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ANALYSIS OF FATIGUE AMONG NURSE EDUCATORS IN BRAZILIAN PUBLIC UNIVERSITIES DURING THE COVID-19 PANDEMIC

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ABSTRACT

Objective: to analyze fatigue among nurse educators affiliated with Brazilian public universities while teaching online and hybrid courses during the Covid-19 pandemic.
Method: qualitative, cross-sectional study addressing 318 nurse educators teaching in federal and state public universities between July and November 2021. The adapted and validated version of the Three-Dimensional Work Fatigue Inventory (3D-WFI) was used to assess fatigue. The means were compared, and variance analysis (ANOVA) was performed with the Bonferroni test and t-test. The statistically significant variables ($p<0.05$) remained in the model.
Results: the participants were 42 (± 9.4) on average; most were women, 279 (87.7%); 225 (70.8%) had children; and 313 (98.4%) reported performing house chores along with online teaching. In addition to the activities concerning undergraduate programs, 88 (27.7%) participants also performed activities in graduate programs. An association was found between course modality (entirely online or face-to-face, or hybrid) and the dimensions: physical fatigue ($p=0.041$), mental fatigue ($p=0.001$), and emotional fatigue ($p=0.019$), and between taking care of children and help them with school tasks while also teaching classes online and physical fatigue ($p=0.012$), mental fatigue ($p=0.001$), and emotional fatigue ($p=0.000$).
Conclusion: the significant differences between course modality and the three dimensions of fatigue (physical, mental, and emotional) showed that the participants experienced physical and mental fatigue during and after work.

DESCRIPTORS: Nursing. Faculty Nursing. Higher Education. Teleworking. Universities. Fatigue.

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ANÁLISE DA FADIGA EM ENFERMEIROS DOCENTES DE UNIVERSIDADES PÚBLICAS BRASILEIRAS DURANTE A PANDEMIA DA COVID-19

RESUMO

Objetivo: analisar a fadiga em enfermeiros docentes de universidades públicas brasileiras durante o trabalho remoto e híbrido na pandemia da Covid-19.
Método: estudo de abordagem quantitativa, do tipo transversal, realizado com 318 enfermeiros docentes de universidades públicas federais e estaduais brasileiras entre os meses de julho a novembro de 2021. Para avaliar a ocorrência de fadiga, utilizou-se a escala *Three-Dimensional Work Fatigue Inventory* (3D-WFI) adaptada e validada para o português. Realizou-se a comparação das médias, análise de variância (ANOVA) com emprego do teste de Bonferroni, e teste t. No modelo, permaneceram as variáveis significantes estatisticamente (p< 0,05).
Resultados: a média de idade dos participantes foi de 42 anos (± 9,4). A maioria era do sexo feminino 279 (87,7%), 225 (70,8%) tinham filhos e 313 (98,4%) referiram desenvolver atividades domésticas junto com o trabalho remoto. Além das atividades na graduação, 88 (27,7%) docentes também desenvolviam atividades na pós-graduação. Observou-se associação entre o modo de trabalho (totalmente online, híbrido ou presencial) e as dimensões: fadiga física (p= 0,041), fadiga mental (p= 0,001) e fadiga emocional (p= 0,019), e cuidar dos filhos e ajudar com as atividades escolares durante o trabalho remoto com fadiga física (p=0,012), fadiga mental (p= 0,001) e fadiga emocional (p= 0,000).
Conclusão: as diferenças significativas entre o modo de trabalho e as três dimensões de fadiga (física, mental e emocional) permitiram evidenciar o que os enfermeiros docentes da amostra pesquisada identificaram como esgotamento físico e mental durante e ao final do dia de trabalho.

DESCRITORES: Enfermagem. Docentes de enfermagem. Educação superior. Teletrabalho. Universidades. Fadiga.

