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Effects of the quality of sleep and the mediating role of eating on self-esteem in healthcare personnel

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Abstract: In recent decades, organizational research has given special attention to the mechanisms promoting the health and wellbeing of nursing professionals. In this context, self-esteem is a personal resource which influences wellbeing at work and psychological wellbeing of nurses. The purpose of this study was to analyze the mediating role of eating in the effect of sleep quality on self-esteem in nursing professionals. The sample of 1073 nurses were administered the Rosenberg General Self-Esteem Scale, the Pittsburgh Sleep Quality Index and the Three-Factor Eating Questionnaire-R18. The results show that poor sleep quality and type of eating directly and indirectly affect self-esteem. More so, poor sleep quality deteriorated self-esteem through emotional eating, and even though emotional eating facilitated disinhibited eating, this relationship had no significant effects on self-esteem. The findings of this study suggest that hospital management should implement employee health awareness programs on the importance of healthy sleep and design educational interventions for improving the quality of their diet.

Keywords: self-esteem; quality of sleep; eating; nursing

1. Introduction

Positive Occupational Health Psychology (POHP) is a discipline for the "scientific study of optimal functioning of the health of persons and groups in organizations, effective management of their psychosocial wellbeing at work and the development of healthy organizations" [1] (p. 23). Far from the tendencies of more traditional research concentrating on the negative aspects of health, this new vein of positive psychology emerged from the need to provide more complete comprehension of the mechanisms that promote occupational health and wellbeing of workers [2-3].

One of the most influential theoretical frameworks in research on wellbeing and job stress is the Job Demands-Resources Model, JD-R [4]. This model underlines the relevance of workers' personal resources, because of their capacity for buffering the negative impact of job demands, and at the same time, promoting job commitment and positively influencing job performance [5-6]. Personal resources can also drive growth and professional development, and are determinant to workers' psychological and occupational wellbeing [7]. In this context, self-esteem has been one of the personal resources most widely studied in the area of organization, although its value has also been widely recognized in education [8-10].

Self-esteem is a multi-dimensional construct referring to an individual's evaluation of their own worth [11]. Somehow, self-esteem determines the way we are and our social behavior, so its relevance stems from the effects it has on individuals and different results in their lives [12]. For example, high levels of self-esteem are related to higher satisfaction in interpersonal relations and at work [13], physical and psychological wellbeing [14], and academic performance [15] and effective management

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of stress and coping adequately in conflict situations [16]. In brief, the level of self-esteem influences the success and wellbeing of persons in important areas of life, such as health, social relations, work and education [14, 17].

In the scope of organization, empirical research in self-esteem has given special attention to nursing professionals as the majority group in the healthcare profession [18]. Another source of this interest is the nature of their work and its effects on their wellbeing, among which are the following: a) many of the tasks involved in the integral care of patients require demanding physical activity (physical exhaustion); b) permanent contact with patients and their families involving continual exposure to suffering and illness (emotional and psychological burnout), and c) attention to a high volume of patients during their workday (work overload) [19-21]. Thus, workers' positive personal evaluations increase their wellbeing and satisfaction, thereby improving the therapeutic relationship with their patients [22-23].

One question related to health and satisfaction of nursing professionals has to do with inadequate sleep, which could result from different factors, such as working rotating shifts and high levels of stress [24-25]. A sleep deficit, whether in amount or duration, negatively influences an individual's physical and psychological health, socioemotional functioning and psychosocial adjustment [26-27]. Because it reduces the tendency to think positively, it is linked with negative emotional states, decreases motivation for gratifying social activities and deteriorates interpersonal relations [28-29]. Likewise, insufficient sleep has been associated with ineffective decision-making, stronger emotional reactions (e.g., irritability), an impulse control deficit and deterioration of emotional regulation, which is the main mechanism linking lack of sleep with psychological health [30-31]. However, poor quality and short duration of sleep in nursing professionals not only has negative consequences for them, but also for the organization, as it diminishes job performance and service quality, increasing risk of making mistakes on the job and endangering patient safety [32].

