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Association between community-based and workplace violence and the sleep quality of health professionals: a cross-sectional study

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Abstract *Community-based and workplace violence against health professionals has caused feelings of vulnerability, emotional exhaustion, and psychological changes, reflecting on sleep quality disorders. Thus, we aimed to analyze the association between community and workplace violence and the sleep quality of health professionals working in primary health care. The study was conducted with 286 health professionals who worked in PHC in one of the largest cities in Brazil. The primary outcome was sleep quality as assessed by the Pittsburgh Sleep Quality Index. Most of the participants (69.2%/p=0.074) were classified as "bad sleepers", and nurses (73.3%/ p=0.049) showed the worst sleep quality. Additionally, most professionals suffered some type of violence at work (p<0.001), which impaired professional activities (p=0.010), forcing them to change their behavior (p<0.001) and consider changing the workplace location (p=0.051). The results showed that professionals have been experiencing moments of fear, anxiety, and stress associated with workplace and community violence. This highlights the need for public policies geared to occupational health.*

Key words *Workplace Violence, Sleep, Health Personnel, Primary Health Care*

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Introduction

Workplace violence against health professionals has been a major occupational challenge, mainly due to the significant impact on these workers' physical and mental well-being, limiting performance in providing services and job satisfaction. Verbal or physical violence is common in hospital wings, such as, for example, in psychiatric wards or urgent and emergency care sectors and PHC units, which ends up affecting operations and efficiency of the entire health system in the short, medium, and long term[1-3].

Workplace violence experiences can be associated with physical impairments and emotional and psychological consequences such as fear, anxiety, post-traumatic stress, guilt, or even decreased sleep quality in different proportions[4]. A systematic review and meta-analysis showed that workers exposed to violence in the workplace manifest problems related to both the amount of sleep and the sleep quality, that is, difficulty falling asleep, frequent interruptions, insomnia, and nightmares, which contributes to lost productivity, increased hostile and aggressive behavior, erroneous conduct, and other adverse outcomes, influencing patient safety[4].

This scenario worsens further when the workforce is primarily female, workplaces are based in geographic and social environments marked by vulnerabilities, and in night work shifts[3]. Moreover, workplace and community-based violence affecting health professionals are commonly generated by relatives or patients' companions against doctors. On the other hand, the literature is not unanimous regarding the highlighted findings. Researchers consider that perhaps the perception and attitude of doctors towards violence was different from nurses – a group suffering a high level of emotional, physical, and sexual harassment[1].

Data from previous reviews point to gaps in investigations regarding associations between violence in the workplace against health professionals, especially those in PHC[5,6]. Also, to the best of our knowledge, there are no published data on the effect of community and workplace violence and the quality of sleep of health professionals in the country, nor is information about the perspective of these health workers on the influence of community violence on the quality of their sleep identifiable. Thus, we hypothesize that primary health care professionals working in violent regions may be more vulnerable to poor sleep quality. Our secondary hypothesis is that professionals considered "bad sleepers" can report negative perspectives on the effect of community and workplace violence on their sleep. The in-depth analysis of these issues allows outlining strategies to mitigate and prevent this occupational risk to improve the quality of life of health professionals.

Thus, this study mainly aimed to analyze the association between community-based violence and workplace region violence, represented by the homicide rate and sleep quality among PHC professionals in Fortaleza, Brazil. Our secondary objective was to analyze the perspectives of PHC health professionals concerning workplace violence and their sleep.

Methods

Study design

This is a cross-sectional study in six health regions located in Fortaleza, in the northeastern region of Brazil, from July and November 2019, approved by the Pitágoras Institute's Human Research Ethics Committee.

Population and sample

The target population included health professionals with higher education (doctors, nurses, and dentists) who worked in Family Health Strategy (ESF) teams in Fortaleza. A total of 1,105 higher education professionals was registered in the ESF teams, with 355 doctors, 463 nurses, and 286 dentists distributed in the six regions of the city.

