat was higher in males than in RDA.Gender, tobacco, alcohol, and eating/drinking before sleep lowers habitual sleep efficiency, which means it lowers the number of hours sleeping in bed to the number of hours lying in bed. Sleep latency is linked with gender and bedroom temperature i.e., males fall asleep sooner than females and poor lighting, noisy rooms and too hot/cold bedroom cause delay in falling asleep. Alcohol and tobacco consumption decreases sleep duration i.e., fewer hours of sleep. Poor subjective sleep is observed with increased screen time and eating habits before bed. Less physical activity and a lesser gap between the last meal and bedtime have daytime dysfunction which affects being enthusiastic about everyday chores.
Conclusion: From the study, it can be concluded that Middle-aged Gujaratisshowalterations in sleep quality when their dietary patternswere changed. Also, poor bedroom environment and higher screentime showed changes in sleep quality.

Keywords: **Dietary pattern, sleep quality, middle age, Gujarati, screen time, bedroom environment**

I. INTRODUCTION

As per the 2011 census, Hinduism accounts for about 79.8% of the total Indian population. Among this percentage, the majority of the population resides in the western Indian state of Gujarat. 4.5% population are native Gujarati speakers of the total Indian population. Globally, Gujaratis are estimated to comprise around 33% of the Indian diaspora worldwide. According to Central Intelligence Agency (CIA) world factbook demographic statistics, India's highest percentage comprises 25 to 64 years of age. It is generally seen in an Indian family, that parents and children and their wives, grandchildren, and unmarried son and daughter live together under the same roof. And this specific stereotype is largely seen in the Gujarati community as well, where two to three generations live together under one roof. The majority of Gujaratis are vegetarian. This might be because of the influence of Jains and Vaishnavas.

In earlier times, sleep was thought to be complaisant and dormant in daily lives. Gujaratis are esteemed entrepreneurs, industrialists and brokers. This manifests much independence and responsibility, which might result in stressful living. This causes brains to be very active during sleep, which affects physical and mental health.

The COVID-19 pandemic has brought several changes to our life. Mostly in physical activity, mobility and limited availability of fresh foods. Altogether has caused a stressful period, which caused delayed bedtime, decreased sleep duration at the night, greater daytime naps, and later sleeps onset- worsening sleep quality. An additional reason for poor sleep quality during the Covid-19 pandemic is increased screen time. Screen time also affects sleep efficiency and sleep duration. [8]. The COVID-19 pandemic has resulted in nightmares and dozing off unintentionally during the day. Sleep disturbance was firmly related to the impact on mental health. [12]. In a pandemic, people have impacted psychological outbreak and showed symptoms of severe depression and severe anxiety and these factors are correlate to reduced sleep quality. [14]

To achieve adequate quality and quantity of sleep, an appropriate sleep environment is a must. Ideally, it is suggested to maintain a dark, cool, comfortable and quiet sleep environment. The ambient room temperature for sleep should range between 17-28°C and relative humidity 40-60%. Greater than 35 decibels of sound cause sleep disturbances, therefore, the sleeping area should have a lower than 35 dB noise. Plus, the bedroom should be free from blue lights and should maintain a dark environment. [1]

Blue light from a small screen or TV inside a bedroom affects sleep durations, making it shorter and giving rise to insufficient rest. Screen light delays circadian rhythm. But rather than a TV, smartphones which have increased nowadays are more harmful and disrupt sleep. This is because devices are held very close to the face, delaying melatonin release. [4]
The use of media has been spread a lot during the social isolation of the coronavirus disease 2019 pandemic. Also, middle-aged and older adults have taken up digital technology and the use of media has also increased bedside. A survey conducted in 2018, showed that 80% of Gen Xers i.e., 40-57yrs of age and 68% of baby boomers i.e.,57-75yrs of age own a smartphone. And the use of a phone for 2-3nights or more per week was related to daytime sleepiness, fatigue and harmed mood, motivation, and consciousness. People devoid of phones before bed have better sleep quality, less presleep arousal and working memory and increased positive affect. [7]
A broad area of adult life is made up of the mid-life period**.** And middle age cannot be defined only as chronological age but with these comes biological, psychological and social changes. The biological effects of stress cause changes in behaviour which also can lead to health risks, one such change is Feeding behaviour, especially food choices [17]. People with stress often use coffee or other stimulants to cope with stress. Caffeine in coffee and tea is responsible for making a person hyperactive because of which sleep patterns can be affected. Stress also leads to a craving for high fat and high sugar foods. Vitamin D deficiency is associated with sleep disorders [6] and zinc deficiency causes poor quality of sleep[2].And as these vitamins are lacking in Gujarati there are chances of poor sleep quality in these communities. Sleep disorders are now a great burden among the Indian population. Lifestyle change, work profile, food habits, leisure activities and various stresses about life influence sleep patterns and result in Sleep-Related Disorders. [10,11]

