# Original Article

# Sleep Health of Healthcare Workers in Kano, Nigeria

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**ABSTRACT**

**Background:** The relevance of sleep in the life of a human being cannot be overemphasized in terms of physical and mental well-being. Among several factors that can affect the sleep health of an individual occupation have been found to play a prominent role. The literature is still scanty with regard to sleep studies in our environment. **Aim:** This study aims to assess the sleep health of tertiary healthcare workers in Kano Nigeria and find, if any, its determining or related factors. **Material and Methods:** This study was cross-sectional questionnaire-based survey and involved all consenting staff members of Aminu Kano Teaching Hospital, Kano, Nigeria. The Pittsburgh Sleep Quality Index Questionnaire was used to assess the sleep health of the participants. **Results:** The participants' ages ranged from 18 to 65 years and have a mean age of $38.94 \pm 8.07$ years. There were 119 (74.4%) males and 41 (25.4%) females with a M:F ratio of 3:1 ($\chi^2 = 19.415$; $P = 0.000$). Among the 155 participants who completed all the aspects of the Pittsburgh Sleep Quality Index questionnaires, the overall sleep quality of the study population was found to be significantly poor [good sleepers = 71 (45.8%), poor sleepers = 84 (54.2%), $\chi^2 = 116.4$; $P = 0.000$]. Considering the various occupational groups working in the hospital, poor sleep was commonest among the nurses 35 (42.7%). Furthermore, among the nurses, poor sleep was significantly commoner in those on shift work 27 (77.1%) than those not on shift work 8 (22.9%); $\chi^2 = 36.2$; $P = 0.000$. Multivariate logistic regression analysis showed that age, sex, and duration in service were not significant predictors of poor sleep quality among the participants [odds ratio (OR) = 1.013, 95% confidence interest (CI) = 0.948–1.084, $P = 0.698$; OR = 0.691, 95% CI = 0.293–1.631, $P = 0.399$; and OR = 0.993, 95% CI = 0.932–1.058 $P = 0.840$, respectively). **Conclusions:** Our study found that a significant proportion of healthcare workers and particularly nurses had poor sleep quality. Also, age, sex, and duration in service were not significant predictors of poor sleep quality among the participants.

**KEYWORDS:** *Health personal, Kano Nigeria, occupational health, sleep disorder*

## INTRODUCTION

Sleep disturbances are common among many individuals and have probably assumed a public health importance worldwide. For instance, in some countries their economic burden may be as much as 1% of the gross national product (GNP).[1,2]

The relevance of sleep in the life of a human being cannot be overemphasized in terms of physical and mental well-being. As a result, it is estimated that on average a person spends approximately one-third of his or her life time sleeping.[3] Among other important roles, sleep has been found to play a vital role in most biological and psychological regeneration processes.[4] On the other hand, sleep disturbances have been associated with some serious health challenges, work absenteeism, safety compromising behaviors, occupational accidents, low productivity, and long-time health problems.[5,6]

In the past, several studies have reported the prevalence of sleep disorders to be in the range of 10–30% in some

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populations.[1,3-7] Furthermore, it has been observed that there are so many factors that can adversely affect the sleep health of an individual. And prominent among them is a person's occupation, which has been found to influence the prevalence of sleep disorders in different individuals.[8] By implication, health workers in our environment might also potentially be at risk for developing sleep disturbances given their unique work patterns and conditions. Accordingly, these can result in many physical and psychological problems, which in turn might affect their ability to provide adequate and qualitative health-related services to their patients. Previous researchers in other parts of the world have reported a poor sleep quality among healthcare workers.[9,10] Interestingly, despite the well-known association between sleep disturbances and many serious health disorders, the literature is still scanty regarding this subject matter in our environment.

The assessment of the various aspects of sleep quality can indeed be a difficult task. As such, several tools aimed at assessing these parameters have been developed in the past, for example, the Epworth Sleepiness Scale, Health and Productivity Questionnaire, Pittsburgh Insomnia Rating Scale, Daytime Insomnia Symptom Scale, Insomnia Symptom Questionnaire, and the Pittsburgh Sleep Quality Index (PSQI), but the latter is perhaps one of the most popular. It is a well-validated instrument and has a sensitivity of approximately 89.6% and specificity of 86.5% in detecting sleep disturbances.[11,12] This study aims to assess the sleep health of tertiary healthcare workers in Kano Nigeria and find if any, its determining or related factors.

