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Correlation Between Anger, Sleep Quality, and Indoor Activities During COVID-19 Quarantine

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Abstract

Background: Coronavirus disease 2019 (COVID-19) is a life-threatening disease that has spread globally and received international concern. Iran is one of the countries severely affected by this pandemic, implementing social lockdown and restrictive strategies. According to Persian medicine, restrictions like quarantine have psychological and social consequences.
Objectives: This study aimed to investigate the relationship between sleep quality and anger behaviors in Iran and compare it with Persian medicine viewpoints.
Methods: In this cross-sectional study, 739 participants were interviewed in April 2020 in Shiraz, Iran. The questionnaire included the Pittsburgh Sleep Quality Index (PSQI), the Multidimensional Anger Inventory (MAI), and items on demographics, temperament, and the quarantine situation social factors. All participants completed the questionnaires willingly and were ensured of data confidentiality.
Results: We found that 58.3% of the participants had low sleep quality. Females showed higher scores on anger and its related aspects ($P < 0.05$). In addition, people with lower education and income levels revealed higher anger scores ($P < 0.05$). Moreover, the mean scores of anger and its related factors were higher in participants with low sleep quality, higher sleep latency, daytime dysfunction, and experience of using sleep medications ($P < 0.05$). Also, after adjustment for demographics and other social factors, the mean scores of anger and all of its aspects were higher in those with a sleep disorder, use of sleep medications, and daytime dysfunction ($P < 0.05$).
Conclusions: In conclusion, our findings illustrated that various factors, including low sleep quality, are associated with anger in individuals with the experience of home quarantine during the COVID-19 outbreak. The outcome is compatible with Persian medicine evidence.

Keywords: COVID-19, Sleep, Anger, Activity, Persian Medicine

1. Background

According to the WHO official reports, about 39,671,115 individuals were infected with COVID-19 as of October 18, 2020, accounting for 1,109,836 deaths (1). The lockdown quarantine has had devastating effects on individuals' mental health as it arouses stress (2). Stress affects sleep timing, quality, and duration. The progressive virus spread and prolonged quarantine have dramatically affected individuals' sleep quality and quantity (3). However, individuals react to this situation differently. Some persons exhibit appropriate behaviors, while others show maladaptive behaviors (4). On the other hand, temperament (Mizaj) can be affected by environmental factors and vice versa. Stress, anger, insomnia, and social restrictions can also change the person's temperament, and people with different types of temperament would react differently in a single situation based on traditional Persian medicine (TPM) (5). Psychological states such as sleep and anger are essential factors in TPM. In their textbooks, great scholars such as Avicenna and Rhazes defined the relationship between sleep and anger quality hundreds of years ago. They believe that low sleep quality would result in impaired psychological conditions (anger), while COVID-19 is a new disease with various consequences on mental health.

It should be noted that sleep is an essential predictor of life quality. Moreover, it is a critical physiological phe-

nomenon that leads to some changes in various physiological functions. Sleep disorders increase physical complaints such as headaches and digestive disorders (6). On the other hand, it promotes the risk of depression, anger, and aggressive behaviors. Lin et al. investigated individuals' sleep quality and mental health during the pandemic and reported that chronic insomnia was more observed in young women living in city centers (7). Another study by Xiao et al. assessed individuals' social behaviors and the sleep quality effect on medical and health care of COVID-19 patients. The findings revealed that the sleep quality dramatically decreased during January and February in China. In this regard, sleep disorder and insomnia had devastating effects on social behaviors, leading to feelings such as anger and violence (8).

According to the research mentioned above, numerous studies were conducted to evaluate the mental health status of society in terms of sleep quality under different conditions (9). Throughout the pandemic, increased isolation and quarantine had the most significant impacts on the mental health of families. In Iran, little research has been published in this field.

2. Objectives

The current study aimed to investigate the relationship of sleep quality and anger with indoor activities among individuals residing in Shiraz, the capital of Fars province, Iran. Also, a comparison was made between the mentioned factors and related Persian medicine viewpoints.

