

Sleep Quality and Factors Affecting Sleep in Individuals With an Intestinal Ostomy: A Descriptive Cross-Sectional Study

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ABSTRACT

BACKGROUND: Multiple factors affect the sleep quality of individuals with intestinal stomas. **PURPOSE:** This study sought to determine sleep quality and factors affecting sleep in individuals with intestinal ostomies. **METHODS:** A descriptive cross-sectional design was used. This study followed 68 individuals with intestinal stomas at the stoma therapy unit of a university hospital. A form was used to gather information about patient demographic and stoma-related data (age, sex, work status, stoma duration, cause and type of stoma, stoma care provider, sleep status during the day, daily coffee consumption, and stoma-related factors affecting sleep), and the Pittsburgh Sleep Quality Index was used to score patient sleep patterns. Descriptive statistics, *t*-test, chi-square test, Fisher's exact test, and logistic regression analysis were used for statistical analysis. **RESULTS:** The patients' mean age was 53.7 ± 13.8 years; 51.5% were male, and 66.2% were married. Of the 68 patients, 41.2% had a diagnosis of rectal cancer, and 55.9% had ileostomies. Mean stoma duration was 24.1 ± 5.8 months, and 57.4% of participants performed their own stoma care. On a scale of 0 to 21, the participants' mean sleep score was 9.08 ± 5.03 , and 66.2% of patients were found to have poor sleep quality. High sleep quality was significantly positively associated with colostomy (odds ratio, 1.78; 95% confidence interval [CI], 1.18–2.69; $P = .006$) and self-performed stoma care (odds ratio, 1.54; 95% confidence interval, 1.03–2.30; $P = .036$). **CONCLUSION:** The results of the current study can provide reference data for future studies and highlight the importance of assessing sleep quality in persons with intestinal stomas.

KEY WORDS: colostomy, cross-sectional study, ileostomy, sleep disorder, sleep quality

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According to the World Health Organization, colorectal cancer is the third most commonly diagnosed cancer worldwide.¹ Cancer statistics published by the Turkish Ministry of Health report similar results, with colorectal cancer being the third most common malignancy in both women and men in Turkey.²

Bowel resection with ostomy formation is a used to treat various colorectal

diseases, including colorectal cancer.^{3,4} According to the United Ostomy Association of America, there are approximately 725,000 to 1 million people with an ostomy in the United States,⁵ and an article published in 2018 reported that there were approximately 100,000 persons with ostomies living in Germany at that time.⁶ In a study by the Stoma Study Group, formed within the Turkish Society of Colon and Rectal Surgery, data collected

from 2017 through 2019 revealed that there were 28,316 patients with ostomies in Turkey.⁷ Additionally, in a multicenter study of persons with stomas, Karadağ et al⁸ found that 54.1% of their study's sample had colostomies, but these were not necessarily due to colorectal cancer. Of 135 patients, 65.9% had stomas (colostomies or ileostomies) due to cancer.

Having an ostomy can result in multiple physiological, social, and psychological

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issues.⁸⁻¹¹ A literature review examining the psychosocial aspects of individuals with intestinal stoma reported that these issues may negatively affect individuals' coping ability and adaptation to the stoma, which negatively affects quality of life.¹² In cross-sectional studies using a stoma compliance scale and a quality of life scale for patients with an average stoma opening time of over 1 year, it was found that stoma compliance was at a low or moderate average level and that compliance had a positive and significant correlation to quality of life.^{13,14}

Low stoma compliance may influence the individual's sleep quality in an undesirable way. A study comparing the quality of life of patients with and without ostomies due to rectal cancer demonstrated that the sleep disturbance rate was 15.29% in the group of patients with ostomies and 12.15% in the other group, and the difference was statistically significant.¹⁵ A qualitative study examining the quality of life of patients with ostomy revealed that their quality of life was low, and sleep-related difficulties were reported more frequently in the female patient group; these difficulties were related to colostomy pouch leaking and sleeping positions. Additionally, some participants stated that deep, uninterrupted sleep did not occur.¹⁶

