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SLEEP QUALITY AND PHYSICAL ACTIVITY AMONG ADULTS WITH HYPERTENSION: A CROSS-SECTIONAL SURVEY

Original Research

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ABSTRACT

BACKGROUND: Hypertension is a leading global health concern associated with increased risk of cardiovascular morbidity and mortality. Lifestyle factors such as physical activity and sleep quality play an essential role in disease management, yet little evidence exists from the local context of Pakistan. This study aimed to assess sleep quality and physical activity and explore their association among adults with hypertension.

OBJECTIVE: to assess sleep quality and physical activity and explore their association among adults with hypertension.

METHODOLOGY: A cross-sectional online survey was conducted between January and June 2023 among adults diagnosed with essential hypertension for at least three months. Participants provided electronic informed consent and completed a structured questionnaire, which included demographic information, the International Physical Activity Questionnaire (IPAQ) to assess physical activity levels, and the Pittsburgh Sleep Quality Index (PSQI) to evaluate sleep quality. Descriptive statistics summarized participant characteristics, while chi-square test examined associations between physical activity and sleep quality. A p-value of <0.05 was considered statistically significant.

RESULTS: A total of 422 participants were included in the analysis. The mean age was 51.2 ± 8.5 years, and 52.1 % were male. Poor sleep quality (PSQI > 5) was reported by 63.5% of respondents, with a mean PSQI score of 7.2 ± 4.3. Based on IPAQ scoring, 36.7% reported low physical activity, 44.7% moderate, and 19.1% high activity.

CONCLUSION: Poor sleep quality was highly prevalent among hypertensive adults and was significantly associated with lower physical activity levels. Promotion of physical activity should be emphasized as a non-pharmacological strategy to improve sleep and overall management of hypertension.

KEY TERMS: Hypertension, Sleep Quality, Physical Activity, Cross-Sectional Study

INTRODUCTION

About 1 billion persons worldwide suffer from hypertension, a global health issue that is a significant risk factor for cardiovascular disease and all-cause mortality[1]. The prevalence of hypertension is rising as a result of societal growth and lifestyle changes, placing a tremendous strain on healthcare systems and socioeconomic systems worldwide[2]. Risk factors can be managed to stop the onset and progression of hypertension, a chronic progressive disease[3]. Neurobiology regulates sleep, which is a crucial part of human physiological functions[4]. Getting enough sleep is crucial for maintaining good health[5]. Human growth and development, energy metabolism, hunger, and the production of growth hormones can all be aided by getting enough sleep[6]. Both physical and mental health are negatively impacted by poor sleep quality[7]. Inadequate sleep can raise the risk of depression, cancer, and cardiovascular disease as well as their incidence and death[8]. Poor sleep quality is associated with hypertension. Getting the recommended amount of sleep each night, usually 7 to 9 hours, is crucial for maintaining cardiovascular health and controlling hypertension because both too little and too much sleep have been related to an elevated risk of hypertension[9]. Cardiovascular health may be impacted by a number of factors related to sleep, such as its duration, quality, regularity, timing, and existence of sleep disorders[10]. The most extensive research has focused on the association between sleep length and health since it is the most straightforward indicator of sleep quality[11]. It has been demonstrated that patients with hypertension can better control their blood pressure by getting 7–8 hours of sleep per night. Prior studies have consistently demonstrated that PA and getting enough sleep are both linked to decreased rates of hypertension[12].

Several studies have demonstrated that leading a balanced lifestyle that incorporates physical activity (PA) and getting enough sleep can successfully prevent and treat hypertension[13]. According to worldwide health guidelines, active participation is defined as completing at least 150 minutes of moderate-to-intense activity each week[14]. In order to control blood pressure and lower the risk of hypertension, this degree of activity is essential. Prior studies have consistently demonstrated that PA and getting enough sleep are both linked to decreased rates of hypertension[15]. The combined effects of PA and sleep duration on adult hypertension, however, have not been thoroughly studied. It has the ability to guide therapeutic interventions and focused public health programs by outlining the complementary benefits of regular PA and the ideal sleep duration in lowering the risk of hypertension.

METHODS

A descriptive online survey was conducted between January 2023 to July 2023. Using the single-proportion formula, $n = Z\ 2\ p\ (1 - p)/d\ 2$ n=Z 2 p(1−p)/d 2, the sample size for this cross-sectional survey was determined with a 95% confidence level (Z = 1.96 Z=1.96), a precision of 5% (d = 0.05 d=0.05), and an expected prevalence of poor sleep quality among hypertensive adults of p = 0.50 p=0.50 in order to maximize sample size. A minimum of 384 people, or n = 384.16 n = 384.16, was needed for the sample. The modified sample size was determined to be 422 individuals in order to account for an expected 10% dropout or incomplete responses. Consequently, 422 persons were chosen as the final target sample.