3. Methods

This cross-sectional study was conducted in Shiraz, the capital of Fars province, Iran, in April 2020 on 739 participants. Fars province, with an area of almost 122,608 square kilometers, is located in the southern part of Iran. With a population of 4,851,274, this province is the fourth largest province in Iran. The capital city, Shiraz, is the most populous city in the province and the fifth most populous city in Iran. According to the official estimations of Iran's Statistics Center, 61% of the province population lives in urban areas, and 38% is rural areas (10)

Given the COVID-19 outbreak and lack of direct access to the participants, a trained person collected the required data via phone. The Shiraz phone directory database was used to select individuals' phone numbers through random-digit-dialing techniques. If the participant did not respond to three calls, the next participant would be chosen.

The adopted questionnaire consisted of three sections. Demographic variables, temperament (assessed by the valid Mojahedi short mizaj form) (11), and other social factors were evaluated through some questions in the first section. The indoor activities were defined as the actions performed inside the house, such as cooking, washing the dishes, and playing games.

The second section assessed the participants' sleep quality using the Pittsburgh Sleep Quality Index (PSQI) as one of the best measurement tools. The index was developed in 1989 by Dr. Buysse et al. at the Pittsburgh Institute of Psychiatry (12). The questionnaire assessed the participants' usual sleeping habits during a month. Also, it contained 19 items that addressed the subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction. The score of each item ranged from zero to 3, with score zero indicating normal condition and scores 1, 2, and 3 representing mild, moderate, and severe problems, respectively (12, 13). Low sleep quality was represented through a total score < 5 (12). Afkham Ebrahimi et al. estimated the validity and reliability of the Persian version of the questionnaire and reported Cronbach's alpha of 0.83 (14). Sleep quality was defined as a sum score of $>$ 6 for all factors (12). In this regard, a score > 1 from seven sleep components was considered a sleep problem in each component.

In the last section, detailed data regarding anger were collected using the Multidimensional Anger Inventory (MAI), a 38-item test designed by Siegel (1986 (to measure anger (15) The following parameters were determined through the questionnaire mentioned above: anger-in (six items), anger-out (six items), anger-arousal (six items), the range of anger-eliciting situations (six items), and hostile outlook (14 items). The responses were selected using a Likert scale ranging from 1 (completely undescriptive) to 5 (completely descriptive). The validity and reliability of the MAI Persian version were measured by Khodayarifard et al. According to these researchers, Cronbach's alpha coefficients of different MAI subscales varied from 0.79 to 0.94 (16).

The research protocol was evaluated and approved by the Ethics Committee of Shiraz University of Medical Sciences (code: IR.SUMS.REC.1399.255). Before completing the questionnaire, the verbal consent of all participants was achieved. All participants voluntarily answered the survey and were assured of information confidentiality.

3.1. Statistical Analysis

Data analysis was carried out using the Statistical Package for the Social Sciences Version 19.0 (SPSS Inc., Chicago, IL, USA). Frequency and percentage were implemented for qualitative variables, such as sleep disorder, temperament, and demographic variables, such as gender, education

level, and regular activities during the quarantine. Mean ± standard deviation was applied for data description. An independent sample *t*-test was conducted to compare the mean scores of anger and its aspects between genders and regular activities during sleep disorder. One-way analysis of variance was conducted to compare the mean scores of anger and its related factors between different groups of age, quarantine duration, education level, and economic status. Moreover, covariance analysis was performed to adjust gender, age, education level, economic status, doing exercises, watching movies in quarantine, and quarantine duration to compare the scores of anger/its aspects and sleep disorder. $P < 0.05$ was set as the significance level.

4. Results

The current study enrolled 739 individuals, including 343 (46.4%) males and 396 (53.6%) females. The mean ± SD of age was 35.2 ± 11.6 years (18 to 72 years), and 431 (58.3%) individuals experienced low sleep quality. Furthermore, the values of dry, cold and dry, cold and wet, and warm and wet temperaments were 8.2%, 21.7%, 10.4%, and 9.7%, respectively. The prevalence rates of problems in sleep duration, use of sleep medications, subjective sleep quality, sleep latency, habitual sleep efficiency, sleep disturbance, and daytime dysfunction were 33.7%, 33.6%, 74%, 82.7%, 41.1%, 96.2%, and 67.9%, respectively.