## MATERIAL AND METHODS

Minimum sample size determination

This was calculated using the formula below

$$n = \frac{(Z1-a)^2 \times p \times (1-p)}{d^2}$$

where *n* is the minimum sample size; Z1-*a*, the standard normal deviate at 95% confidence level (1.96); *p,* 10% (the proportion of the target population estimated to have poor sleep quality (using a previous study)[1]; and *d*, the desired precision of the estimate (0.05).

$$\text{Thus,} \, n = \frac{(1.96)^2 \times p \times (1.0-p)}{(0.05)^2}$$

$n = 138$.

To account for nonresponse 153 respondents were required for the study.

### Study design and setting

This study was cross-sectional questionnaire-based survey and involved all consenting staff members of Aminu Kano Teaching Hospital, Kano, Nigeria.

### Protocol

**Eligibility criteria:** Age 18–65 years, healthcare workers in Kano, participants not on hypnotics, antidiabetic drugs, or anxiolytics/antidepressants.

**Exclusion criteria:** Pregnancy, use of continuous positive airway pressure treatment for sleep disordered breathing, those on medication for sleep problems on a regular basis, those on antidiabetic drugs, those on permanent night duties and those with previous diagnosis of stroke, myocardial infarction, or interventional cardiology procedures.

### Data collection procedure

Using the PSQI questionnaire[13] information regarding sociodemographic and sleep-related data were obtained. There were different subgroups in the hospitals; however, these subgroups were divided according to departments, namely, microbiology department, hematology department, medicine department, nursing services department, pharmacy department, and the like, giving a total of 16 departments in Aminu Kano Teaching Hospital. Participants consisted of physicians, pharmacist, nurses, primary healthcare providers, and other health professionals. To ensure that all relevant subgroups were adequately represented in the study sample, a Stratified Random Sample was utilized, that is, by taking a simple random selection of 10 participants from each department. The study protocol was explained to each participant prior to administering the questionnaires (self-administered, un-named but numbered for identification) and the participants signed an informed consent.

Participants were given a period of 1 week to fill and return the questionnaires and consent forms. Afterward, each questionnaire was examined to ensure it was properly filled and the consent form signed. Forms returned unfilled or incorrectly filled were considered a nonresponse and discarded. A global PSQI score of ≤ 5 was interpreted as good sleep quality, whereas a global score of > 5 was interpreted as poor sleep quality.

At the end of this study, participants adjudged to have poor sleep quality using the PSQI were informed and referred to the appropriate healthcare provider for proper management. This study conformed to the code of ethics of the World Medical Association (Declaration of Helsinki) and was approved by the ethical review committee of Aminu Kano Teaching Hospital, Kano, Nigeria.

### Data management

Data was analyzed using IBM SPSS version 21 (for windows). Binary logistic regression was used to evaluate the association between the set of demographic, determining or sleep-related factors, and poor quality sleep.

### RESULTS

This was a prospective cross-sectional study conducted on healthy employees of Aminu Kano Teaching Hospital in August 2015. Participants consisted of doctors, nurses, pharmacists, laboratory scientists, administrative office workers, and other paramedics; of the 201-administered questionnaires 160 were completed and returned giving a response rate of 79.6%. The participants' ages ranged from 18 to 62 years and with a mean age of 38.94 ± 8.07 years. There were 119 (74.4%) males and 41 (25.4%) females with a M:F ratio of 3:1 ($\chi 2 = 19.415$; $P = 0.000$). The sociodemographic variables of the participants are shown in Table 1. The participants' scores in the seven components of the PSQI are shown in Table 2. An analysis of the disciplines of the respondents from the different groups within the hospital showed 33 (22.1%) were doctors, 60 (40.3%) were nurses, 15 (10.1%) were other paramedical staff, and 41

(27.5%) were administrative staff. [Table 3] shows the sleep health status of the different groups of participants using the PSQI.