In addition to the above, poor-quality or insufficient sleep as a result of rotating shifts and/or job stress is in itself a stress factor which acts as an indicator of psychological stress, and can even lead to maladjustment in diet and eating behavior [25, 33]. In a systematic review, it was observed that negative emotions can cause a feeling of being full, which leads to a decrease in the amount of food eaten. Nevertheless, the amount eaten may also increase to alleviate the distress of those negative emotions. This phenomenon has been explained as "emotional eating" [34]. For example, Van Strien & Koenders (2014) showed that an association between short duration of sleep and increase in the body mass index (BMI) in women was due to emotional eating, not disinhibited eating or by cognitive restriction. Similar results were found by Dweck et al. [33] who found a relationship between worse sleep quality and emotional and disinhibited eating. Indeed, emotional eating has been considered a predictor of Binge Eating Disorder [36]. In this line, it has been demonstrated in normal and obese populations that emotional eating is associated with a higher BMI, which may be reflected in weight gain [34]. Frederick, Sandhu, Morse, & Swami [37] showed that BMI is an important predictor of body image, such that an increase in weight causes greater body dissatisfaction. Some authors, such as Griffiths et al. [38] and Oh, Song, & Shin [39] found that body dissatisfaction has adverse effects on the emotional wellbeing of individuals, negatively affecting their self-esteem and quality of psychosocial life.

Because of the important implications that self-esteem, sleep and eating behavior have for the general wellbeing of workers, our objective was to analyze the mediating role of eating on the effect that quality of sleep has on the level of self-esteem in nursing professionals.

2. Materials and Methods

Participants

The original sample consisted of 1094 nurses in Andalusia (Spain). Incomplete questionnaires or those answered at random were discarded. The final study sample was made up of a total of 1073 Spanish nurses aged 22 to 57 with a mean age of 32.32 (SD=6.62). Of this sample, 14.7% (n=158) were men and 85.3% (n=915) women, with mean ages of 32.79 (SD=6.27) and 32.24 years (SD=6.68),

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respectively. The sample was distributed by sleep quality as follows: 60% (n=644) had sleep problems and the remaining 40% (n=429) had no sleep problems.

Instruments

Rosenberg Self-Esteem Scale [11]. Developed for evaluating self-esteem in adolescents, it consists of 10 items which focus on one's own feelings of respect and acceptance. Items are rated on a four-point Likert-type scale (from 1 = Strongly agree, to 4 = Strongly disagree). Other studies have demonstrated its adequate psychometric characteristics in both the general population [40] and in more specific populations [41]. In this study, internal consistency was α= .82.

Pittsburgh Sleep Quality Index (PSQI, [42]; Spanish version by Macías & Royuela [43]). This questionnaire, which was developed to measure sleep quality, discriminates between good and poor sleepers. It consists of 24 items, five for evaluation by a roommate or bed partner, which are not included in the subject's self-evaluation score. The 19 self-reported items focus on aspects such as sleep latency and duration, frequency and severity of sleep problems. Seven components are generated based on the subject's answers: subjective quality, latency, habitual sleep efficiency, disturbances, use of sleeping medication and repercussion on daytime activity. An overall sleep quality score is found from the sum of these partial components. Royuela & Macías [44] reported reliability indices for the instrument of .81 with clinical population and .67 in a sample of students.

Three-Factor Eating Questionnaire-R18. The brief version of the original 51-item TFEQ [45] translated and adapted to Spanish (TFEQ-SP) by Jáuregui-Lobera, García-Cruz, Carbonero-Carreño, Magallares, & Ruiz-Prieto [46] and adapted by Pérez-Fuentes, Molero, Gázquez, & Oropesa [47] for a nursing population was used in this study. The questionnaire consists of 18 items which are rated on a four-point response scale (definitely true: 1, mostly true: 2, mostly false: 3, definitely false: 4). It evaluates three dimensions of eating behavior: (a) Uncontrolled eating (tendency to eat more than usual due to a loss of control over eating with a subjective sensation of hunger); (b) Emotional eating (inability to resist emotional signals, eating as a response to negative emotions); and (c) Cognitive restraint (conscious restraint of eating directed at controlling body weight and/or promoting weight loss). The TFEQ-R18 shows adequate coefficients of reliability on all three subscales (varies from .75 to .87) [46], and adequate in the nursing population (from .85 to .90) [47]. In this study, reliability indices were .89 for disinhibited eating, .84 on emotional eating and .74 on cognitive restriction.