We established the following inclusion criteria for calculating the sample: being a doctor, nurse, or dental-surgeon who has been working for at least one month straight in the same ESF, regardless of gender and age. On the other hand, we excluded from the sample professionals using psychotropic drugs for more than 12 months or diagnosed with a neurological or psychiatric problem that interfered with sleep.

With this in mind, we performed a sample calculation based on a formula for a finite population.

$$n = \frac{N \cdot Z^2 \cdot p \cdot (1 - p)}{Z^2 \cdot p \cdot (1 - p) + e^2 \cdot (N - 1)}$$

Where: n=Sample calculated; N=Population (1,105); Z=Standardized normal variable as-

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sociated with a confidence level (1.96); p=True probability of the event (0.5) (due to the lack of knowledge about previous studies on the quality of sleep of PHC professionals); e=Sampling error (5%).

We used the prevalence of poor sleep quality as an outcome since we were unaware of studies associating poor sleep quality of PHC professionals with violence. The calculations returned a final sample of 286 participants, which were stratified into six strata (given the six regions of Fortaleza) according to the representative percentage of each health professional category, by region, against the total number of health professionals in Fortaleza (100%) Brazil, as provided in Chart 1.

Study predictive variables

The variables addressed in this block were grouped into sociodemographic and violence information. In the case of sociodemographic information, we asked for items such as age (in years), gender, professional category (doctor, dental-surgeon, or nurse), and seniority in the primary care unit (in months). We also asked the name of the service, the neighborhood, and the region where the PHC unit is located.

We investigated community violence through the homicide rate per 100 thousand inhabitants in the six regions of Fortaleza in 2018 since this rate derives from the violence-related mortality rate due to external causes.

It was necessary to access data on mortality through the TABNET system (free access digital system, available at http://intranet.sms.fortaleza.ce.gov.br) to calculate the mortality rate in order to identify deaths by specific external causes for homicides (deaths by assault - codes X85 to Y09 of chapter XX - External causes of morbidity and mortality, of the 10th Review of the International Classification of Diseases, [ICD-10]) by region.

The homicide mortality rate per 100 thousand inhabitants was calculated by the number of deaths of residents due to homicides (assaults) divided by the total resident population by region, multiplied by 100 thousand. Thus, we obtained the measurement of violence by region in 2018, as shown in Chart 2.

Outcome

The outcome variable of our study was sleep quality according to the Pittsburgh Sleep Quality Index (PSQI). The professionals were classified as good or bad sleepers.

Data collection and instruments

The research team visited 71 PHC Units to interview health professionals during the second half of 2019. Eligible Healthcare professionals were approached and questioned about their interest in participating in the research. Data collection began after signing the Informed Consent Form.

An instrument was developed containing 28 questions, divided into three sections, namely, sociodemographic characteristics (gender, age, region where the health unit is located, seniority), sleep assessment according to the Pittsburgh Sleep Quality Index (PSQI), adapted and validated in Brazilian Portuguese[7]. Information about violence was assessed through objective questions to capture the respondents' perspective on their sleep and community-based and workplace

Chart 1. Sample stratification by professional category and region of Fortaleza, Ceará, Brazil, 2019.

Region	Number of doctors	Sample of doctors	Number of nurses	Sample of nurses	Number of dental surgeons	Sample of dental surgeons	Total sample
1	55	14	68	18	34	9	41
2	44	11	47	12	43	11	34
3	60	16	78	20	43	11	47
4	36	9	48	13	35	9	31
5	65	17	97	25	46	12	54
6	95	25	125	32	86	22	79
Total	355	92	463	120	287	74	286

Source: Elaborated by the authors.

Chart 2. Mortality rate due to homicide per 100 thousand inhabitants, in the region of Fortaleza, Ceará,

Region	Mortality rate due to homicide per 100 thousand inhabitants
1	55.32
2	40.59
3	51.72
4	43.48
5	91.13
6	61.98
Fortaleza	60.15

Source: Elaborated by the authors.

violence. As an example: Do you consider the community to be violent? Has community-based violence harmed professional activities? Did violence force you to change your behavior? Have you been a victim of service or community-based violence? The professionals were approached in three different shifts (morning, afternoon, and night) in a room reserved for that purpose, ensuring confidentiality.