The mean ± SD of the MAI score was 124.88 ± 18.3 (range: 77 - 183). In this regard, the mean ± SD of anger-in, anger-out, anger-arousal, range of anger-eliciting situations, and the hostile outlook was 18.52 ± 3.48, 17.71 ± 4.17, 16.95 ± 4.18, 38.14 ± 3.43, and 33.56 ± 8.48, respectively.

Females achieved higher scores of anger, anger-out, anger-arousal, and range of anger-eliciting situations ($P < 0.05$). Anger-arousal had an inverse correlation with age ($P < 0.001$). The education and income levels were strongly correlated with all aspects of anger ($P < 0.05$). Accordingly, individuals with lower education and income levels had higher anger scores. Those with the experience of more than two months of home quarantine also showed higher levels of anger-in and a range of anger-eliciting situations ($P < 0.05$). Among regular activities during home quarantine, doing sports decreased anger, anger-in, anger-out, and anger-arousal ($P < 0.05$); however, watching movies increased the score of anger and all related aspects, except hostile outlook ($P < 0.05$) (Table 1).

The mean scores of anger and its aspects were higher in participants with low sleep quality, higher sleep latency, daytime dysfunction, and experience of using sleep medications ($P < 0.05$). Furthermore, the mean scores of anger and its aspects, except hostile outlook, were higher in individuals with sleep disturbance and habitual sleep efficiency ($P < 0.05$). The anger, anger-in, and hostile outlook scores were higher in subjective sleep quality ($P < 0.05$). Sleep duration did not reveal any significant relationship with anger and its aspects ($P > 0.05$) (Table 2).

In covariance analysis, higher mean scores of anger and its dimensions were observed in those with a sleep disorder, use of sleep medications, and daytime dysfunction ($P < 0.05$), adjusted gender, age, education level, economic status, leisure time activities such as watching movies and doing exercises in quarantine, and quarantine duration. Moreover, the scores of anger, anger-in, anger-out, and anger-arousal were higher in habitual sleep efficiency ($P < 0.05$). Anger and all of its aspects, except for hostile outlook, received higher scores in participants with sleep disturbance ($P < 0.05$) (Table 2).

5. Discussion

Today, COVID-19 is a life-threatening disease with a global prevalence that has become an international concern. It leads to various side effects based on age, gender, education level, etc. The COVID-19 outbreak has affected all aspects of individuals' lives, physiologically and psychologically (7, 17). The anger quality could be one of the psychological complications. The results revealed that demographic variables were related to the studied aspects of anger across a sample of the Shiraz population. The current study revealed an inverse correlation between anger-arousal and age; moreover, higher mean scores of anger-arousal were observed among individuals aged less than 30. The TPM scholars have concluded an association between dry temperament and anger in the young population, resulting from dry temperament, confirming the finding mentioned above (18). Phillips et al. investigated the relationship between age and anger regulation and observed less anger among older individuals (19). Another study by Thomas et al. revealed that the highest mean scores of the total expressed anger were shown by women aged 20 - 30, consistent with the current study findings and TPM textbooks (20).

It was also found that females had higher scores in terms of multiple anger aspects ($P < 0.05$), which was in contrast to TPM viewpoints that consider more temperament wetness in females (21). This may have resulted from higher rates of responsibility and stress among mothers during the outbreak (22). Thomas et al. indicated that the scores of women participating in their study were almost twice those of men (20). In another study by Thomas et al. (23), the gender difference and anger expression were evaluated, showing that both anger and its expression by physical symptoms were higher in women. All of the investi-

Table 1. Relationship Between Anger Aspects and Demographic Variables and Dominant Activities During COVID-19 Pandemic Quarantine