Procedure

Before collecting data, compliance with information standards, and confidentiality and ethics in data processing were guaranteed to the participants. The questionnaires were administered on a Web platform which enabled participants to fill them in online. For control of random or incongruent answers, a series of control questions were included, and any such cases were discarded from the study sample.

Data analysis

First, to test the relationship between the variables to be included in the causal analyses, bivariate correlations were calculated. Then the descriptive statistics for these variables were found. To test for the existence of significant differences in self-esteem and eating between the groups with and without sleep problems, a Student's t for independent samples was done.

The Preacher & Hayes [48] macro for SPSS was used for estimating the mediation model, in this case for multiple mediation effects [49]. This resource enables computation of different regression models, finding information on indirect effects, while avoiding the limitations of the classical Baron & Kenny [50] proposal. To do this, bootstrapping was applied with 5000 bootstraps which provided a confidence interval of 95%, and determined the multiple mediating effect of the mediator variables. In this study, an analysis of multiple mediation was carried out with two mediator variables forming a causal chain.

3. Results

Descriptive and correlational analyses

Table 1 shows the descriptive statistics and correlations between variables: overall self-esteem, sleep quality, and eating. The global score on the PSQI was taken for sleep quality, in a range of 0 to 21 points, where 0 points = No sleep problems and 21 points shows the existence of severe problems in all areas or dimensions evaluated by the instrument [42-43].

Table 1. Descriptive statistics and correlations between the self-esteem, sleep quality and eating variables.

	M	*SD*	1	2	3	4	5
1. Self-esteem	32.43	4.54	–				
2. Sleep quality	6.44	2.90	-.23***	–			
3. Disinhibited eating	17.38	5.88	-.21***	.17***	–		
4. Emotional eating	5.75	2.50	-.24***	.19***	.74***	–	
5. Cognitive restraint	16.08	4.55	-.002	.05	.23***	.25***	–

***p<.001

The table shows data confirming the existence of a negative correlation (r=-.23, p<.001) between the predictor variable (global PSQI score) and self-esteem as the dependent variable. Furthermore, of the variables considered as potential mediators (Disinhibited eating, Emotional eating, and Cognitive restraint), those observed to maintain correlations, in this case negative, with the dependent variable, were Disinhibited eating (r=-.21, p<.001) and Emotional eating (r=-.24, p<.001). Therefore, these are the variables included later as mediators in the analysis.

Table 2 shows the results of the analysis of mean scores in Self-Esteem and the TFEQ-R18 subscales for comparison of subjects with and without sleep problems. The results reveal the existence of significant differences in relation to the level of self-esteem, ($t_{(1071)}$=5.01; p<.001; d=.31) between those who had sleep problems (M=31.88; SD=4.73) and those who did not (M=33.25; SD=4.12), where the latter had higher scores.

In addition, when the groups were compared for the eating dimensions that correlated with sleep quality, statistically significant differences were observed in Disinhibited eating ($t_{(1071)}$=-4.96; p<.001; d=.31) and Emotional eating ($t_{(1071)}$=-4.21; p<.001; d=.26), where those who had sleep problems had the highest points in both cases. There were no statistically significant differences between groups in Cognitive restraint ($t_{(1071)}$=-1.80; p=.071).

Table 2. Self-esteem and eating (emotional/disinhibited). Descriptive statistics and t test by sleep quality (No problem/problems).

	Sleep quality						*t*	*p*	*d*
	No problem			Problems					
	N	*Mean*	*SD*	*N*	*Mean*	*SD*			
Self-esteem	429	33.25	4.12	644	31.88	4.73	5.01***	.000	.31
Disinhibited eating	429	16.32	5.36	644	18.08	6.11	-4.96***	.000	.31
Emotional eating	429	5.37	2.28	644	6.01	2.60	-4.21***	.000	.26
Cognitive restraint	429	15.77	4.53	644	16.28	4.55	-1.80	.071	--

***p<.001

Multiple Mediation Analysis

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The mediation analysis was carried out based on the following mediation hypothesis: Having sleep problems involves a tendency to emotional eating, which has a negative repercussion on self-esteem. Emotional eating facilitates disinhibited eating, although it does not have indirect effects on self-esteem by this path.