ANÁLISIS DE LA FATIGA EN ENFERMEROS DOCENTES DE UNIVERSIDADES PÚBLICAS BRASILEÑAS DURANTE LA PANDEMIA DE COVID-19

RESUMEN

Objetivo: analizar la fatiga en enfermeros docentes de universidades públicas brasileñas durante el trabajo remoto e híbrido en la pandemia de Covid-19.
Método: estudio de abordaje cuantitativo, del tipo transversal, realizado en 318 enfermeros docentes de universidades públicas federales y estatales brasileñas, entre los meses de julio y noviembre de 2021. Para evaluar la ocurrencia de fatiga; se utilizó la escala *Three-Dimensional Work Fatigue Inventory* (3D-WFI) adaptada y validada para el portugués. Se realizó la comparación de las medias, el análisis de variancia (ANOVA) con empleo del test de Bonferroni y el teste t. En el modelo, permanecieron las variables estadísticamente significativas (p< 0,05).
Resultados: la media de edad de los participantes fue de 42 años (± 9,4). La mayoría era del sexo femenino 279 (87,7%), 225 (70,8%) tenían hijos y 313 (98,4%) refirieron realizar actividades domésticas, junto con el trabajo remoto. Además de las actividades en la graduación, 88 (27,7%) docentes también realizaron actividades en la postgraduación. Se observó asociación entre el modo de trabajo (totalmente *online*, híbrido o presencial) con las dimensiones: fatiga física (p= 0,041), fatiga mental (p= 0,001) y fatiga emocional (p= 0,019); y, cuidar de los hijos y ayudar con las actividades escolares durante el trabajo remoto con fatiga física (p=0,012), fatiga mental (p= 0,001) y fatiga emocional (p= 0,000).
Conclusión: las diferencias significativas entre el modo de trabajo y las tres dimensiones de fatiga (física, mental y emocional) permitieron evidenciar que los enfermeros docentes de la muestra investigada identificaron agotamiento físico y mental durante y al final del día de trabajo.

DESCRIPTORES: Enfermería. Docentes de enfermería. Educación superior. Teletrabajo. Universidades. Fatiga.

INTRODUCTION

A search for efficiency in universities has led professors to intensify their work routine[1]. In this context, the social organization of educators' work is redefined. Besides facing excessive competition, the profession's subjectivity is based on immediate productivism, where professionals have problem-solving capacity and constantly update their knowledge[2].

College professors work more than 40 hours a week as they participate in extracurricular activities, occupy management positions, and perform research[3]. Hence, the increased number of tasks Brazilian educators perform requires more time and effort. Meanwhile, a more demanding workload may lead to physical fatigue and mental stress, creating an imbalance in these workers' professional and personal lives[4].

Even though teaching is considered one of the most stressful professions, the Covid-19 pandemic imposed unprecedented challenges, new demands, and stressors[1]. Facemasks, hand washing, and social distancing were necessary to prevent the spreading of the virus, and all sectors were affected, including education. Thus, faculty members and students had to adapt to a new teaching modality: online classes[5].

Thus, Emergency Remote Teaching (ERT) was a temporary alternative that educational institutions adopted to replace face-to-face classes with partially or entirely online classes (depending on the severity of the contagion and local restrictions) to ensure the continuity of education[6]. With such new work models, educators performed synchronous (live) and asynchronous activities (e-mail, virtual learning environments, WhatsApp, among others) while they faced the challenge of establishing connections with students, family members, and colleagues and experienced health concerns and uncertainty surrounding the spread of the virus[2,5].

Hence, there was a need to rapidly learn how to use digital tools and platforms to implement ERT in teaching activities[1–2]. There were also extensive and exhausting video calls, demanding familiarity with cameras and greater concentration. All these challenges made educators feel unprepared. The excessive use of technology resulted in technostress, affecting these workers' physical and mental health, as digital and videoconferencing tools are considered more psychologically demanding[7].

The problems faculty members faced with online classes include the inability to contact and socially Interact with colleagues, a lack of experience with working from home, problems reconciling work and personal lives, difficulty concentrating, ergonomic problems involved with working from home, and not having the technological equipment necessary to perform tasks[8]. Due to the pandemic, the nurse educators in Brazilian public institutions experienced a "new work environment": their own Home.

With the advent of the vaccine against Covid-19 and the easing of distancing restrictions, some face-to-face activities were resumed with a blended-learning proposal that integrates educational technologies, where students attend face-to-face classes and complement knowledge with remote teaching[5]. Specifically, many undergraduate nursing programs resumed face-to-face activities, providing real-world simulations in laboratories and activities in health facilities during the pandemic[8].

Therefore, the universities' educators needed to organize activities to combine teaching strategies, which required updated and dynamic planning[5]. In addition to the emotional overload caused by the new work demands, educators needed to deal with anxiety and concerns inherent to face-to-face classes during the pandemic, which became an indicator of illness and the development of fatigue[7].

Fatigue stands out in broad theoretical perspectives on workers' health. It is considered the personal result of physical and cognitive discomfort associated with feeling tired and exhausted at work. It is a factor that contributes to making workers ill, risking their safety, and possibly leading to occupational accidents[9].

Work-related fatigue is experienced during and at the end of a working day. It involves three types of energy resources: physical (involving muscle movement), mental (involving cognitive processing), and emotional (involving emotion regulation and expression).[10] Professional contexts that are usually related to fatigue as there is a high likelihood of workers developing fatigue include hospitals,[11–13] pharmaceutical services,[14] and teaching[15].