Data analysis

The collected data were entered and tabulated in the free software Epi Data version 3.1 and then analyzed using SPSS software version 23. Absolute and relative frequency were calculated for qualitative variables. Quantitative variables were summarized through statistics: mean, standard deviation, quartiles, minimum, and maximum. The Shapiro-Wilk test verified the normality of the quantitative variables. The association between qualitative variables was verified using the Chi-square and Fisher's exact tests, and Mann-Whitney's tests verified the comparison of groups between quantitative variables.

A Poisson regression model was used with the variables that showed a significant relationship with sleep quality. The magnitude of the association between the variables was expressed through point and interval estimates of prevalence ratios.

Poisson regression was used to estimate the adjusted prevalence ratio instead of the odds ratio, and remove confounding variables.

The results were presented in charts and tables. A significance level of 5% was adopted for all inferential procedures.

Results

Sleep quality among PHC health professionals

Most participants in this study were women (73.8%), aged 40-49 years (40.6%), and nurses (42%). Approximately half of the sample reported good subjective sleep quality (52.7%) and sleep duration between 6-7 hours (51.4%). As for the sleep latency component, the response options 16-30 minutes (30.8%) and 31-61 minutes (35%) prevailed according to the PSQI. The answer with the option ≥85% (76.2%) prevailed in the sleep efficiency component.

Most participants were classified as "bad sleepers" (65.7%) according to PSQI global score. The PHC health professionals with the highest prevalence of poor sleep quality were nurses (73%/p=0.049). We did not identify a statistically significant association between poor sleep quality and gender (p=0.074), age group (p=0.989), workplace's region (p=0.518), or seniority in the PHC unit (p=0.957), as shown in Table 1.

Participants considered "bad sleepers" according to the PSQI had high subjective very poor and poor sleep quality rates (p<0.001), sleep latency >60 minutes (p<0.001), sleep duration <5 hours/day (p<0.001), usual sleep efficiency <65% and between 65-74%.

We observed in the participants classified as "bad sleepers" that the variables sleep disorders ≥3 times a week (p<0.001), use of drugs to sleep ≥3 times a week (p<0.001), and daytime sleepiness ≥3 times a week (p<0.001) showed statistically significant differences compared to good sleepers. When calculating the PSQI, we found the highest score and the lowest standard deviation (1.4±0.6 points) precisely in the sleep disorders domain.

Perspectives of primary care professionals regarding violence in the workplace's region and their sleep

Most respondents (60.8%) consider their work region very violent. Approximately 80.1% of the participants reported having suffered an episode of violence within their respective workplaces, among the six regions of Fortaleza. In this case, the most reported frequencies of violent situations were 1-2 times (39.2%) and ≥3 times (40.9%). In the latter case, two characteristics were statistically associated with being a nurse (50%, p=0.011) or bad sleeper (71.9%, p=0.001).

Table 1. Distribution of sociodemographic characteristics according to the classification of sleep quality. Fortaleza, Ceará, Brazil, 2019 (n=286).