For computation of the model, the PSQI global score was taken as the independent or predictor variable. In this case, the variable was previously dichotomized following the authors' [42] proposal, where a Global PSQI >5 suggests severe problems sleep in at least two areas, or moderate problems in more than three areas. We therefore had two groups coded as 0=no sleep problem and 1=sleep problems. The dependent variable proposed in the model was self-esteem, and as mediators, emotional eating (M_1) and disinhibited eating (M_2).

Thus, the multiple mediation model was computed with two mediating variables (M_1: E-E and M_2: U-E). Figure 1 shows the model, including the direct, indirect and total effects. In the first place, it may be observed that there was a statistically significant effect [B_{PSQI}=.63, p<.001] of sleep quality (X) on emotional eating (M_1). The second regression analysis took Mediator 2 as the result variable and included sleep quality (X) and emotional eating (M_1) in the equation. There was a significant effect of emotional eating [$B_{E\text{-}E}$=1.72, p<.001] and of sleep quality [B_{PSQI}=.65, p<.01] on disinhibited eating (M_2). The third regression analysis, taking self-esteem (Y) as the result variable, estimated the effect of the independent variable and of the two mediators. In this case, the effects of emotional eating [$B_{E\text{-}E}$=-.35, p<.001] and sleep quality [B_{PSQI}=-1.07, p<.001] as the independent variable were significant. Meanwhile, disinhibited eating (M_2) did not have a significant effect [$B_{U\text{-}E}$=-.03 p=.265] on the dependent variable. The total effect of sleep quality on self-esteem was significant [B_{PSQI}=-1.36 p<.001].

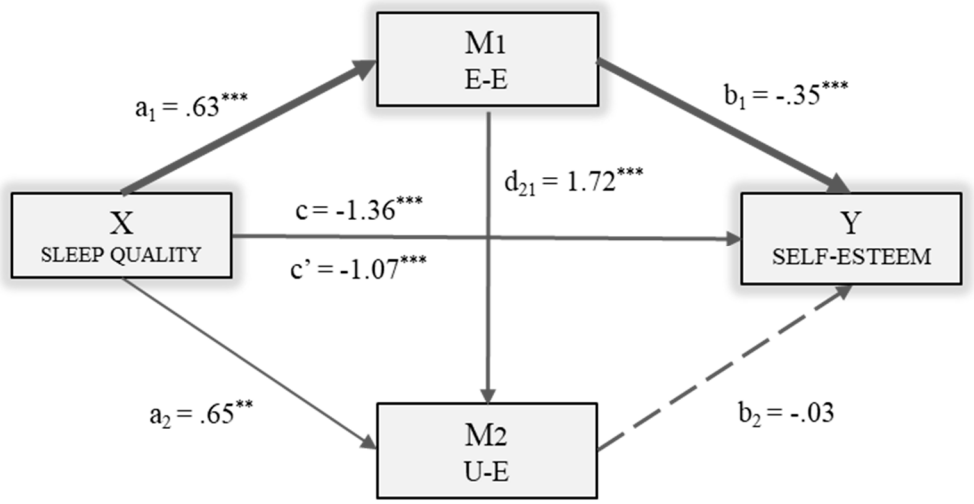

Figure 1. Multiple Mediation Model of eating (emotional/disinhibited) on the relationship between sleep quality and self-esteem. Note. E-E = Emotional eating; U-E = Disinhibited eating. $^{**}p < .01$, $^{***}p < .001$

Finally, the analysis of the indirect effect by bootstrapping found data supporting the significance of Path 1 [Ind1: X→M1→Y; B=-.22, SE=.07, 95% CI (-.41, -.10)]. Therefore, sleep quality had a stronger effect on self-esteem through emotional eating (M1) than the two mediators operating in series. Thus, the path or indirect effect would basically take place through emotional eating.

4. Discussion

Most nursing professionals showed poor sleep quality (60%), which could be the result of working in rotating shifts and high job stress [24-25]. The results also showed that poor sleep quality negatively influenced self-esteem [BPSQI=-1.36 p<.001], suggesting that inadequate sleep reduces the tendency to think positively and is related to negative emotional states which affect the emotional and psychological wellbeing of nurses [28].

Moreover, the data show that poor sleep quality functions as a predictor of eating behavior. Specifically, workers with poorer sleep quality had higher rates of emotional and disinhibited eating. Similarly, Dweck et al. [33] suggested that both eating styles are associated with poor sleep quality and not its duration. This finding could be explained by a deficit of impulse control and deterioration of emotional regulation and decision-making caused by deficient sleep quality [29]. In agreement with previous studies, no significant relationship was found between sleep quality and cognitive restriction [10].