In another study conducted to determine the difficulties experienced by patients with intestinal stoma, sleep problems were the most common challenge reported under the activity and rest subtheme. Most of the patients stated that the reason for this problem was the concern that the bag would burst or leak. They stated that they could not comfortably sleep because of this anxiety, thus becoming angry and experiencing disturbed sleep patterns.¹⁷

A study conducted in South Korea examined the sleep satisfaction of patients with ostomy (N = 217) and found that 47.6% of the patients were neutral, whereas 23.1% were dissatisfied.¹⁸

In the literature, sleep problems are generally evaluated as just one aspect of quality of life in patients with intestinal stoma. To the best of the authors' knowledge, there are no studies

examining sleep quality alone in this patient group.

Purpose. This descriptive cross-sectional study was conducted to determine the sleep quality of patients with intestinal ostomies and the factors that affect sleep in these patients. The study questions were as follows: 1) What is the sleep quality experienced by patients with intestinal ostomies? and 2) What are the factors affecting sleep quality in patients with intestinal ostomies?

METHODS

Design. The study was designed as a descriptive and cross-sectional study to determine the sleep quality and factors affecting sleep in individuals with intestinal ostomies.

Sample. The necessary sample size was calculated using the G*Power program (Heinrich Heine Universität, Düsseldorf, Germany) based on Cohen's sample size estimation table. On G*Power version 3.1.9.2, the effect size was set to 0.5, whereas the significance level and power were set to 0.001 and 0.80, respectively. The results of the calculation showed that 57 patients were necessary for the sample.

The study sample was composed of 87 patients with permanent colostomies or ileostomies who underwent follow-up in the stoma therapy unit of a university hospital in Istanbul, Turkey. Patients with permanent colostomies or ileostomies for at least 1 year without psychological diagnoses who could speak Turkish and consented to participate were included in the study. However, 19 patients were excluded either for not consenting to participate or for other reasons (moving to another city, n = 5; failure to show up to follow-ups, n = 14), and the study's sample consisted of the remaining 68 persons with a stoma.

Ethical considerations. Before the start of the study, permission from the Istanbul University Cerrahpaşa Medical School Ethics Committee (decision no. 83045809/604.01/02-171716; date of approval, June 5, 2015) and the institution where the data would be collected were obtained. The study was performed in compliance with

KEY POINTS

- The authors conducted a descriptive cross-sectional study to determine sleep quality and factors affecting sleep in individuals with intestinal ostomies.
- Sixty-eight participants underwent follow-up. Data collected included demographic and stoma-related variables (age, sex, work status, stoma duration, cause and type of stoma, stoma care provider, sleep status during the day, daily coffee consumption, and stoma-related factors affecting sleep), and the Pittsburgh Sleep Quality Index was used to score sleep quality.
- Of the 68 patients, 41.2% had a diagnosis of rectal cancer, and 55.9% had ileostomies. Mean stoma duration was 24.1 ± 5.8 months, and 57.4% of participants performed their own stoma care. High sleep quality was significantly positively associated with colostomy and self-performed stoma care.
- These results provide reference data for future studies and highlight the importance of assessing sleep quality in persons with intestinal stomas.

the Declaration of Helsinki. The researcher explained the study in detail to potential participants and obtained written and verbal informed consent from all participants.

Data collection. A patient information form and Pittsburgh Sleep Quality Index (PSQI) were used for data collection. The patient information form included patient's age, sex, marital status, education status, work status, reason for stoma opening, stoma opening date, stoma type, stoma care provider, daily coffee consumption (in cups), smoking status, presence of sleep problems

Table 1. Demographic and Medical Characteristics^a

Characteristics	N (%)	Mean ± SD
Age		53.7 ± 13.8
Sex		
Male	33 (48.5)	
Female	35 (51.5)	
Marital status		
Married	45 (66.2)	
Single	23 (33.8)	
Work status		
Unemployed	19 (27.9)	
Employed	49 (72.1)	
Stoma duration, mo		24.1 ± 5.8
Diagnosis		
Colon cancer	18 (26.5)	
Rectal cancer	28 (41.2)	
Inflammatory bowel disease	22 (32.3)	
Stoma type		
Colostomy	30 (44.1)	
Ileostomy	38 (55.9)	
Who performs stoma care?		
Self	39 (57.4)	
Spouse or children	29 (42.6)	

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before stoma, daytime sleep status, and stoma-related factors affecting sleep.