Variables	Bad sleeper (n=188)		Good sleeper (n=98)		PR (95%CI)	p-value
	n	%	n	%		
Gender					0,0741	0,074[1]
Male	43	57.3	32	42.7	1	
Female	145	68.7	66	31.3	1.2 (0.97-1.49)	
Age group (years)					0.9892	0,989[2]
23-29	28	68.3	13	31.7	1.07 (0.74-1.53)	
30-39	64	66.7	32	33.3	1.04 (0.75-1.44)	
40-49	75	64.7	41	35.3	1.01 (0.73-1.40)	
50-59	16	64.0	9	36.0	1	
≥60	5	71.4	2	28.6	1.12 (0.64-1.94)	
Professional category					0.0491	0,049[1]
Doctor	58	63.0	34	37.0	1.11 (0.86-1.43)	
Nurse	88	73.3	32	26.7	1.29 (1.03-1.62)	
Dental surgeon	42	56.8	32	43.2	1	
Region of the city where the primary health care unit is located					0.5181	0,518[1]
Region 1	26	63.4	15	36.6	1.10 (0.80-1.53)	
Region 2	24	70.6	10	29.4	1.23 (0.90-1.69)	
Region 3	34	72.3	13	27.7	1.26 (0.94-1.68)	
Region 4	23	74.2	8	25.8	1.29 (0.95-1.76)	
Region 5	31	57.4	23	42.6	1	
Region 6	50	63.3	29	36.7	1.1 (0.83-1.47)	
Seniority in the primary health care unit	72.0 (22.0-156.0)		72.0 (16.0-144.0)		-	0.957[3]

[1]Chi-square test; [2]Fisher's exact test; 3Mann-Whitney test.

Source: Elaborated by the authors.

We observed an opposite result when we investigated reports of violence in work activities outside the UBS building, with a significant portion of respondents (64.7%) reporting having never suffered any type of violence.

Most respondents (89.1%) reported that workplace violence has impaired the development of their professional activities on more than one occasion, with 37.1% being 1-2 times and 44.8% % ≥3 times. This last answer option was given mainly by the participants considered bad sleepers (p=0.001), as shown in Table 2.

Among the bad sleepers, other predominant reports (≥3 times) due to community-based and workplace violence were the feeling of fear, anxiety, or stress (p=0.011), sleep latency (p=0.001), and nightmares (p=0.001) (Table 2).

The prevalence of "bad sleepers" among healthcare professionals stood out in all regions of the city analyzed. However, based on the Mann-Whitney test, we found no statistically significant association between the homicide rate and the quality of sleep of the interviewed professionals (p=0.191).

Associating the variable poor quality of sleep of professionals with homicide rates (by regional office and neighborhoods in Fortaleza, Brazil) showed no statistically significant differences between doctors (p=0.191), nurses (p=0.069), and dental-surgeons (p=0.467). The homicide rate did not influence the report of sleep latency due to thinking about the violence suffered (p=0.997). However, in Regional Office II, the reporting of nightmares predominated in those who lived in places with a higher median rate of violence (p=0.015).

After adjustment, the variables change in behavior and sleep latency when thinking about community and workplace violence remained significant in the model. Professionals who re-

Table 2. Distribution of health professionals' perception of violence by sleep quality. Fortaleza, Ceará, Brazil, 2019 (n=286).