II. METHODOLOGY

A cross-sectional research study design was conducted among 100 participants of age 40-60 years who were selected from residing all over India. Data was obtained through a hybrid mode in which google Forms included a structured questionnaire and 24 hours dietary recall was collected through phone calls and google meet. The questionnaire included general information, anthropometric measurements, lifestyle information, physical activity status, screen time, Pittsburgh Sleep Quality Index, sleep environment, and food habits. Both genders (male & female), middle-age group (40-60yrs of age), Gujarati were included and pregnant women, lactating women, blind people, and critical illness (cancer, liver failure, etc.) were excluded from the study. The data analysis was done using the Statistical Package of Social Software Program (SPSS, version 25). Descriptive statistics includedpercentages, frequencies, and a measure of central tendency. Advanced statistics comprised one-way ANOVA, t-test, and Pearson correlation. Findings were considered to be significant when $p \leq 0.05$ and were considered highly significant when $p \leq 0.01$.

III. RESULTS

Table 1 General informationof the participants

Variables	Categories	Percentages (%)
Gender	Male	32
	Female	68
Family type	Nuclear	21
	Joint	79
Family size	2	1
	3-4	19
	4-5	32
	5-8	22
	More than 8	26
Marital status	Married	97
	Unmarried	0
	Widow/widower	2
	Divorced	1
Occupation	Jobless	1
	Homemaker	59
	Business	30
	Self-employed	3
	Semi-skilled profession	2
	Profession	51
Night shift worker	Yes	3
	No	97
Tobacco	Yes	7
	No	93
Alcohol	Yes	11
	No	89
Exercise	Yes	55
	No	45

In the present study, the age of the participants was between 40-60years i.e., middle-aged adults with a mean age of 50.97years±5.1. Table 1 shows most of the participants were female (68%) and 32% were males. 21% had nuclear and 79% belonged to a joint family. Maximum participants had a family size of 4-5 members, 26% more than 8, 22% 5-8, 19% 3-4,1% had 2 members in a family. Most of the participants were married (97%), window/widower (2%), and divorced (1%). Homemakerscomprised 59% and 30% of the business, 3% self-employed, 2% semi-skilled professions and 1% jobless. 97% of the participants were not night shift workers, and 3% were night shift workers. Tobacco consumption was among 7% of the total participants and 93% did not consume tobacco. Alcohol consumption was among 11% of the total participants and 89% did not consume alcohol. The physical activity of the participants was 55% while 45% had no physical activity.

Table 2 Pittsburgh Sleep Quality Index of the participants

Variables	Mean ± SD (n=100)	Pearson's correlation	p-value
Subjective sleep quality	0.57 ± 0.607	.690	.000
Sleep latency	0.94 ± 0.827	.630	.000
Sleep duration	0.93 ± 0.555	.631	.000
Habitual sleep efficiency	0.21 ± 0.624	.656	.000
Sleep disturbances	0.93 ± 0.383	.424	.000
Use of sleeping medication	0.03 ± 0.171	.203	.043
Daytime dysfunction	0.41 ± 0.698	.590	.000
PSQI global score	4.02 ± 2.309		

It can be observed from table 2, that the mean PSQI global score (4.02 ± 2.30). The study population had the least score for use of sleeping medicine (0.03 ± 0.171) followed by habitual sleep efficiency (0.21 ± 0.624), daytime dysfunction (0.41 ± 0.698), subjective sleep quality (0.57 ± 0.607), sleep disturbances (0.93 ± 0.383), sleep duration (.93 ± .55) and figure 2 shows Gujarati middle-aged had greater difficulty with sleep latency with a mean score of 0.94 ± 0.827. All the 7 components such as subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction showed statistically significant association with global PSQI score ($p<0.05$).