The PSQI was developed by Buysse et al.¹⁹ and validated in Turkish by Ağargün et al.²⁰ It is a 19-item self-report questionnaire assessing sleep quality and disturbances over the past month. The 19 self-rated items assess the following 7 components: 1) subjective sleep quality, 2) sleep latency, 3) sleep duration, 4) habitual sleep efficiency, 5) sleep disturbances, 6) use of sleeping medication, and 7) daytime dysfunction. Each component was scored from 0 to 3 points, and the sum of the 7 components gave the global score, which ranged from 0 to 21 (Table 2). A global score greater than 5 indicated poor sleep quality.¹⁹ The Cronbach's alpha value for this study was 0.80.

The study's data were collected from January to April 2017. The patient information form and the PSQI were completed by the same researcher using the face-to-face interview technique. Data were collected at the university hospital where stoma follow-up was done.

Appointments were made routinely for patients at the third, sixth, and 12th month after surgery. Patients were called 1 week before their appointments and reminded of the appointment date. They were invited to the hospital's stoma therapy unit, and the data were collected face to face; the researcher first introduced herself and provided information about the research. The patients were given data collection forms and asked to complete them. For some patients (those with vision problems or who were illiterate), the questions were read aloud by researcher. Data were recorded using paper/pencil materials and entered into a computer by the researchers. Each patient spent approximately 20 minutes filling out the data collection form. During data collection, the patient, any patient relatives who had come with the patient, and the researcher were present.

Data analysis. The data were entered into SPSS v20 (IBM) and analyzed. The Kolmogorov-Smirnov test was used to assess whether the data were normally distributed. Descriptive statistics (mean

± standard deviation, or median interquartile range) were used to analyze continuous variables; categorical data were calculated in numbers and percentages. Differences between groups for continuous variables were evaluated using the *t*-test. The chi-square test and Fisher's exact test were used to assess differences based on demographic characteristics and sleep quality. Probability values (*P* values) less than .05 were considered statistically significant. Logistic regression analysis was used to assess the relationship between good sleep quality and demographic and stoma-related characteristics.

RESULTS

The study's participants' median age was 53.5 years (range, 20–80 years). Among the participants, 51.5% (*n* = 35) were male, 66.2% (*n* = 45) were married, 41.2% (*n* = 28) had a diagnosis of rectal cancer, and 55.9% (*n* = 38) had ileostomies. The patients' mean stoma duration was 24.1 ± 5.8 months. Of 68 patients, 57.4% (*n* = 39) performed stoma care by themselves, and the rate of patients who did not sleep during the day was 52.9% (*n* = 36). When the situation regarding the stoma affecting their sleep was examined, it was found that 97.1% (*n* = 66) of the patients did not lie on the side with the stoma. The patients' mean daily coffee consumption was 1.0 ± 1.0 cups, and 82.4% of the patients were nonsmokers (Table 1).

Mean global PSQI score was 9.08 ± 5.03 (median = 7.0 [5–14]), and 66.2% (*n* = 45) of participants were found to have poor sleep quality. The patients' median time to fall asleep was 30 minutes, and 80.9% of patients slept for 6 to 7 hours at night. Among the PSQI components, sleep latency had the highest median score (2.0 [1.0–2.0]), whereas sleeping medication use had the lowest (0 [0.0–0.0]; Table 2).

Among the factors affecting sleep in patients with poor sleep quality, the most frequent ones were inability to lie on the side of stoma (*n* = 42, 93.3%), discomfort due to the ostomy pouches (*n* = 38, 84.4%), anxiety associated

Table 1. Demographic and Medical Characteristics^a (Continued)

Characteristics	N (%)	Mean ± SD
Do you sleep during the day?		
Yes	32 (47.1)	
No	36 (52.9)	
Daily coffee consumption (cups)		1.0 ± 1.0
Smoking		
Yes	12 (17.6)	
No	56 (82.4)	

Abbreviation: SD, standard deviation.