Variables	Bad sleeper (n=188)		Good sleeper (n=98)		PR (95%CI)	p-value
	n	%	n	%		
You consider the work territory			0.1572			0,157[2]
I do not consider it a violent area	3	42.9	4	57.1	1	
I consider it a non-violent area	64	61.0	41	39.0	1.42 (0.6-3.39)	
I consider it a very violent area	121	69.5	53	30.5	1.62 (0.69-3.84)	
Territorial violence hindered professional activities			0.0101			0,010[1]
Not once	24	48.0	26	52.0	1	
Once or twice	71	67.0	35	33.0	1.4 (1.02-1.92)	
≥3 times	92	71.9	36	28.1	1.5 (1.1-2.04)	
Territorial violence forced a change of conduct			<0.0011			<0,001[1]
Not once	36	43.9	46	56.1	1	
Once or twice	72	69.9	31	30.1	1.59 (1.21-2.1)	
≥3 times	80	79.2	21	20.8	1.8 (1.39-2.35)	
Was a victim of violence during work activities within the service			<0.0011			<0,001[1]
Not once	25	44.6	31	55.4	1	
Once or twice	70	62.5	42	37.5	1.4 (1.01-1.94)	
≥3 times	92	78.6	25	21.4	1.76 (1.3-2.39)	
Was a victim of violence during work activities within the community			0.0071			0,007[1]
Not once	110	59.5	75	40.5	1	
Once or twice	45	72.6	17	27.4	1.22 (1.01-1.48)	
≥3 times	31	83.8	6	16.2	1.41 (1.17-1.7)	
Felt fear, anxiety, or stress due to violence in the territory			0.0012			0,001[2]
Not once	22	45.8	26	54.2	1	
I do not consider the territory violent	1	100.0	0	0.0	2.18 (1.6-2.97)	
Once or twice	71	62.8	42	37.2	1.37 (0.98-1.92)	
≥3 times	93	76.2	29	23.8	1.66 (1.2-2.3)	
It took a long time to sleep when thinking about territorial violence			<0.0011			<0,001[1]
Not once	78	51.3	74	48.7	1	
Once or twice	67	78.8	18	21.2	1.54 (1.27-1.86)	
≥3 times	43	89.6	5	10.4	1.75 (1.45-2.1)	
Had nightmares related to violence in the service/ territory			<0.0011			<0,001[1]
Not once	125	59.2	86	40.8	1	
Once or twice	42	85.7	7	14.3	1.45 (1.23-1.7)	
≥3 times	21	80.8	5	19.2	1.36 (1.1-1.7)	
Woke up unmotivated to go to work due to violence in the service/territory			<0.0011			<0,001[1]
Not once	62	52.5	56	47.5	1	
Once or twice	57	72.2	22	27.8	1.37 (1.1-1.71)	
≥3 times	69	78.4	19	21.6	1.49 (1.22-1.83)	
Considered changing the workplace due to violence in the service/territory			0.0511			0,051[1]
Not once	106	63.5	61	36.5	1	
Once or twice	39	60.0	26	40.0	0.95 (0.75-1.19)	
≥3 times	43	79.6	11	20.4	1.25 (1.05-1.5)	

[1]Chi-square test; [2]Fisher's exact test.

Source: Elaborated by the authors.

ported a change in behavior ≥3 times had a 42% higher prevalence of poor sleep quality than those who did not report a behavior change. In turn, participants who take a long time to sleep had a 55% higher prevalence of poor sleep quality (Table 3).

Discussion

In our study, 65.7% of health professionals working in PHC were considered "bad sleepers", according to the PSQI global score. Interestingly, when asked about their sleep quality, approximately half of the participants reported good sleep quality (52.7%) with a sleep duration between 6-7 hours (51.4%). Nurses (73%) were prevalent among "bad sleepers" (p=0.049). There is evidence in the literature of a association between long working hours and night stops and sleep impairment (PSQI >7) of nursing professionals, lower quality of care provided, and impaired sleep-wake cycle. Combined, these factors have a negative impacts in quality of life and the physical, psychological, and social well-being of healthcare workers[8-12]. Evidence from a meta-analysis conducted with 53 observational studies concluded that nurses are the professionals most susceptible to poor sleep quality[13].

In Brazil, PHC nurses are the professionals most involved in organizational management and mediation of the work of other professional categories. Moreover, these professionals are in charge of many other activities that transcend nursing care increasing the burden associated with compromised sleep quality.

Data from a national study in PHC pointed out that insomnia is a recurrent problem among healthcare professionals[14,15]. Moreover, dissatisfaction with quality of sleep and difficulty sleeping are also frequently registered as sequelae caused by the PHC work environment[16,17], which probably explains why most of the participants in this research reveal the use of sleeping pills. This finding is similar to previous studies, whose variation in poor sleep quality ranged between 17.7% and 85%, placing nurses as one of the primary users of this medication type[9,10,15]. We believe that some factors in Brazilian PHC units cooperate for this problem, such as the complex demands of the populations served, the poor governance of healthcare professionals in solving structural problems and work processes, and workplace violence.

Workplace violence can indeed be considered a stressful factor with an adverse impact on the lives of the people involved. Occupational risk and sleep disorders become even more present in regions marked by incivility and social vulnerability.