Among the 155 participants who completed all the aspects of the PSQI questionnaires, the overall sleep quality of the study population was found to be significantly poor (good sleepers 71 (45.8%), poor sleepers 84 (54.2%) ($\chi 2 = 116.4$; $P = 0.000$). Of the 84 participants who had poor sleep status, 27 (32.1%) were none shifting workers and 57 (67.9%) were shift workers ($\chi 2 = 116.4$; $P = 0.000$).

Considering the various occupational groups working in the hospital, poor sleep was commonest among the nurses

### Table 3: Participants' occupation versus sleep health status based on Pittsburgh Sleep Quality Index

| Occupation | Sleep health status | | |
|---|---|---|---|
| | Good | Bad | Total |
| Doctors | 16 | 17 | 33 |
| Nurses | 25 | 35 | 60 |
| Administrative staff | 21 | 20 | 41 |
| Other para-medics | 5 | 10 | 15 |

### Table 1: Sociodemographic variables of the participants

| Variables | Number (*n*) | Percentage (%) |
|---|---|---|
| Gender: | | |
| Male | 119* | 74.4 |
| Female | 41† | 25.6 |
| Age (years): | | |
| Range | 18 – 65 | |
| Mean | 38.94 + 8.07 | |
| Marital status: | | |
| Single | 17 | |
| Married | 137 | |
| Divorced | 1 | |
| Occupation: | | |
| Doctors | 34 | 22 |
| Nurses | 62 | 40 |
| Administrative staff | 16 | 10 |
| Other para-medics | 43 | 28 |

*,†(Significant difference $P = 0.000$)

### Table 2: Participants' scores for the seven components of the Pittsburgh Sleep Quality Index

| Component | Total participants | Numbers (%) | | | |
|---|---|---|---|---|---|
| | | 0 | 1 | 2 | 3 |
| Subjective sleep quality | 152 | 67(44.1) | 78(51.3) | 7(4.6) | 0(0) |
| Sleep latency | 160 | 52(32.5) | 69(43.1) | 20(12.5) | 19(11.9) |
| Sleep duration | 158 | 17(10.8) | 78(49.4) | 43(27.2) | 20(12.6) |
| Habitual sleep efficiency | 155 | 113(72.9) | 20(12.9) | 15(9.7) | 7(4.5) |
| Sleep disturbance | 160 | 8(5.0) | 132(82.5) | 19(11.9) | 1(0.6) |
| Need for sleep medications | 157 | 132(84.1) | 13(8.3) | 6(3.8) | 6(3.8) |
| Daytime dysfunction | 156 | 96(61.5) | 40(25.7) | 10(6.4) | 10(6.4) |

### Table 4: Distribution of poor sleep health among the different groups within the hospital

| Variable | Number | Poor sleep (%) | Work Schedule | | Chi Square | *P*-value |
|---|---|---|---|---|---|---|
| | | | Shift (%) | Non-shift (%) | | |
| Doctors | 33 | 17 (51.5) | 4 (23.5) | 13 (76.5) | 11.9 | 0.000 |
| Nurses | 60 | 35 (58.3) | 27 (77.1) | 8 (22.9) | 36.2 | 0.000 |
| Administrative Staff | 41 | 20 (48.8) | 0 (0) | 20 (100) | - | - |
| Para-medics | 15 | 10 (66.7) | 3 (30) | 7 (70) | 18.5 | 0.000 |

| Table 5: Multiple logistic regression model for the effect of age, sex and duration in service on poor sleep quality | | | | | |
|---|---|---|---|---|---|
| Variable | Beta coefficien | Standard terror | 95% CI interval | Odds ratio | *P* value |
| Age | 0.013 | 0.034 | 0.948 - 1.084 | 1.013 | 0.698 |
| Sex | -0.369 | 0.438 | 0.293 - 1.631 | 0.691 | 0.399 |
| Duration in service | -0.007 | 0.032 | 0.932 - 1.058 | 0.993 | 0.840 |

