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Original Article

Lifestyle Factors Associated with Poor Sleep Quality Among Healthcare Professionals: A Cross-Sectional Study

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ABSTRACT

Background: Healthcare professionals have been reported to be one of the poorest sleepers' groups, but most of the available research has focused on individual sleep habits (e.g., using a phone in bed) without assessing whether any of these sleep habits are still associated with poorer sleep. The lifestyle habits which are predictive of poor sleep quality in participants when controlling other lifestyle habits, using the Pittsburgh Sleep Quality Index (PSQI) as the outcome.
Materials and Methods: This is an analytical cross-sectional study, which was conducted among 158 doctors and other health care professionals in public and private hospitals. A self-administered questionnaire consisting of socio-demographic, 8-lifestyle habits and 19-item PSQI was used. One hundred and nineteen of the 136 responses received were complete PSQI data that were analyzed.
Results: Mean PSQI scores was 6.29 ± 3.06 and 72 (60.5%) participants were identified as having poor sleep. The odds of a poor sleep were almost three times higher when a gadget was kept next to the bed (aOR 2.82, 95% CI 1.00–7.92, p = 0.050), whereas the odds of a poor sleep were slightly more than two-thirds lower with daytime napping (aOR 0.36, 95% CI 0.15–0.83, p = 0.018), which suggests a potential compensating effect of napping on the disrupted nighttime sleep. After adjustment, the remaining six habits, such as physical inactivity and general gadget use before bedtime did not show independent association.
Conclusions: Poor sleepers were found to be three of five participants. Of the eight lifestyle behaviors studied, the only behavior that remained as a risk factor after controlling for the other behaviors could be considered a target behavior for change from an intervention perspective proximity to an overnight gadget; napping also should be considered a proxy for sleep disruption.

Keywords: *Pittsburgh Sleep Quality Index; Healthcare Professionals; Lifestyle Habits; Electronic Gadget; Sleep Quality in Pakistan; cross-sectional study.*

INTRODUCTION

A good night's sleep is one of those luxuries that are taken for granted until they're not there anymore. But the stakes are even greater for healthcare professionals, as they lose the same abilities they need to practice medicine: attentiveness, memory and judgment. In many researches, doctors and other medical personnel are some of the worst sleepers around, and this is often attributed to shift rotations, long shifts and the inherent instability of working in a hospital. The most widely-used tool for measuring sleep is the Pittsburgh Sleep Quality Index (PSQI), which assesses sleep in seven dimensions: subjective quality, latency, duration, efficiency, disturbances, medication use and daytime dysfunction, and synthesizes these dimensions into a global score, higher scores representing poorer sleep.

According to the recent researches, the mean PSQI score for the 402 sample Chinese health care professionals was 8.37 ± 3.6 with approximately 27% considered poor sleepers.[1] In a Brazilian study of 244 health professionals, over half (55.7%) were poor sleepers and physical inactivity was a stand-out independent predictor (PR 1.32, 95% CI 1.02–1.70).[2] In a survey of psychiatrists in Saudi Arabia, most reported poor sleep quality, which is much higher than the general population.[3] Numbers such as these motivate healthcare workers to remain a high-risk group for sleep disturbance and its attendant chronic cardiometabolic consequences, including for burnout, error rate, and overall long-term health.[4]

However, when it comes to the behavior surrounding the bedtime, the focus has been on screens and smartphones: in medical and nursing student samples, between 90 and 98% indicated that they used a screen within an hour of bedtime, with this consistently correlating with delayed sleep onset and reduced PSQI scores.[4] But overnight exposure to the phone appears to make things worse, as it allows for checking or screen viewing following night-time awakening, and this has emerged as an independent predictor in multivariable models from an international cohort of medical students recently.[5,6] Other habits such as eating late, caffeine or alcohol close to bedtime, skipping exercise turn up in the literature too, usually studied on their own. Other behaviors that could potentially be useful, including an afternoon nap, regular exercise, or a relaxing activity, such as prayer, have only been studied in small numbers of healthcare workers.[7] The difficulty with learning each habit one at a time is that it's not a reflection of the real world. If a clinician has a late-night dinner, scrolls her phone in bed and never exercises these are not three separate exposures because they are all happening simultaneously and likely reinforcing each other.[8]