Variables	Anger-In	Anger-Out	Anger-Arousal	Range of Anger-Eliciting Situation	Hostile Outlook	Anger
Age (y)						
< 30	18.56 ± 3.48	17.82 ± 4.15	17.79 ± 4.05	38.48 ± 3.49	33.66 ± 8.17	126.32 ± 17.71
30 - 49	18.61 ± 3.47	17.78 ± 4.17	16.59 ± 4.22	37.9 ± 3.39	33.62 ± 8.88	124.52 ± 18.75
≥ 50	18.03 ± 3.47	17.16 ± 4.20	16.19 ± 4.01	38.18 ± 3.35	33.02 ± 7.64	122.58 ± 17.81
P-value	0.314	0.358	< 0.001	0.111	0.793	
Sex						
Female	18.74 ± 3.35	18.18 ± 3.92	17.51 ± 3.78	38.64 ± 3.21	33.27 ± 7.38	126.34 ± 16.43
Male	18.33 ± 3.58	17.31 ± 4.35	16.46 ± 4.45	37.71 ± 3.56	33.80 ± 9.33	123.61 ± 19.70
P-value	0.113	0.004	0.001	< 0.001	0.396	0.191
Education level						
Under diploma	19.08 ± 3.84	18.88 ± 4.17	18.21 ± 3.74	39.12 ± 2.93	34.5 ± 7.59	129.81 ± 16.88
Diploma	19.02 ± 3.58	18.8 ± 4.1	17.84 ± 3.79	38.91 ± 3.25	34.67 ± 8.41	129.26 ± 16.88
Associate degree	19.5 ± 2.65	18.57 ± 4.09	18.09 ± 3.62	38.98 ± 3.41	33.42 ± 7.65	128.59 ± 16.05
Bachelor degree	18.69 ± 3.6	17.66 ± 4.19	17.32 ± 4.33	38.32 ± 3.62	34.07 ± 8.8	126.08 ± 18.82
Master degree or higher	17.63 ± 3.17	16.52 ± 3.91	15.38 ± 4.08	36.98 ± 3.2	32.16 ± 8.57	118.69 ± 18.01
P-value	< 0.001	< 0.001	< 0.001	< 0.001	0.029	< 0.001
Income						
Low income	19.05 ± 3.33	18.31 ± 4.16	17.47 ± 4.07	38.7 ± 3.45	34.6 ± 8.53	128.15 ± 18.07
Sufficient	18.16 ± 3.5	17.24 ± 4.01	16.63 ± 4.2	37.89 ± 3.37	32.79 ± 8.27	122.74 ± 17.89
High income	18.53 ± 3.58	18 ± 4.57	16.83 ± 4.25	37.68 ± 3.43	33.84 ± 8.88	124.91 ± 19.27
P-value	0.007	0.005	0.046	0.005	0.029	0.001
Quarantine duration (d)						
< 30	18.12 ± 3.40	17.58 ± 4.23	16.82 ± 4.16	37.89 ± 3.19	33.33 ± 8.17	123.76 ± 17.56
30 - 60	18.62 ± 3.50	17.69 ± 4.19	16.91 ± 4.29	38.11 ± 3.58	33.59 ± 8.74	124.94 ± 18.92