35 (42.7%) as shown in Table 4. Furthermore, among the nurses, poor sleep was significantly commoner in those on shift work 27 (77.1%) than those not on shift works 8 (22.9%) ($\chi$2=36.2; *P* = 0.000). Table 5 shows the multivariate logistic regression analysis, which revealed that age, sex, and duration in service were not significant predictors of poor sleep quality among the participants [odds ratio (OR) = 1.013, 95% confidence interval (CI) = 0.948–1.084, *P* = 0.698; OR = 0.691, 95% CI = 0.293–1.631, *P* = 0.399; and OR = 0.993, 95% CI = 0.932–1.058, *P* = 0.840, respectively).

## DISCUSSION

In the face of the current global economic difficulties and diverse competing demands these days, sleep has often been relegated to the background and many people try to sleep as little as possible. However, just as exercise and nutrition are essential for optimal health and happiness, so also is sleep. Moreover, it has been reported that the quality of one's sleep directly affects the quality of one's waking life, including mental sharpness, productivity, emotional balance, creativity, and physical vitality.[14]

Sleep disturbance has been described as a common complaint of which tremendous variation exists among different populations and can be an important early sign of underlying physical or mental health issues.[15] Furthermore, several studies have shown that a person's occupation can influence the occurrence and prevalence of sleep disorders in an individual.[8] In this study, we found the prevalence of poor sleep among healthcare workers in Kano to be 54.2%. This finding is similar to that of Ghalichi *et al*.[16] who found a prevalence of 43.1% in a related study. Likewise, the studies by Patterson *et al*. and Ertel *et al*. has also shown that sleep problems were common among healthcare workers and many factors such as sociodemographic and occupational characteristics were important determinants.[10,17] However, it is imperative to point out that the work by Ghalichi *et al*. included only the emergency medical service workers rather than the entire hospital work force.

Again in this study, we found that a person's age and gender were not significant predictors of poor sleep among the participants. As such, our findings were observed to be at variance with that of previous researchers who have repeatedly shown that increasing

age was strongly associated with poor sleep health among their study population.[15-19] Contrary to the findings of this study also, many studies have reported a higher prevalence of sleep problems among females both in the general population and among healthcare workers.[16-20] Nonetheless, the authors acknowledge that the higher significant proportion of males recruited in our study may have biased our findings with regards gender.

Meanwhile, after analysis of the various subgroups of health workers among our participants, this study found the prevalence of poor sleep to be highest (42.7%) among the nurses. In other works, Dorrian *et al*. and Hsieh *et al*. corroborated our findings in their studies in which they reported high levels of sleep problems among nurses and midwives.[21,22] Furthermore, this study found that overall; sleep disorder was significantly higher in shift workers than in nonshift workers and was so even among the nurses. These findings are in agreement with that of Chehri *et al*.[9] in a similar study among health workers in Iran. However, of note is the fact that in the Iranian study a different sleep assessment instrument rather than the PSQI questionnaire was used. Arguably, the high prevalence of sleep disorder among the nurses in our study could possibly be explained by the fact that nurses were more engaged in shift duty routines than any other group of health workers in our hospital. More so, our observations in this study could lend credence to the fact that shift work and in particular night work is known to disrupt the sleep–wake cycle and its synchrony with the diurnal rhythm and other endogenous biologic rhythms which affects physiologic sleep.[23]

## CONCLUSIONS

Our study found that a significant proportion of healthcare workers and particularly nurses had poor sleep quality. By implication, these findings should alert occupational health physicians of the need to early detect these features of intrinsic sleep disorders, which could adversely affect a health worker's health and increase the risk of accidents. We, therefore, recommend the provision of screening and monitoring programs to detect sleep disorders and associated health conditions and their consequent treatment. To this end, it is worth emphasizing that the teaching of "sleep hygiene" rules, learning of relaxation techniques and also medication

therapy by a specialist among others, have proven to be effective.[19] These without doubt can promote the health status and productivity of healthcare employees and by extension improve society's health, both directly and indirectly.

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## Conflicts of interest
There are no conflicts of interest

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