The problem with isolating a single variable like most of the studies already conducted do, is that it can be given too little or too much credit when all the other habits around it are taken into account; and it doesn't easily lend itself to advice, as no one's daily routine is just one habit.[9,10]

This study is designed to fill that gap and will test eight lifestyle factors simultaneously (versus one at a time); smoking, eating before sleep, drinking a beverage before sleep, physical activity, prayer before sleep, use of electronic gadget before sleep, keeping a gadget near the bed, and napping during the day) on sleep quality as measured by the PSQI in a sample of practicing health workers. The idea is to determine which of these habits remain as an independent predictor even after the other habits have been included in the model, thus providing a more realistic picture of where intervention efforts should be made. The objective of this study is to determine which lifestyle habits are independently associated with poor sleep quality among practicing healthcare professionals, using the Pittsburgh Sleep Quality Index as the outcome measure.

Most existing research on this topic zeroes in on a single habit, typically mobile phone use, and stops there. This study instead looks at eight lifestyle habits together in one multivariable model, so that their independent contributions to poor sleep can be told apart rather than assumed.

METHODOLOGY

Study Design and Setting

The study was an analytical cross-sectional study conducted among the existing healthcare professionals in Lahore, Pakistan working in public and private sector hospitals. The data was collected between June to July 2026, using a structured self-administered Google Forms created questionnaire.

Study Population and Sampling

The participants included doctors and other healthcare professionals including house officers, medical officers/registrars, postgraduate trainees and senior faculty from various clinical specialties who were in active practice. No sampling frame was available to sample, so the recruitment process was convenience sampling; the survey link was sent via WhatsApp, and the individual who responded and met the criteria was included. There were 136 responses that were complete enough for analysis.

Inclusion and Exclusion criteria

- ***Inclusion criteria:*** qualified healthcare professionals (MBBS and above including post — graduate trainee) who were in current clinical practice and agreed to participate.
- ***Exclusion criteria:*** respondents that did not respond to an item in the PSQI, patients in purely administrative positions without clinical responsibilities, and those who refused.

Data Collection Tool

There were 2 parts to the questionnaire. Information pertaining to socio-demographic and occupational data, including age, gender, marital status, qualification, designation, specialty, working hours and number of night duties per month, as well as lifestyle habits of interest, was collected. The latter was the traditional 19 item, self-rated Pittsburgh Sleep Quality Index which includes questions regarding sleep quality and sleep disturbances during the last month. The answers to the 19 PSQI items were translated into seven component scores ranging from 0–3: subjectively rated sleep quality; sleep latency; sleep duration; habitual sleep efficiency (calculated from the reported bedtime, wake time, and hours slept); sleep disturbances;

use of sleep medicine; and daytime dysfunction. The PSQI was obtained by summing up these seven components. Individuals with scores above 5 were considered as poor sleepers.

Study Variables

The independent variables were smoking status, eating within an hour of going to bed, drinking anything within one hour of bed, regular physical activity, offering prayer before sleep, using an electronic gadget before sleep, keeping a gadget or phone near to the bed at night, and daytime napping. The results were the quality of sleep. This was reported as overall PSQI score (a continuous measure ranging from 0-21), and for the main analysis as good sleep quality (PSQI ≤ 5) versus poor sleep quality (PSQI > 5) based on the standard PSQI cut-off[11].

Statistical Analysis

SPSS 24 was used for analysis. Frequency and percentages for categorical variables, mean ± SD for continuous variables, if continuous variables were normally distributed, and median (IQR) for continuous variables if they were not normally distributed. Bivariate analysis was conducted, using Chi-square test (Fisher's exact test when expected cell counts were <5) to examine the association between each lifestyle variable and sleep quality category. Binary logistic regression was carried out to determine which lifestyle factors remained independent predictors of poor sleep after controlling for other lifestyle factors and socio-demographic and occupational factors. The variables that were significant at $p < 0.20$ at bivariate analysis were taken forward to the model. Adjusted ORs with 95% CI for the variables included in the final model were reported. The significance level used throughout was a two-tailed p value of < 0.05.