^aN = 68.

Table 2. Pittsburgh Sleep Quality Index Scores^a

	N (%)	Median (IQR)
Global PSQI (mean ± SD = 9.08 ± 5.03)		7.0 (5-14)
No. of minutes to fall asleep		30 (30-45)
Poor sleep (global PSQI > 5)	45 (66.2)	
Good sleep (global PSQI ≤ 5)	23 (33.8)	
Subscale results		
Sleep duration		0.0 (0.0–1.0)
≥ 7 h sleep per night	13 (19.1)	
< 7 h sleep per night	55 (80.9)	
Sleep disturbance		1.0 (1.0–3.0)
No sleep disturbance	1 (1.5)	
Low sleep disturbance	10 (14.7)	
Medium sleep disturbance	36 (52.9)	
High sleep disturbance	21 (30.9)	

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Table 2. Pittsburgh Sleep Quality Index Scores^a (Continued)

	N (%)	Median (IQR)
Sleep latency		2.0 (1.0-2.0)
No sleep latency	1 (1.5)	
Low sleep latency	25 (36.8)	
Medium sleep latency	27 (39.7)	
High sleep latency	15 (22.1)	
Daytime dysfunction		1.0 (0.0-2.0)
No daytime dysfunction	22 (32.4)	
Low daytime dysfunction	16 (23.5)	
Medium daytime dysfunction	19 (27.9)	
High daytime dysfunction	11 (16.2)	
Habitual sleep efficiency		3.0 (3.0-3.0)
≥ 85% number of hours spent in bed	7 (10.3)	
75% to 84% of number of hours spent in bed	60 (88.2)	
65% to 74% of number of hours spent in bed	1 (1.5)	
≤ 64% number of hours spent in bed	–	
Subjective sleep quality		1.0 (1.0-3.0)
Very good	7 (10.3)	
Fairly good	9 (13.2)	
Fairly bad	36 (52.9)	
Very bad	16 (23.5)	

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with leakage (n = 34, 75.5%), waking up to empty pouches (n = 32, 71.1%), and flatulence from pouches at night (n = 25, 55.5%; Table 3). Very few patients were using pouches with gas filters; after reviewing the results reported here, the authors recommended gas-filtering pouches to these patients.

Patients who were of older age, had an ileostomy, and whose stoma care was performed by spouses or children were found to have significantly poorer-than-average sleep quality ($P < .05$; Table 4).

Persons with colostomy were significantly more likely to have good sleep quality relative to persons with ileostomy (odds ratio [OR], 1.78; 95% confidence interval [CI], 1.18–2.69). Using “stoma care performed by the spouse or children” as the referent category, a logistic regression model showed that good sleep quality was significantly associated with stoma care performed by the patient (OR: 1.54, 95% CI: 1.03–2.30) after adjusting for demographics and stoma risk factors (Table 5).

DISCUSSION

Considering sleep quality components, sleep latency had the highest mean score, and sleeping medication use had the lowest mean score. Like the present study, other studies have reported sleep disturbances among persons with ostomies. In their qualitative, descriptive phenomenology study of 12 persons who had permanent colostomies, Alwi et al⁹ noted that individuals' sleep quality decreased after their colostomies. Patients expressed that their sleep was poor because they could not comfortably move to the right and left because of the pouch.⁹

Kimura et al²¹ reported similar results in persons with ostomies due to colorectal cancer, finding that 60% of these individuals had poor quality of sleep. In a Brazilian study that used both quantitative and qualitative approaches to investigate the quality of life of 120 patients with a stoma due to colorectal cancer, researchers reported that poor-quality sleep was considered a negative subcategory for quality of life.²² Harputlu et al²³ assessed the sleep quality of persons

with stomas, and their findings, similar to those of the present study, revealed low use of sleeping medications along with high subjective sleep quality and sleep latency scores.