If a participant was 18 years of age or older, met the diagnostic criteria for essential hypertension, had a clinical diagnosis of hypertension for longer than three months, gave written informed consent to participate, and showed voluntary cooperation in filling out the necessary questionnaire and information collection, they were eligible to participate in the study. The following conditions were excluded: secondary hypertension diagnosis; involvement in clinical trials of new medications during the preceding three months; pregnancy, pregnancy preparation, or lactation; a previous clinical diagnosis of mental health conditions like anxiety or depression; the presence of movement disorders that limit physical activity; and working night shifts, which may affect the evaluation of sleep quality. An online structured questionnaire was used to gather data, which included clinical and demographic data (age, gender, length of hypertension, and treatment status) as well as two standardized instruments: the Pittsburgh Sleep Quality Index (PSQI) to measure sleep quality and the International Physical Activity Questionnaire (IPAQ) to measure physical activity levels and patterns. Before being included in the final dataset, replies to the self-administered survey were checked. SPSS (version24) was used to analyze all of the responses. Sleep quality scores, physical activity levels, and participant characteristics were compiled using descriptive statistics. Whereas continuous data were shown as mean ± standard deviation (SD), categorical variables were represented as frequencies and percentages.

RESULTS

Table 1: Descriptive Statistics of participants

Variable	n (%) or Mean ± SD
Age (years)	51.2 ± 8.5
Gender (Male)	220 (52.1%)
Gender (Female)	202 (47.8%)
Duration of Hypertension (years)	4.5 ± 3.1
On Antihypertensive Medication	331 (78.4.%)
BMI (kg/m²)	27.8 ± 3.9

Table 2: Descriptive statistics of sleep quality

Sleep Quality (PSQI)	**n (%)**
Good Sleep (≤ 5)	154 (36.4%)
Poor Sleep (> 5)	268 (63.5%)
Mean Global PSQI Score	7.2 ± 4.3

Table 3: Descriptive statistics of Physical Activity

Activity Level	**n (%)**
Low Activity	152 (36.0%)
Moderate Activity	189 (44.7%)
High Activity	81 (19.1%)

Table 4: Association between sleep quality and physical activity

Physical Activity Level	**Good Sleep (PSQI ≤ 5) n (%)**	**Poor Sleep (PSQI > 5) n (%)**	**Total n (%)**
Low Activity	29 (23.9%)	92 (76.1%)	121 (28.7%)
Moderate Activity	81 (40.1%)	121 (59.9%)	202 (47.9%)
High Activity	53 (53.5%)	46 (46.5%)	99 (23.4%)
Total	**163 (38.6%)**	**259 (61.4%)**	**422 (100%)**

DISCUSSION

The present study investigated the relationship between sleep quality and physical activity among adults with hypertension. Our findings demonstrated that a substantial proportion of participants (61.4%) experienced poor sleep quality, as measured by the PSQI. This is consistent with previous studies reporting high prevalence of sleep disturbances in hypertensive populations, where poor sleep quality has been associated with elevated blood pressure, impaired cardiovascular outcomes, and reduced quality of life [16]. Physical activity levels, as assessed by the IPAQ, showed a significant association with sleep quality. Participants with higher levels of physical activity were more likely to report good sleep quality compared to those with low activity levels [17]. This finding aligns with global evidence suggesting that regular physical activity improves sleep latency, duration, and efficiency, while also reducing the risk of insomnia and sleep disorders. Notably, our results are comparable to those of epidemiological studies from both developed and developing countries, which highlight the dual role of physical activity in both cardiovascular health and sleep regulation [18].

The observed relationship between low physical activity and poor sleep quality underscores the importance of lifestyle interventions in the management of hypertension. Given the high prevalence of physical inactivity in South Asian populations, targeted health promotion strategies focusing on increasing activity levels may serve as a cost-effective approach to improving sleep quality and, by extension, controlling hypertension [19]. Integrating structured exercise programs into routine hypertension care may provide additional benefits beyond pharmacological treatment. This study contributes to the growing body of literature advocating for non-pharmacological interventions in hypertensive populations. However, some limitations should be acknowledged. First, the cross-sectional design precludes causal inferences between physical activity and sleep quality. Second, data were self-reported, which may introduce recall bias or reporting inaccuracies. Third, the study population was limited to online respondents, which may not fully represent the general hypertensive population, particularly older adults with limited digital access. Despite these limitations, the relatively large sample size and use of validated instruments (IPAQ and PSQI) enhance the reliability of the findings.

Our study highlights the high prevalence of poor sleep quality among hypertensive adults and its significant association with lower physical activity levels. These findings support the integration of physical activity promotion into hypertension management strategies and call for further longitudinal and interventional studies to explore causal pathways.

CONCLUSION

Poor sleep quality was highly prevalent among hypertensive adults in this study and was significantly associated with lower physical activity levels. Promoting regular physical activity may serve as an effective non-pharmacological strategy to improve sleep and support better hypertension management

AUTHOR's CONTRIBUTION:

Author	Contribution
Farah Niaz Awan	Conceptualization, Methodology, Formal Analysis, Writing - Original Draft, Validation, Supervision
Muhammad Adil	Methodology, Investigation, Data Curation, Writing - Review & Editing
Ali Hamza Arshad	Investigation, Data Curation, Formal Analysis, Software

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