Ethical Considerations

The study was carried out with approval from the Institutional Review Board. Participation was voluntary and respondents consented electronically prior to their participation in the survey. Every response was anonymous, and no personally identifying information was associated with any responses, and confidentiality was ensured during handling and analysis of the data.

RESULTS

Of the 136 healthcare professionals who filled out the questionnaire, 119 gave complete enough answers on the PSQI items to calculate a global sleep score that's the group the results. The rest were dropped rather than guessed at, since PSQI is a fussy instrument that needs every component filled in to mean anything. The sample skewed working-age and was almost perfectly split by gender, which is a nice coincidence for a study like this: nobody can accuse the results of being driven by one gender dominating the numbers.

Characteristic	Value
Sample size (n)	119
Age, mean ± SD (years)	41.4 ± 15.2
Gender	60 female (50.4%) · 58 male (48.7%)
Global PSQI score, mean ± SD	6.29 ± 3.06 (range 0–14)
Global PSQI score, median (IQR)	6.0 (4.5–8.0)
Poor sleepers (PSQI > 5)	72 (60.5%)
Good sleepers (PSQI ≤ 5)	47 (39.5%)

Table 1. Who's in the sample, and how they slept.

Three out of every five healthcare professionals in this sample are poor sleepers by PSQI standards, as shown in fig 1

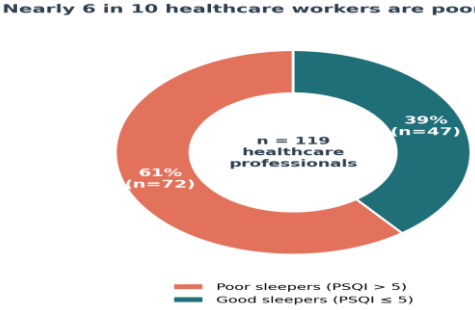

Figure 1. Sleep quality split across the sample (n = 119).

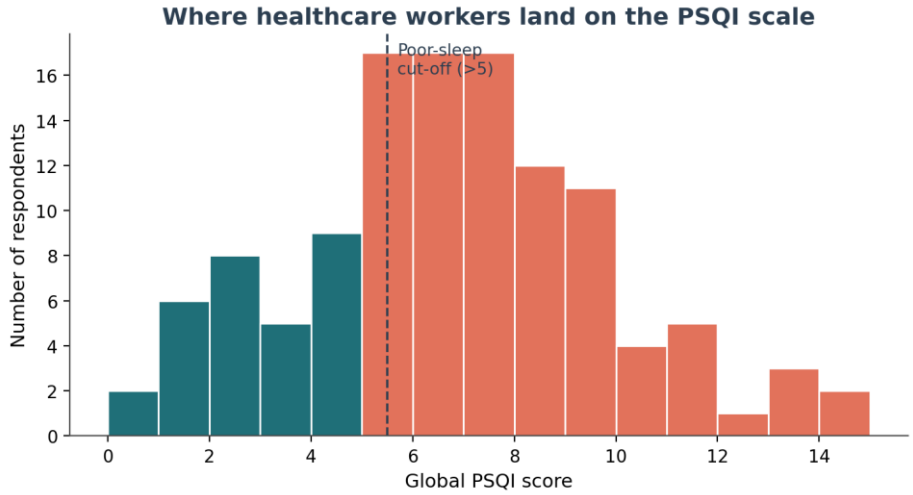

Figure 2. Spread of PSQI scores. The dashed line marks the poor-sleep cut-off (>5) — notice how much of the sample sits to the right of it.

Which Habits Actually Line Up with Poor Sleep

Running each lifestyle habit against sleep quality on its own (Chi-square), most of them turned out to be more noise than signal plausible-sounding habits that just didn't separate good sleepers from poor ones in this sample.