Thus, the educational context of ERT in the Covid-19 pandemic and the challenges faced by nurse educators, for which many were unprepared or had no training, indicated the need to study the fatigue phenomenon and the variables that may influence the health of teaching workers more in-depth. Even though there are studies addressing this phenomenon,[11–15] no studies have been identified thus far associating fully or partially online classes during the Covid-19 pandemic with work-related fatigue among nurse educators at public universities.

Additionally, burnout among faculty members is linked to several consequences, such as poor job satisfaction, lower levels of commitment, intention to quit their teaching position, and absenteeism[16]. Thus, fatigue influences work and life, significantly threatening workers' health and well being[17].

Knowing more deeply about the fatigue phenomenon and its relationship with teaching and verifying the aspects involved in the work process of educators during the restrictive measures imposed during the pandemic can allow the implementation of actions that favor the educators' quality of life. Additionally, this study's results can help universities, managers, and public education policies by providing a theoretical basis to support educators with mechanisms to moderate the impacts of fatigue not only in health crises but also out of pandemic contexts. Therefore, given the discussion above, the following guiding question is proposed: did nurse educators in Brazilian public universities become fatigued when implementing Emergency and Remote Teaching and blended learning during the Covid-19 pandemic?

Therefore, this study aims to analyze fatigue among nurse educators in public universities when implementing Emergency Remote Teaching during the Covid-19 pandemic.

METHOD

Quantitative, cross-sectional study based on the guidelines of Strengthening the Reporting of Observational Studies in Epidemiology (STROBE)[18]. The population consisted of 318 nurse educators teaching at Brazilian federal and state universities. This study covered the five regions of Brazil (South, Southeast, Midwest, North, and Northeast), and data were collected in a virtual environment using the Google Forms digital tool. Those who agreed to participate signed a free and informed consent form.

A total of 336 nurse educators teaching in federal and state universities participated in the study. Of these, 18 were excluded for not meeting the inclusion criteria. Thus, 318 nurse educators were included in the sample, 252 affiliated with federal and 66 with state universities. Eligibility criteria were being a nurse educator teaching in an undergraduate program at a Brazilian public university in the face-to-face, online, or hybrid modality during the Covid-19 pandemic. In addition, those on a temporary hiring contract were excluded.

A non-probabilistic sampling method (convenience sampling) was adopted. First, we verified the total number of federal and state universities with an undergraduate nursing program in Brazil to estimate the sample size. Next, we searched the electronic addresses and email contacts of faculty members in each university to obtain a list of the educators per university. A total of 1,525 educators were identified in federal and state public universities with undergraduate nursing programs. The sample was estimated using the EpiInfo software, version 7.2, with a 95% confidence level and a 5% sampling error. A minimum sample size of 307 was identified. Thus, the objective was to reach the largest number of participants based on the minimum sample to obtain a safety margin.

The participants were recruited, and data were collected individually between July and November 2021. Invitations were sent via e-mail to the universities' faculty members. Its content described the study's purpose and objectives and contained a link to access the instrument and instructions. A seven-day deadline was established for the participants to complete the questionnaire online. Additionally, the participants received five alert e-mails reminding them to participate in the study. The invitations were also sent through social media (Facebook® and Instagram®) and WhatsApp® groups. Additionally, a 46-second video was used to disseminate the study with an art invitation providing the link to access the questionnaire and free informed consent form.

Two instruments were used to collect data: the authors developed a form to address sociodemographic variables (sex, age, and whether the participants had children) and occupational variables: type of university, graduate activities, and course modality during the pandemic. The second instrument was the Three-Dimensional Work Fatigue Inventory (3D-WFI) scale, translated and validated for Brazilian Portuguese, to assess the occurrence of fatigue among nurse educators. The inventory comprises 18 items that measure fatigue in three dimensions (physical, mental, and emotional), rated on a Likert scale: "During the last 12 months, how often did you feel ...": 1 (every day), 2 (at least once a week), 3 (at least once a month), 4 (less than once a month) and 5 (never). It requires caution when interpreting the scores, as high scores indicate a low level of fatigue, while low scores indicate a high level of fatigue[10].

Each dimension comprises six questions. Dimension 1 - Physical Fatigue involves extreme physical tiredness and inability to perform physical activities at the end of a working day. Dimension 2 - Mental Fatigue is related to extreme mental tiredness and inability to think or concentrate at the end of a workday. Finally, dimension 3 - Emotional Fatigue involves extreme emotional tiredness and inability to feel or show emotions at the end of a workday.

The data integrating this study comprise a database organized in the Statistical Package for the Social Sciences (SPSS) software, version 23.0, through which they were analyzed. Descriptive variables were presented with absolute (n) and relative (%) frequencies (lower and upper limits, mean, standard deviation, and coefficient of variation). In addition, the Shapiro-Wilk normality test was applied.