The National Sleep Foundation²⁴ recommends an average of 7 to 9 hours of sleep for individuals who are 18 to 64 years of age. In the current study, 80.9% of participants' sleep durations were 6 to 7 hours, reflecting their ostomies' negative influence on their sleep quality. Ostomies are performed to treat underlying pathology and improve patient outcomes, and they impact individuals' entire lives. Adapting to an ostomy is a continuous process, and physical, psychological, and socioeconomic problems that patients experience during this process are considered to have potential negative effects on their sleep quality.

In this study, patients were found to experience poor sleep due to many factors. Those patients who reported poor sleep mostly stated that they could not lie on the side of the stoma (93.3%) and that their sleep was disturbed because the ostomy pouch was uncomfortable (84.4%). In another study examining the quality of life of colorectal cancer patients with intestinal stoma, it was found that there was a significant negative relationship between sleep and pain, fatigue, and discomfort; such feelings have negative effects on quality of life.²¹ In their qualitative study on persons with permanent

Table 2. Pittsburgh Sleep Quality Index Scores^a (Continued)

	N (%)	Median (IQR)
Use of sleeping medication		0.0 (0.0-0.0)
Not during the last month	58 (85.2)	
Less than once a week	5 (7.4)	
Once or twice a week	4 (5.9)	
3 or more times a week	1 (1.5)	

Abbreviations: PSQI, Pittsburgh Sleep Quality Index Scores; IQR, interquartile range.
^aN = 68.

colostomies, Alwi et al⁹ found that the pouch creates discomfort, and patients cannot sleep comfortably due to leakage anxiety, or they lie on the side of the stoma bag. Especially in persons with high body mass index, sleeping in the supine position can exacerbate sleep apnea and thus negatively influence health.

It is reported in the literature that interrupted sleep causes increased peristalsis, which in turn results in dysfunctional motility and increased gastric emptying in patients with gastrointestinal disorders.^{25,26} Therefore, patients experience stool passage when they wake up at night and may need to empty the pouch. Patients should be informed that if the pouch is properly adhered to the

skin, there will be no leakage and that the pouch will not burst even if they lie on its side. This information can relax patients and help them sleep better. Further research is needed to better understand this result.

In the present study, the mean age of persons with poor sleep quality was significantly higher than the mean age of those with good sleep quality; this is similar to the results of other studies. Vorbeck et al²⁵ emphasized that age is significantly correlated with sleep disturbances in persons with ostomies and that quality of sleep decreases with increasing age. Other studies have reported that age influences sleep; with advanced

Table 3. Distribution of Factors Affecting sleep in Patients With Poor Sleep Quality (PSQI > 5)^a

Factors affecting sleep ^b	N	%
Discomfort due to ostomy pouch	38	84.4
Anxiety associated with leakage	34	75.5
Not being able to lie to the side of stoma	42	93.3
Flatulence from pouch at night	25	55.5
Waking up to empty the pouch	32	71.1

Abbreviation: Pittsburgh Sleep Quality Index.

^aN = 45.

^bMore than 1 factor could be selected for this question.

Table 4. Comparison of Demographic Characteristics of Patients With Good and Poor Sleep Quality^a

		Good sleep quality (≤ 5) N = 23	Poor sleep quality (> 5) N = 45	P value
Age, mean $\pm$ SD ^b	53.7 $\pm$ 13.8	44.3 $\pm$ 11.7	58.5 $\pm$ 12.4	.000 ^c
Stoma duration, mo (mean $\pm$ SD) ^b	24.1 $\pm$ 5.8	23.1 $\pm$ 6.2	24.6 $\pm$ 5.6	.204
Sex, n (%)^d				.106
Male	35 (51.5)	13 (56.5)	22 (48.9)	
Female	33 (48.5)	10 (43.5)	23 (51.1)	
Work status, n (%)^d				.076
Employed	19 (27.9)	8 (34.8)	11 (24.4)	
Unemployed	49 (72.1)	15 (65.2)	34 (75.6)	
Diagnosis, n (%)^e				.083
Colon cancer	18 (26.5)	3 (13.0)	15 (33.3)	
Rectal cancer	28 (41.2)	9 (39.1)	19 (42.2)	
Inflammatory bowel disease	22 (32.3)	11 (47.8)	11 (24.4)	
Stoma type, n (%)^e				.000 ^c
Colostomy	30 (44.1)	18 (78.3)	12 (26.7)	
Ileostomy	38 (55.9)	5 (21.7)	33 (73.3)	
Who performs stoma care? n (%)^e				.000 ^c
Self	39 (57.4)	23 (100)	16 (35.6)	
Spouse or children	29 (42.6)	–	29 (64.4)	