Table 3Gender and sleep quality of the participants

Parameters	Gender	Sample	Mean ± SD	t-value	P-value
PSQI global score	Male	35	4.03 ± 2.717	.027	.978
	Female	65	4.02 ± 2.08		
Habitual sleep efficiency	Male	35	.40 ± .812	2.280	.025
	Female	65	.11 ± .472		
Sleep latency	Male	35	.71 ± .710	-2.035	.045
	Female	65	1.06 ± .864		

Table 3 shows, that the mean frequency of PSQI global score in males was 4.03 ± 2.717 in females was 4.02 ± 2.08. And the comparison between males and females was not statistically significant. (t-value=.027, p-value=.978). Whereas, habitual sleep efficiency and sleep latency were statistically significantly correlated with gender wherein males had higher habitual sleep efficiency and females had higher sleep latency ($p<0.05$).

Table 4nutrients and sleep quality

Nutrients	Mean ± SD	PSQI global score		Sleep latency		Sleep disturbances	
		r-value	P-value	r-value	P-value	r-value	P-value
Energy (kcal)	1430.15 ± 400.68	0.092	.361	.212	.034	-.046	.649
Protein (gm)	199.75 ± 67.38	.138	.172	,253	.011	.000	.998
Carbohydrate (gm)	38.27± 10.66	.112	.266	.252	.012	-.055	.586
Fats (gm)	54.98 ± 22.81	.059	.558	.084	.406	-.020	.843

Zinc (mg)	4.9 ± 1.39	.043	.671	.209	.037	-.050	.620
Vitamin C (mg)	54.87 ± 27.25	.163	.105	.088	.383	.205	.041
Copper (mg)	1.08 ± 0.28	.135	.179	.277	.005	.014	.887
Tryptophan (gm)	0.78 ± 0.24	.046	.653	.065	.522	.021	.839

Pearson correlation was used to find an association between macronutrients and micronutrients. Table 4 shows that there is no significant correlation between nutrients and sleep quality. (p>0.05) But sleep latency was positively correlated with energy, carbohydrate, protein, zinc and copper (p<0.05). Also, sleep disturbance was positively correlated with vitamin C intake.

Table 5 Eating habits before bedand sleep quality

Eating habits before sleep						
Parameter	**Total (n=100)**	**Yes (n=5)**	**No (n=50)**	**Sometimes (n=45)**	**F value**	**P-value**
PSQI global score	4.02 ± 2.309	4.80 ± 2.490	4.38 ± 2.687	3.53 ± 1.714	1.927	.151
Subjective sleep quality	.57 ± .607	1.20 ± .447	.58 ± .642	.49 ± .549	3.239	.043
Habitual sleep efficiency	.21 ± .624	.00 ± .000	.38 ± .830	.04 ±.208	3.939	.023

Participants who had a habit of eating or drinking before sleeping had a mean PSQI score of 4.80 ± 2.490 and that who did not have this habit had a mean score of 4.38 ± 2.687. Participants who had a habit of eating or drinking sometimes had a mean score of 3.53 ± 1.714. No statistically significant association was observed between the eating habit before bedand sleep quality. (p=.151) But there was a statistically significant association between subjective sleep quality, and habitual sleep efficiency with eating/drinking before sleeping. (p=<0.05). (Table 5)