> 60	19.73 ± 3.34	18.65 ± 3.46	18.04 ± 2.63	39.82 ± 2.59	34.48 ± 7.41	130.75 ± 14.31
P-value	0.013	0.312	0.215	0.004	0.713	0.076
Dominant activities during quarantine						
Satellite						
No	18.42 ± 3.46	17.56 ± 4.15	16.76 ± 4.17	37.99 ± 3.45	33.47 ± 8.31	124.21 ± 17.98
Yes	18.83 ± 3.51	18.21 ± 4.21	17.57 ± 4.15	38.62 ± 3.29	33.84 ± 9.02	127.08 ± 19.17
P-value	0.183	0.073	0.026	0.034	0.615	0.072
Internet						
No	18.48 ± 3.46	17.87 ± 4.02	16.95 ± 3.96	38.36 ± 3.31	33.36 ± 7.69	125.05 ± 17.24
Yes	18.55 ± 3.49	17.54 ± 4.32	16.94 ± 4.4	37.89 ± 3.53	33.75 ± 9.24	124.69 ± 19.36
P-value	0.809	0.278	0.958	0.066	0.536	0.787
Television						
No	18.46 ± 3.49	17.51 ± 4.13	16.78 ± 4.13	37.94 ± 3.43	33.09 ± 8.83	123.8 ± 18.55
Yes	18.61 ± 3.44	18.04 ± 4.22	17.23 ± 4.25	38.46 ± 3.4	34.34 ± 7.79	126.71 ± 17.72
P-value	0.567	0.097	0.152	0.047	0.053	0.037
Social media						
No	18.87 ± 3.59	17.9 ± 4.34	17.17 ± 4.31	38.21 ± 3.67	33.49 ± 8.64	125.65 ± 19.07
Yes	18.11 ± 3.28	17.5 ± 3.96	16.68 ± 4	38.05 ± 3.13	33.63 ± 8.29	123.98 ± 17.34
P-value	0.03	0.193	0.113	0.541	0.823	0.217
Sports in home						
No	18.64 ± 3.42	17.86 ± 4.13	17.08 ± 4.14	38.21 ± 3.4	33.65 ± 8.36	125.45 ± 17.96
Yes	17.44 ± 3.72	16.46 ± 4.33	15.84 ± 4.37	37.5 ± 3.6	32.71 ± 9.42	119.97 ± 20.34
P-value	0.004	0.005	0.014	0.082	0.356	0.012
Game						
No	18.49 ± 3.47	17.67 ± 4.18	16.88 ± 4.21	38.07 ± 3.44	33.56 ± 8.53	124.69 ± 18.51
Yes	18.72 ± 3.49	18.05 ± 4.07	17.6 ± 3.78	38.74 ± 3.25	33.5 ± 8	126.62 ± 16
P-value	0.597	0.471	0.172	0.121	0.954	0.401
Movie						
No	18.72 ± 3.52	18.05 ± 4.15	17.19 ± 4.29	38.43 ± 3.45	33.57 ± 8.1	125.98 ± 18.34
Yes	18.05 ± 3.31	16.94 ± 4.11	16.38 ± 3.86	37.47 ± 3.29	33.5 ± 9.29	122.37 ± 17.97
P-value	0.016	0.001	0.015	< 0.001	0.916	0.013