Lifestyle habit	% poor sleep — lower-risk group	% poor sleep — higher-risk group	χ^2	p-value
Keeps gadget beside bed	38% (not always/mostly)	66% (always/mostly)	5.51	**0.019 ***
Daytime napping	52% (naps)	73% (doesn't nap)	4.27	**0.039 ***
Uses gadget before sleep	41% (no)	64% (yes)	2.29	0.130
Physical activity	56% (active)	74% (inactive)	2.24	0.134
Eating before sleep	55% (no)	64% (yes)	0.50	0.479
Drinking before sleep	57% (no)	63% (yes)	0.13	0.719
Prayer before sleep	59% (regular)	63% (infrequent/never)	0.06	0.806
Smoking	61% (non-smoker)	60% (smoker)	0.00	1.000

Table 2. Chi-square results for each lifestyle habit vs. sleep quality category. * $p < 0.05$. Rows sorted by strength of association.

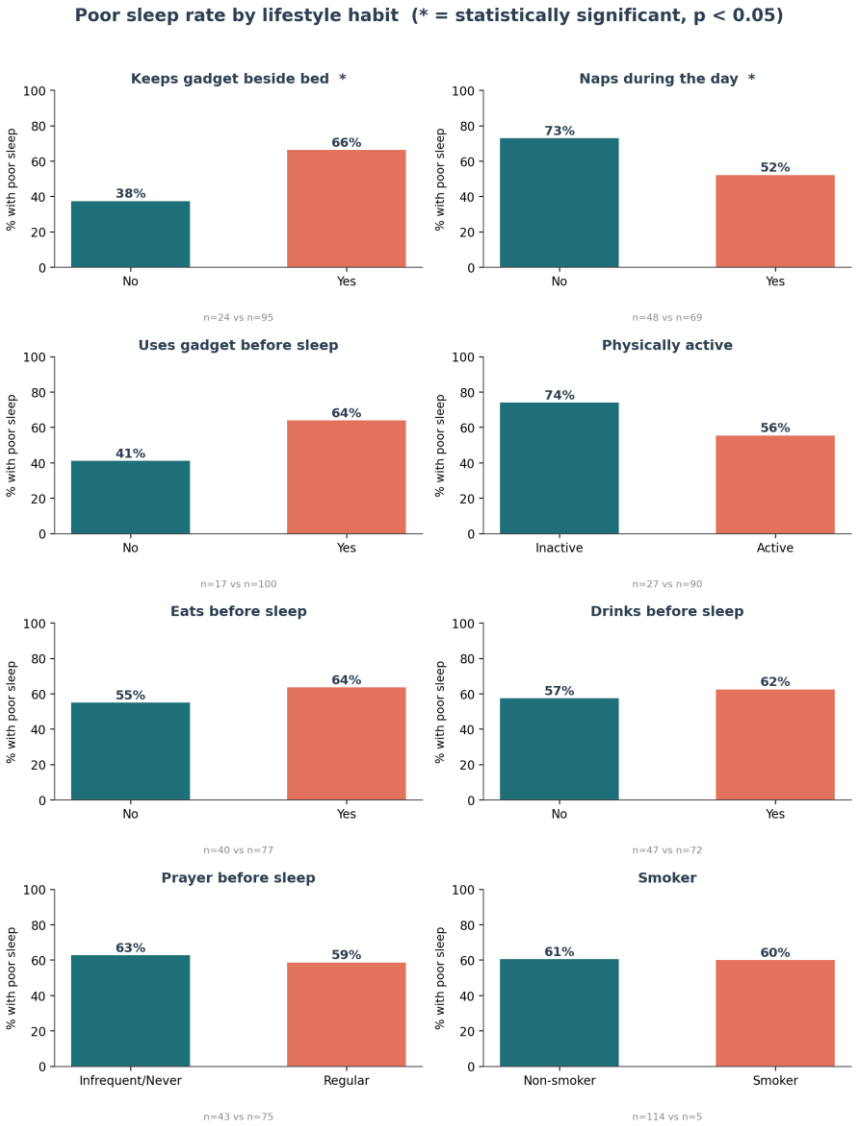

Figure 3. Poor-sleep rate by lifestyle habit, side by side. The taller the gap between bars, the more that habit tracks with sleep quality — gadget-beside-bed and napping are the only two where the gap is statistically real.