The mediation models confirmed our hypotheses. In the first place, a deficit in sleep quality implies more emotional eating, which negatively affects self-esteem [*B*=-.22, *SE*=.07, 95% *CI* (-.41, -.10)]. Poor sleep quality causes generalized emotional distress. In response to those negative emotional signals, people tend to increase eating to feel better. Some authors have noted that it is an atypical response of the organism which may be explained by inadequate emotional regulation. It has also been suggested that emotional eating is related to maladaptive coping strategies [35]. More so, these sleep problems are associated with eating more junk foods, which are high in fats and sugars, and therefore, emotional eating leads to weight gain [27, 34]. Thus, individuals faced with weight gain feel greater dissatisfaction with their body image, and as a result, this negative affect influences self-esteem and their psychosocial quality of life [37, 39]. Keeping in mind that self-esteem is a personal resource determining workers' psychological wellbeing and their wellbeing at work, their job performance and quality of service given patients will be [5, 22].

In the second place, emotional eating [*B*E-E=1.72, *p*<.001] facilitates disinhibited eating, although it does not affect self-esteem [BU-E=-.03 p=.265], even though these two different dimensions of eating behavior are closely related (*r*=-.74, *p*<.001). Emotional eating is provoked by an absence of adapted emotional regulation, which in turn, is associated with a deficit in impulse control, more characteristic of disinhibited eating [29, 36]. The findings of Van Strien & Koenders [35] offer a possible explication for the absence of any effect of disinhibited eating on self-esteem. These authors showed that self-esteem is only weakened when there is an increase in BMI. However, this relationship was only found when emotional eating was the only mediator between poor sleep quality and self-esteem.

The results of this study have relevant practical implications. For one thing, the importance of self-esteem as an essential personal resource for nursing professionals [7-8], should be emphasized. For another, the effects of sleep quality and diet on the general wellbeing of nurses and the quality of their attention to patients should also be underlined [28, 34]. Organizations should implement health awareness programs for workers emphasizing the importance of healthy sleep to prevent health problems, and educational programs to facilitate tools which improve the quality of their diet [32]. Following the recommendations of Amutio et al. [26] it would also be of interest to include positive interventions (e.g., mindfulness) to improve the quality of sleep of these healthcare professionals.

This study has some limitations. First, its cross-sectional nature impedes establishing any causal relationship between the study variables, for which a longitudinal design would be necessary. The second is that the data may be biased by the variance in the common method because of how the data were collected, and therefore, we propose inclusion of other qualitative methods and more objective and exhaustive measures to offer more precise information on the duration and quality of sleep.

As future lines of research, it is suggested that variables related to work demands (e.g., shifts) be included with individual and collective results on the organization (e.g., engagement, job performance). Similarly, multilevel studies of the deficit in sleep quality in different areas of work would be of interest for implementing preventive programs.

5. Conclusions

This study analyzed the mediating role of eating on the effect of sleep quality on self-esteem in nursing professionals. It emphasizes the importance of self-esteem in the organizational environment as a personal resource essential to the psychological and emotional wellbeing of workers, in addition to positively influencing organizational results (e.g., job performance) and improving therapeutic relations with patients.

Furthermore, the TFEQ-R18 [47] is a valid instrument for studying the three dimensions of eating behavior (emotional, behavioral and cognitive), not only for persons with obesity, but also in the normal population.

This study provides important contributions to Positive Occupational Health Psychology (POHP) by emphasizing eating behavior and sleep quality as essential aspects for health and wellbeing of nursing professionals and quality of patient care. In fact, it was demonstrated that both factors have direct and indirect effects on self-esteem.

The main finding of this study is that poor sleep quality can deteriorate self-esteem of nurses through emotional eating, suggesting that this relationship could cause job performance to diminish and patient service quality to deteriorate. The second most important finding is that there is a close relationship between the emotional dimension of eating (emotional eating) and its behavioral dimension (disinhibited eating), however, this association does not negatively influence self-esteem of nursing professionals.

Altogether, the results suggest the relevance of implementing health awareness programs to make healthcare professionals aware of the importance of healthy sleep and educational programs for improving the quality of their diet.

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