Table 2. Relationship Between Anger/Anger Aspects and Sleep Disorder Aspects

Sleep Item	Anger-In	P-Value [a]	P-Value [b]	Anger-Out	P-Value [a]	P-Value [b]	Anger-Arousal	P-Value [a]	P-Value [b]
Sleep disorder		< 0.001	< 0.001		< 0.001	< 0.001		< 0.001	< 0.001
No	17.79 ± 3.58			16.71 ± 4.15			15.7 ± 4.27		
Yes	19.03 ± 3.30			18.43 ± 4.03			17.77 ± 3.91		
Sleep duration		0.109	0.048		0.836	0.525		0.801	0.501
No	18.37 ± 3.44			17.69 ± 4.14			16.97 ± 4.02		
Yes	18.80 ± 3.52			17.75 ± 4.23			16.89 ± 4.48		
Use of sleep medications		< 0.001	0.003		< 0.001	< 0.001		< 0.001	< 0.001
No	18.17 ± 3.58			16.97 ± 4.19			16.20 ± 4.25		
Yes	19.20 ± 3.15			19.18 ± 3.72			18.41 ± 3.60		
Subjective sleep quality		0.010	0.002		0.455	0.111		0.158	0.020
No	17.96 ± 3.67			17.52 ± 4.52			16.58 ± 4.54		
Yes	18.71 ± 3.38			17.78 ± 4.03			17.07 ± 4.04		
Sleep latency		< 0.001	< 0.001		0.001	0.002		< 0.001	< 0.001
No	17.01 ± 3.86			16.60 ± 4.29			15.40 ± 3.85		
Yes	18.83 ± 3.30			17.94 ± 4.11			17.27 ± 4.17		
Habitual sleep efficiency		0.013	0.042		0.001	0.006		< 0.001	0.004
No	18.25 ± 3.48			17.29 ± 4.07			16.49 ± 4.12		
Yes	18.89 ± 3.43			18.31 ± 4.24			17.58 ± 4.18		
Sleep disturbance		0.010	0.008		0.001	0.001		< 0.001	< 0.001
No	16.85 ± 3.31			15.14 ± 4.18			13.78 ± 3.43		
Yes	18.58 ± 3.46			17.81 ± 4.14			17.07 ± 4.16		
Daytime dysfunction		< 0.001	< 0.001		< 0.001	< 0.001		< 0.001	< 0.001
No	17.66 ± 3.70			16.23 ± 4.34			15.29 ± 4.37		
Yes	18.92 ± 3.29			18.41 ± 3.90			17.73 ± 3.84		
Sleep disorder		< 0.001	< 0.001		0.002	0.002		< 0.001	< 0.001
No	37.23 ± 3.58			32.40 ± 9.13			119.94 ± 19.28		
Yes	38.78 ± 3.16			34.37 ± 7.88			128.40 ± 16.70		
Sleep duration		0.921	0.575		0.315	0.310		0.459	0.209
No	38.14 ± 3.43			33.33 ± 8.60			124.53 ± 18.28		
Yes	38.12 ± 3.43			33.99 ± 8.22			125.57 ± 18.33		
Use of sleep medications		< 0.001	< 0.001		0.009	0.004		< 0.001	< 0.001
No	37.50 ± 3.50			32.97 ± 8.76			12183 ± 18.66		
Yes	39.38 ± 2.91			34.69 ± 7.77			130.89 ± 15.93		
Subjective sleep quality		0.266	0.029		0.004	0.004		0.011	0.001
No	37.90 ± 3.56			32.03 ± 8.42			122.00 ± 19.59		
Yes	38.22 ± 3.38			34.09 ± 8.44			125.88 ± 17.72		
Sleep latency		< 0.001	< 0.001		< 0.001	< 0.001		< 0.001	< 0.001
No	36.99 ± 3.43			36.52 ± 8.53			116.53 ± 18.13		
Yes	38.37 ± 3.38			34.19 ± 8.33			126.62 ± 17.85		
Habitual sleep efficiency		0.016	0.123		0.076	0.062		0.001	0.004
No	37.88 ± 3.48			33.09 ± 8.71			123.01 ± 18.41		
Yes	38.50 ± 3.31			34.21 ± 8.10			127.51 ± 17.82		
Sleep disturbance		< 0.001	< 0.001		0.641	0.575		0.001	0.001
No	35.39 ± 3.37			32.82 ± 10.07			114.00 ± 18.52		
Yes	38.24 ± 3.39			33.58 ± 8.41			125.30 ± 18.16		
Daytime dysfunction		< 0.001	< 0.001		< 0.001	< 0.001		< 0.001	< 0.001
No	36.81 ± 3.69			31.49 ± 9.36			117.49 ± 19.95		
Yes	38.76 ± 3.10			34.52 ± 7.85			128.35 ± 16.35		

[a] Based on independent *t*-test;

[b] Analysis of covariance adjusted by gender, age, education level, economic status, sports and movie activities in quarantine, and quarantine duration

gations mentioned above were in line with the current research

findings.

Several investigations show a strong correlation between education level and anger management (24). The current study showed that individuals with lower education and income levels had higher anger scores ($P < 0.05$). An investigation carried out by Schieman et al. found that education level could impact the personal and social conditions, which, in turn, influenced the anger procedures (25).