The napping outcome is worth considering since it defies the belief that naps during the day interfere with sleep at night. But our results show opposite non-nappers had the worse sleep (73% poor) compared with nappers (52% poor). One plausible read is that healthcare professionals who nap are doing it to recover from short or fragmented nighttime sleep in the first place meaning the nap isn't causing anything, it's a coping response to a bad night. Cross-sectional data like this can't settle that either way, and it's flagged again in the limitations.

Which Habits Hold Up After Adjusting for the Rest

Table 3 shows as, A habit lines up with sleep quality on its own. It doesn't tell as whether that habit is still doing anything, the people who keep a phone beside the bed are often the same people who scroll on it before sleeping, skip naps, and so on. That's what the logistic regression model is for all eight habits entered together, so each odds ratio below is the effect of that one habit with the other seven held constant.

Lifestyle habit	Adjusted OR	95% CI	p-value
Keeps gadget beside bed	**2.82**	1.00 – 7.92	**0.050 ***
Daytime napping (protective)	**0.36**	0.15 – 0.83	**0.018 ***
Uses gadget before sleep	1.98	0.66 – 5.95	0.225
Physically inactive	1.56	0.55 – 4.43	0.403

Eats before sleep	1.36	0.59 – 3.15	0.469
Drinks a beverage before sleep	1.21	0.53 – 2.75	0.654
Infrequent/no prayer before sleep	0.97	0.40 – 2.36	0.955
Smoker	0.87	0.12 – 6.33	0.888

Table 3. Multivariable logistic regression — all eight habits modelled together. * p < 0.05. Reference categories: non-smoker, no eating/drinking before sleep, physically active, regular prayer, no gadget use/no gadget beside bed, no nap.

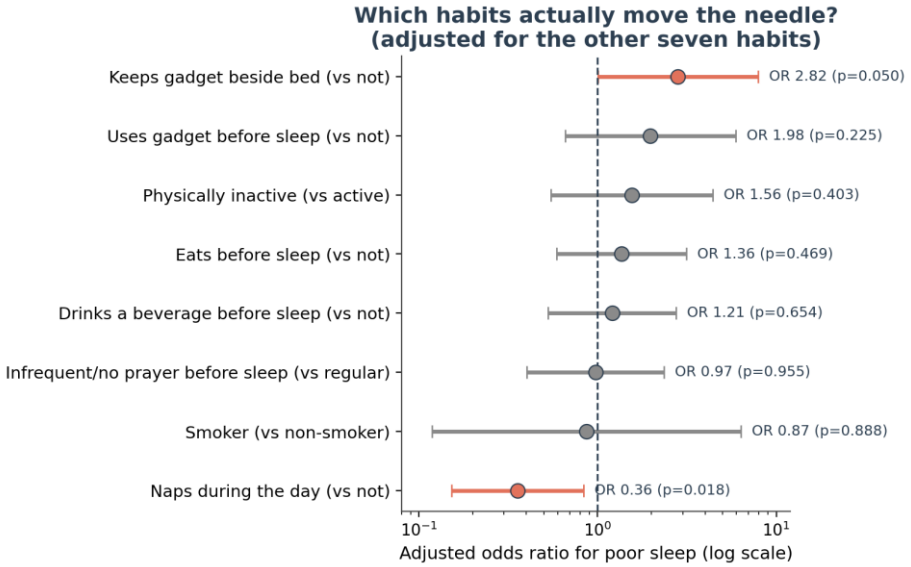

Figure 4. Forest plot of adjusted odds ratios. Dots to the right of the line 1.0 raise the odds of poor sleep; dots to the left lower it. Coral markers are the two habits that stayed significant after adjustment.

Two habits survive the adjustment, and it's the same two that showed up in the simple Chi-square test which is reassuring, since it means they're not just artefacts of some other habit riding along with them. Sleeping with a gadget within reach very nearly triples the odds of poor sleep *(aOR 2.82, 95% CI 1.00–7.92, p = 0.050)*, sitting right on the edge of significance. Napping during the day cuts the odds of poor sleep by roughly two-thirds *(aOR 0.36, 95% CI 0.15–0.83, p = 0.018)*, which, as flagged above, probably reflects nappers compensating for rough nights rather than napping actively protecting sleep. Everything else i.e smoking, eating or drinking before bed, physical activity, prayer, and even general gadget use before sleep, dropped out once the other habits were accounted for. None of them achieved statistical significance on their own once the model adjusted for the rest.