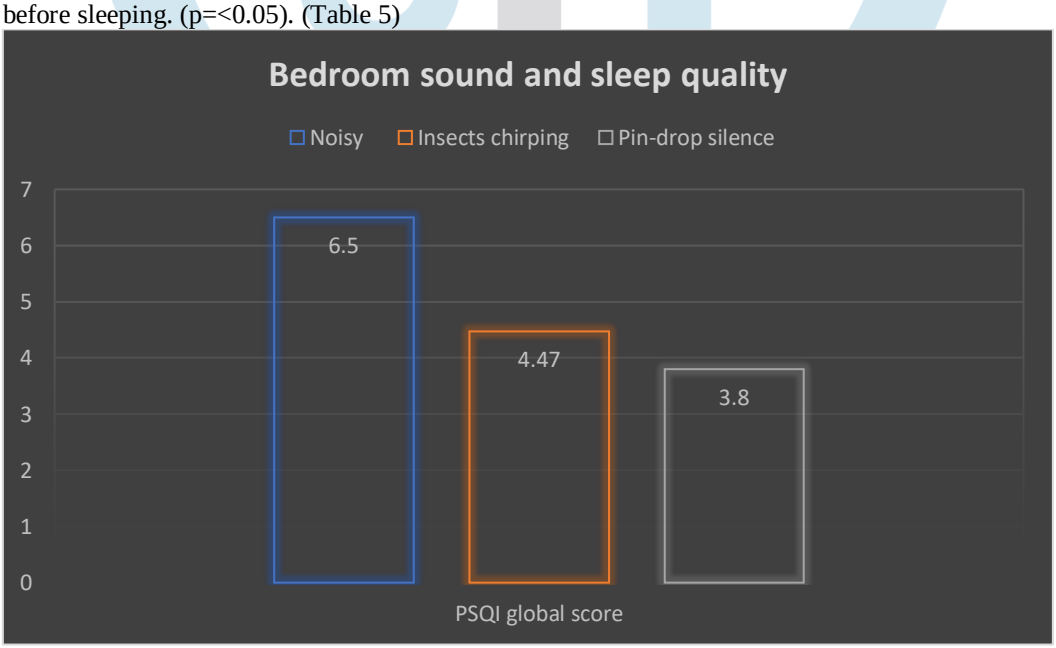

Figure 1 Association between the bedroom sound and sleep quality of the participants

In the study,fig. 1 shows that a noisy bedroom had a mean PSQI score of 6.50 ± 5.066, a bedroom sound of insect chirping had a mean score of 4.47 ± 2.764 and the least mean was for a bedroom with pin-drop silence of 3.80 ± 1.951. A statistically significant correlation was found between bedroom soundand sleep quality. (F-value=.048, p=0.048).