In our study, 60.8% of respondents considered that the region in which they worked was violent, and 80.1% of the sample reported having suffered some type of violence during their professional activity. A systematic review and meta-analysis that aimed to assess the prevalence of violence against Iranian nurses showed that verbal, physical, sexist, and racist violence in the workplace and the threat against these professionals was 80.8% (95%CI [74.2-86.0]), 24.8% (95%CI [17.4-34]), 6.7% (95%CI [4-9.2]), 14.6% (95%CI [10.1-20.7]) and 44% (95%CI [30.1-58.8]), respectively[18], resulting in an experience marked by feelings of fear, anxiety, stress, prolonged sleep latency, and constant nightmares.

In this regard, 80.5% of the 188 professionals considered to be poor sleepers reported having nightmares, 89.6% long sleep latency, and 76.2% felt fear, anxiety, and stress when they experienced episodes of workplace and community violence, which ends up harming the professional practice – confirmed by almost 90% of the respondents.

It should be noted that most professionals classified as bad sleepers reported experiencing violence within PHC services and not within the community. This finding differs from a pa-

Table 3. Poisson regression model for the variable poor sleep quality of professionals.

Variables	PR (95%CI)	p-value
Did violence in the community force professionals to change their behavior?		
Not once	1	
Once or twice	1.42 (1.07-1.89)	0.014
≥3 times	1.42 (1.06-1.89)	0.019
Did the professional take too long to sleep when thinking about violence in the community?		
Not once	1	
Once or twice	1.38 (1.13-1.69)	0.002
≥3 times	1.55 (1.25-1.91)	<0.001

Source: Elaborated by the authors.

per published about 15 years ago in Brazil, which found that activities such as home visits are a work-related risk factor, insofar as the feeling of security in the physical structure of the PHC unit is broken[19]. While the sleep quality variable was not used in this study, we believe that the chronological issue justifies the divergence because the country is now more violent in many social spheres, including health services.

Notwithstanding this, many of the analyses conducted on the violence and sleep variables of the professionals were not statistically significant, which may derive from the professional's view of violence, that is, violence is a phenomenon interpreted according to the time, place, and circumstances in which it occurs. Therefore, some type of violence may be tolerated or condemned by professionals. As a result, any analysis on the theme of violence requires considering the subjectivity of the participants' reports[19].

Thus, policies aimed at worker's health should highlight the importance of discussing and promoting the quality of sleep of PHC healthcare staff, given the repercussions of this issue on productivity and quality of life.

This research has some limitations that should guide its analysis and interpretation. We adopted the variable homicide mortality rate to represent the outcome for community-based violence, despite the multifactorial nature of the violence. Also, homicide mortality rates are for 2018, and the PSQI assesses sleep in the last 30 days. Thus, there is no chronological harmony between the dependent and the independent variable.

Another limitation is that social situation and homicide mortality rates quite different between and even within the same region. One possibility would be to adjust the analyses according to the Human Development Index by neighborhood for future studies. On the other hand, our sample was representative, and deaths are well-documented outcomes and not subject to underreporting at the Information Technology Department of the Unified Health System - SUS (DATASUS).

Thus, we suggest further research be carried out with a longitudinal design and incorporating into the analytical model other predictive elements or confounders about the relationship between community violence and sleep quality with health workers and in the industry, commerce, education, and other sectors involved.

Conclusion

Community-based and workplace violence were associated with poor sleep and increased prevalence of feeling fear, anxiety, stress, longer sleep latency, and nightmares. Those who reported sleep latency due to community violence had a 55% higher prevalence of poor sleep quality than professionals who did not suffer any type of violence.We did not observe a statistically significant association between the homicide rate and the quality of sleep among the sample.

Collaborations

FBCA Silveira and MFM Araújo contributed to the conception and design, analysis, and interpretation of the data. FBCA Silveira, MFM Araújo, JCG Lira Neto and C Weiss drafted the paper and critically reviewed it. JCG Lira Neto, C Weiss and MFM Araújo contributed to the approval of the version to be published.

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