None of the eight habits set out to be tested as cause of bad sleep, but only one is an obstacle to a good night's rest: having the phone or gadget within reach while sleeping, and daytime napping seems to be symptoms of a bad night's sleep, rather tan a cause. That is much more specific and more useful finding than "lifestyle habit matter" and one that a single habit study (e.g., one that only asked about phone use) would have lacked context for.

DISCUSSION

In this study, 60% of healthcare professionals were poor sleepers by PSQI criteria, and when we analyzed the other seven lifestyle habits together (and adjusted for this one), the only ones that remained were having a gadget within reach at night and napping in the day. That narrowness is intentional; the entire point in modelling all eight habits together is that there was no reason to give a habit more or less credit. This is done by exploring what these two finding might mean, why the other six habits were silent after they were adjusted, what the participants themselves referenced when asked directly, and where the boundaries of this study lie.

4.1 High-Burden Sample that isn't an Outlier.

The poor rate of sleep (60.5%) is higher than the rate reported in the 402 Chinese health care professionals mentioned above (approx. 27%), but lower than that reported among the Saudi psychiatrists specifically (near-universal poor sleep).[1] This poor sleep rate among the sample of health care professionals is not necessarily a fair comparison for a larger sample of house officers, registrars, trainees, and faculty across specialties, as their on-call duties are probably a more apt comparator.[5,12] Together, the image is less Lahore has a sleep problem and more healthcare work everywhere seems to tax sleep more than most jobs, and this sample is on the upper end of that international pattern.[5]

4.2 The Gadget by the Bed

Being within reach of a gadget increased sleep disturbance even after accounting for self-reported use of the gadget before sleep (aOR 1.98, 95% CI 0.66–5.95, p = 0.225), and did so four times as often as those who were not within reach of a gadget (aOR 2.82, 95% CI 1.00–7.92, p = 0.050). That's a split that's worth sitting with: It wasn't the reported habit of scrolling before going to bed that was the deciding factor in the split after everything was adjusted for, it was just the proximity of the device.[13,14] This is consistent with what the international student literature in the introduction indicated, that one's pre-sleep use of sleep-waxing triggers poor sleep, but that overnight waking up after a spontaneous arousal is a more independent predictor of poor sleep.[6,15] Having a phone on the night stand is an open invitation to check it out when it breaks sleep; it doesn't seem like that much of an open invitation to check out when it's across the room.[16,17] In this context there's an occupational nuance to be mentioned and not overlooked: A clinician on call may not be able to afford not to have a phone on hand in the middle of the night. This study can't distinguish between "keeps the phone close by choice" and "keeps the phone close because the hospital might call" and the impact of the former on sleep might be slightly exaggerated if some of the association is due to a burden of calls. [18]The lower limit of the confidence interval is also 1.00, the same as the line of no effect, which is a polite way of saying this finding is not yet a settled one, but the strongest of the study. It merits replication in a bigger sample before it becomes a definite recommendation.

Napping, A Symptom Worth Reading Correctly

The protective association for napping (aOR 0.36, 95% CI 0.15–0.83, p = 0.018) is easy to misinterpret as “napping improves sleep”, but in fact, this finding is the most likely explanation for a protective association. A cross-sectional study cannot determine the causality but the more plausible one is inverse causality that healthcare professionals whose already short sleep cycles, or broken ones by shift changes, or the general uncertainty that the introduction to the world brought about, are preferring to spend their day napping to recover some of the sleep they missed at night.[19] In other words, this nap is not a cause of good sleep, and rather than good sleep, it is a substitute for poor sleep. This distinction is important because it is not a reason to promote napping as a sleep-quality intervention, but definitely a reason not to discourage it, especially if it is a coping strategy when the sleep pattern is disrupted by shift work, so that the hospital ought to promote opportunities for napping during long shifts or night shifts as a strategy for managing fatigue, rather than sleep quality.[20]