Abbreviation: SD, standard deviation.

^aN = 68.

^bt-test.

^cStatistically significant.

^dChi-square test.

^eFisher's exact test.

age, sleep disruptions increase, and sleep disturbances are more commonly encountered.^{27,28}

In this study, the type of stoma (colostomy versus ileostomy) was also found to influence sleep quality. Patients with ileostomies must empty their pouches

more frequently than those with colostomies,⁶ so patients with ileostomies experience more sleep interruptions and, in turn, have poorer sleep quality. A study by Baldwin et al²⁹ showed that persons with ostomies wake up at night both for pouch emptying and because

of leakage anxiety. The present study's findings indicating that stoma type impacts sleep quality are consistent with the literature.

In a cross-sectional study examining the sleep quality of patients with stoma for an average of 18 months, it was found

Table 5. Fully Adjusted Binary Regression Model, Adjusted for Demographics and Stoma Risk Factors^a

Variable	Categories	Odds ratio	95% confidence interval	P value
Stoma Type	Ileostomy ^b	–	–	–
	Colostomy	1.78	1.18-2.69	.006 ^c
Age	≤ 53	0.93	0.76-1.13	.277
	≥ 54	–	–	–
Sex	Male ^b	–	–	–
	Female	0.24	0.01-3.11	.118
Work status	Employed ^b	–	–	–
	Unemployed	0.43	0.01-1.75	.662
Stoma duration, y	1–2 ^a	–	–	–
	≥ 3	0.89	0.71-1.12	.329
Who performs stoma care	Spouse or children ^b	–	–	–
	Self	1.54	1.03-2.30	.036 ^c

^aThe model was fitted with good sleep quality as the dependent variable.

^bReferent category.

^cStatistically significant.

that the sleep quality of patients who performed stoma care themselves was better than that of other patients.²³ Similarly, individuals in the current study who performed stoma care themselves had improved sleep quality. Self-care is thought to have positive effects on patients' psychology. Additionally, it is thought that patients who perform their own stoma care are not unnecessarily awakened by others and can adjust their own nighttime bag emptying times.

LIMITATIONS

Because there is little information about the sleep quality of patients with intestinal stoma in the literature, this study will serve as a preliminary source of information for health care professionals. However, this study's results can

be generalized to only this sample group, the size of which is limiting. The study was conducted in a single center with a small number of persons with ostomies. The authors could not find any study in the literature that directly measured the sleep quality of patients with intestinal stoma; in the sources discussed, sleep quality generally was considered as a subdimension of the quality of life scale.

CONCLUSIONS

This descriptive cross-sectional study was conducted to evaluate sleep quality and factors affecting sleep quality in persons with stomas. The results revealed poor sleep quality in persons with stomas, with sleep quality being worse in persons with ileostomies than that of those with colostomies. More than half

of patients stated that they could not lie on the side of the stoma pouch. It was determined that the sleep quality of male patients and of those whose spouses or children cared for their stomas was worse than that of other patients. Considering that sleep is a basic human need and that sleep disturbances cause serious consequences, further qualitative research with in-depth interviews is needed to clarify the factors affecting sleep in this patient population. The development of interventions based on such findings is also warranted. Moreover, regular follow-up evaluation of sleep in persons with ostomies receiving care in stoma therapy units and planning individualized interventions are recommended. Studies comparing the sleep quality of persons with ostomies with

that of patients without ostomies may be recommended.

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