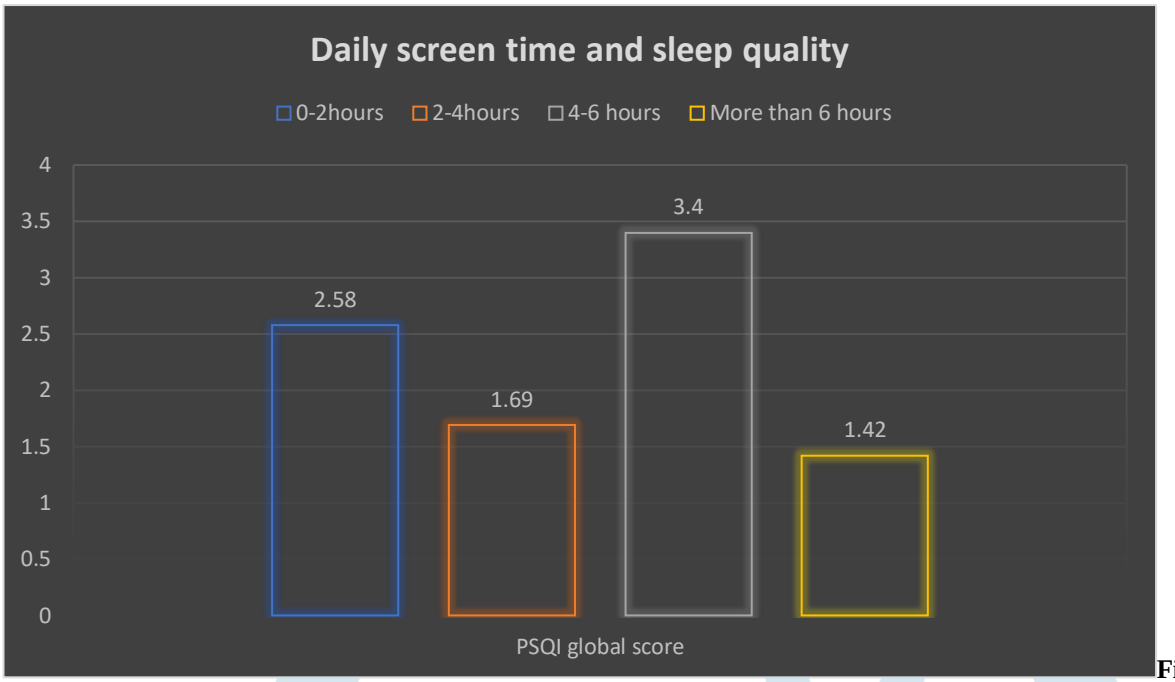

Figure 2 Association between the daily screen time and sleep quality of the participants

Figure 2 showsthe mean PSQI score with daily screen time can be observed. 0-2hours of daily screen time had a mean PSQI score of 2.58 ± .488, 2-4hours had a 1.69 ± .239 mean PSQI score while 4-6hours had a mean score of 3.40 ± .943 and those with daily screen time more than 6 hours had a mean score of 1.42 ± .475. and there is a statistically significant association between daily screen time and sleep quality. (F-value=3.54, p=.017)

IV. DISCUSSION

The study was conducted to understand the dietary patterns and sleep quality and their association in the middle-aged Gujarati community. A total of 100 participants completed the survey.

Indians are known for joint/extended family and in this study maximum number of participants belongedto joint family. As the study had most female participants, the study had more homemakers and followed by businessmen. Among 7 PSQI components, 0 show no difficulties and 3 show severe difficulty with sleep. Hence,the sleep quality of the middle-aged Gujarati population is of good quality. But Gujarati middle-aged had greater difficulty with sleep latency.
Males had more hours sleeping in bed than hours lying in bed and females took a longer time to fall asleep after going to bed. Females took 16-30min to fall asleep while males took ≤ 15 minutes. It was observed that long sleep duration is associated with an increase in hypertension. Therefore, middle-aged Gujarati women are at higher risk of hypertension than males. [16]

Participants who eat/drink sometimes had a very good sleep while those who did not eat/drink every day had a fairly good sleep. Healthy adults' daily caloric intake is influenced by meal timing and late-night eaters have a greater intake of energy and high BMI [13]. Consumption of late-night meals and sleep time found that later meal timing was associated with lower physical activity levels, which could affect weight and body fat. [15]
The higher the intake of energy, carbohydrate, protein, zinc and copper lower the sleep latency. Lower vitamin C intake causes trouble in sleep. Poor sleep quality with higher intake of energy and poor-quality diet in women,lower unsaturated fat intake and greater food weight and added sugars had worse sleep quality. Higher energy intake had a sleep latency of >60mins. [18]

In the present study, results showed daily screen time had a relation with sleep quality, where more than 6 hours had good quality sleep followed by 2-4 hours, 0-2 hours but 4-6 hours showed worst sleep quality. Contradictorily,the study mentioned that the greater the use of electronic devices more is sleep problems and poor quality of sleep. And also caused tiredness, restless sleeping, and difficulties awakening [9].Also, longer screen time was associated with shorter sleep duration and worse sleep efficiency.[3]

V. CONCLUSION

From the study, it can be concluded that Middle-aged Gujarati have a related to their dietary patterns and sleep quality. Physical activity is moderate in this population. Middle-aged Gujarati has good sleep quality with no severe difficulties. This is because they have a good bedroom environment, and a proper gap between meals and sleep. Also, tryptophan which is higher in this Gujarati middle-aged community helps improve sleep quality. But their diet shows an imbalance in macronutrients and eating practices. Hence these findings, emphasise awareness about screen time, eating habits before bed, quality of diet and physical activity which influence sleep quality among the Gujarati middle-aged needs to be done.

VI. REFERENCE

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