Why the Other Six Habits Went Quiet

The association between smoking, eating before sleep, physical inactivity, infrequent prayer, and gadget use before sleep was weaker separately and were not significant after adjustment for the rest.[17,21] These habits are also correlated with a much more powerful predictor, the individual effect of these habits might be modest. But some of it may also be due to a deficiency in power, not an absence of effect. This smoking estimate is certainly within the range of what would be expected in a healthcare sample population, as smoking levels are generally low; the statistical signature of this result is that it has a very wide confidence interval, ranging from 0.12 to 6.33, meaning that this study would not have been able to detect a true smoking effect, if it exists. Physical inactivity is a special non-replication. Of the 10 studies presented, the Brazilian study introduced in the introduction was a standout independent predictor of poor sleep (PR 1.32, 95% CI 1.02–1.70) in a sample approximately double the size of this sample. Here it moved in the same direction (aOR 1.56, 95% CI 0.55–4.43, p = 0.403) but fell well short of significance.[2] This result may be due to real between-group differences or to the impoverished statistical power provided by the smaller sample size, and is not addressed by this study.

4.5 What the Respondents Themselves Blamed

Two open-ended questions were included in the survey asking the participant in his/her own words what he or she felt was interrupting his/her sleep and what he or she felt might help improve sleep. These answers have not been subjected to any formal thematic coding and therefore are provided here as context and not as a validated answer, but the pattern within these answers is not difficult to miss. Stress, tension or anxiety was the most frequently mentioned cause of poor sleep with just over half (52%) of respondents with a clear answer to the question saying that it was the greatest factor in their poor sleep, significantly outnumbering the other causes, which included gadgets/phones (24%), workload or job pressure (18%), late eating (16%) and noise (12%). Some respondents spontaneously mentioned items that were not even on this questionnaire: hot weather; mosquitoes; a sick child; a checklist of lifestyle habits (the normal texture of life) that cannot be captured by this questionnaire! It is a true matchup worthy of sitting with.[2,15]

The number one thing that respondents pointed to as causing their poor sleep was stress, and it was not even quantified in the quantitative model at all. The one habit that statistically held up was gadget proximity, which was cited by about one in four respondents who were on-site in their own stories although this was still not a top factor in perceived causes. The two images are not in opposition to each other, but they are asking different questions. The regression model can only tell you about the 8 habits that are being tested. It doesn't describe the psychological burden, and the free text responses indicate that, rather than any one night-time routine, burden, in general, is what healthcare professionals in this sample feel is the more dominant influence on their own sleep. It would be beneficial to future research on this population to measure perceived stress/burnout as well as lifestyle habits, not just lifestyle alone.

Limitations

These findings have some limitations. It's cross-sectional, so none of this has direction of causality, and the napping finding in particular only makes sense as reverse causality. The prevalence and associations reported here may not be representative of healthcare professionals in Lahore, or of those elsewhere, nor even of those in Lahore who were not approached via these mailing lists, because of the convenient sampling method used. All lifestyle variables were self-reported, thus recall bias can be a possibility and for some habits in this context smoking and prayer, social desirability bias can be considered. The number of samples analyzed for the regression (n = 119) is small, several of the broad confidence intervals in Table 3 merely reflect limited power rather than real power, and the gadget finding is towards the upper edge of significance. Finally, a number of factors not structured as variables in this study but rather identified by respondents as important that impact sleep are missing from this study, such as psychological stress, on call burden, ambient heat, and household circumstances.

CONCLUSION

This point was supported by the fact that three out of five health care professionals in this sample were poor sleepers, meaning it was more than a concern with a small minority. In the combined analysis of all eight lifestyle habits, only having a gadget in bed at night was independently linked to poor sleep and daytime napping was independently linked to better sleep, which most likely means it was a proxy for having a bad night's sleep. The remaining 6 habits of smoking, eating/drinking before bed, not exercising, praying less frequently, and using general gadgets did not show any impairment once they were modeled together with the other habits.

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