According to the present study, the range of anger-eliciting situation and anger-in increased with increased quarantine duration ($P < 0.05$), which is in line with TPM. Based on TPM, repeated tasks or situations would turn into habits with fixed temperaments (25). In this case, prolonged quarantine may develop more anger and lead to a dry temperament. Another investigation compared psychological consequences among individuals with the experience of isolation due to Middle East respiratory syndrome. During the isolation period, 275 (17%) individuals showed anger; however, symptoms decreased by 6% after 4 - 6 months of isolation (26). On the other hand, several investigations revealed that individuals with the experience of longer quarantine duration did not have appropriate control of emotions, such as anger, and mental health (27, 28). This study revealed that home quarantine affected the sleep pattern, ie, sleep disorder, sleep duration, use of sleep medications, subjective sleep quality, sleep latency, habitual sleep efficiency, sleep disturbance, and daytime dysfunction. The results of the current study revealed inappropriate sleep quality in 431 (58.3%) participants; moreover, similar sleep quality was reported in other investigations during the outbreak, which ranged from 52.4% in Italy (29) to 55.8% in Taiwan (30). The results of a recent study on the Greek population are not in line with those of Voitsidis et al., which indicated clinical insomnia in almost 38% of the participants (31). It could be due to increased dryness, which is in line with the current study results. According to TPM sages, stress leads to low sleep quality due to the increased dryness of nervous system temperament (32).

According to several studies, the average sleep quality in Iranian society ranged from 12% to 37% before this outbreak (33, 34). The current study showed significant variations between individuals' sleep quality, which threatened human health, impaired social functions, and caused more negative psychosocial behaviors in conventional medical systems. A wide range of qualitative studies has been carried out on the psychological effects of quarantine (35, 36), which were associated with psychological effects of quarantine, including confusion, anger, and insomnia resulting from anxiety (37). According to the mentioned findings, an increased rate of anger could lead to low sleep quality, which may be related to adverse social effects.

Researchers refer to anger as a common mental consequence of sleep disturbance (38), confirmed by TPM evidence (39). Furthermore, the current study indicated that anger was associated with decreased sleep quality resulting from increased dry temperament, which aligns with TPM viewpoints (5). The relationship between sleep disorders, aggression, and anger can influence the prefrontal cortex, central serotonergic, and hypothalamic-pituitary-adrenal (HPA) functions. Various biological systems in individuals can lead to different aggressive behaviors, such as anger (38). One of the possible explanations of the anger-sleep association could be the impacts of anger suppression on the limbic system, which may harm REM sleep (40). Madigan et al. investigated the heart rate and REM sleep and observed the increased/decreased heart rates of angry/non-angry participants during the non-REM period/sleep cycle (41). Anger expressions and sleep quality among middle-aged men and women were evaluated by Shin et al., showing a direct association between anger and low sleep quality (42). Garrett et al. assessed the anger and sleep tendency among United States adults in the midlife and reported the interrelated sleep and anger patterns (41); also, this correlation with temperament (Mizaj) is reported in TPM textbooks (21, 32).

Preacher et al. compared individuals with higher and lower psychological resilience to evaluate the balance between sleep and unexpected events and consequently, observed a stronger positive relationship between the stressful life (events/rumors) and PSQI scores among individuals with lower mental resilience (43), which was also observed in the current study. Moreover, there are several recommendations in TPM manuscripts to relax and increase psychic hygiene during unexpected conditions, such as outbreaks (44).

One of the strengths of the present study was the inclusion of a large number of home-quarantined participants; however, more caution was required for the analysis. This was mainly because of the study limitations, including self-reporting due to possible inconsistencies. Another limitation was the lack of clinical tests to verify the accuracy of TPM recommendations to resolve the anger and poor sleep in the participants. It could be a topic of the upcoming trial in this field.

5.1. Conclusions

The current study found an association between anger and low sleep quality among individuals with the experience of home quarantine during the COVID-19 outbreak.

It could be beneficial to implement health education programs for sleep hygiene and anger management via social media and television and using humidifying foods or beverages to maintain the wet body temperament. It is noteworthy that the efficacy of the interventions mentioned above should be rigorously evaluated. Furthermore, it is recommended that healthcare professionals consider the simple TPM suggestions to control the anger and overcome sleep problems.

Footnotes

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