After verifying the normal distribution of data, the means were compared through analysis of variance (ANOVA) using the Bonferroni test and the t-test. Significance was established at $p<0.05$.

RESULTS

A total of 318 nurse educators teaching in undergraduate nursing programs participated. The participants were 42 years old (±9.4) on average, and most were women 279 (87.7%); 225 (70.8%) reported children; and 313 (98.4%) reported house chores along with teaching online classes.

In addition to working with an undergraduate program, 88 (27.7%) participants also worked with graduate programs and specialization training. Regarding the state where the public teaching institution was located, 83 (26.1%) reported Rio Grande do Sul; 30 (9.4%) Paraná; 27 (8.5%) Bahia; 26 (8.2%), Santa Catarina; and 24 (7.5%) reported Rio de Janeiro; while the institutions to which 128 (40%) participants were affiliated were distributed in other Brazilian states.

According to the results of the descriptive analysis (Table 1), the construct "1 - Did you feel physically exhausted at the end of the workday?" obtained the highest mean of the inventory (1.53), showing that the participants were experiencing physical fatigue after work. Next is construct "7 - Did you feel mentally exhausted at the end of the working day?" (1.66), showing that the participants were mentally tired and unable to think or concentrate during and at the end of the workday.

Table 1 – Means and standard deviations. Rio Grande, RS, Brazil, 2021. (n=318).

Dimensions/ Constructs	Mean	SD
Physical Fatigue		
1. Did you feel physically exhausted at the end of the workday?	1.53	0.58
2. Did you have difficulty engaging in physical activity at the end of the workday?	1.68	0.91
3. Did you feel physically worn out at (physically fatigued/tired) the end of the workday? 4. Did you want to physically shut down at the end of the workday? 5. Did feel physically drained (no energy) at the end of the workday?	1.82	0.95
6. Did you want to avoid anything that took too much physical energy at the end of the workday?	2.24	1.09
1. Did you feel physically exhausted at the end of the workday?	1.93	0.83
2. Did you have difficulty engaging in physical activity at the end of the workday?	1.91	0.94
Mental Fatigue		
7. Did you feel mentally exhausted at the end of the workday?	1.66	0.73
8. Did you have difficulty thinking and concentrating at the end of the workday?	1.87	0.88
9. Did you feel mentally worn out Mentally fatigued/tired) at the end of the workday?	1.82	0.80
10. Did you want to mentally shut down at the end of the workday?	1.70	0.80
11. Did you feel mentally drained (no energy) at the end of the workday?	1.86	0.82
12. Did you want to avoid anything that took too much mental energy at the end of the workday?	1.82	0.88
Emotional Fatigue		
13. Did you feel emotionally exhausted at the end of the workday?	1.98	0.87
14. Did you have difficulty showing and dealing with emotions at the end of the workday?	2.32	0.99
15. Did you feel emotionally worn out at the end of the workday?	2.17	0.97
16. Did you want to emotionally shut down at the end of the workday?	2.06	1.02
17. Did you feel emotionally drained at the end of the workday?	2.15	0.98
18. Did you want to avoid anything that took too much emotional energy at the end of the workday?	2.14	1.05

*SD=standard deviation

Subsequently, construct “2 - Did you have difficulty engaging in physical activity at the end of the working day?” with an average of 1.68 showed that the participants were depleted of physical resources at the end of the workday. Construct “10 - Did you want to mentally shut down at the end of the workday?” showed an average of 1.70, indicating that the participants were mentally tired and unable to think or concentrate during and at the end of the workday.

Constructs “14 - Did you have difficulty showing and dealing with emotions at the end of the workday?”, “15 - Did you feel emotionally worn out (fatigued/emotionally tired) at the end of the workday?”, “17 - Did you feel emotionally drained (no energy) at the end of the workday?”, “18 - Did you want to avoid anything that took too much emotional energy at the end of the workday?” and “16 - Did you want to emotionally shut down at the end of the day?”, which belonged to the emotional dimension, obtained the lowest means: 2.32, 2.17, 2.15, 2.14 and 2.06, respectively. These means showed that the participants seldom showed emotional fatigue or inability to feel or show emotions during and at the end of the workday.

The ANOVA test was performed and showed a statistically significant difference between the course modality (entirely online or face-to-face, or blended learning) and the dimensions: physical fatigue (p=0.041), mental fatigue (p=0.001), and emotional fatigue (p=0.019). In addition, a significant association was also found between working hours (8 hours/day; between 8h and 12 hours/day; more than 12 hours/day) and the dimensions: physical fatigue (p=0.000), mental fatigue (p=0.000) and emotional fatigue (p=0.006) (Table 2).

Table 3 presents the descriptive statistics and the t-test performed for each of the three dimensions (physical fatigue. mental fatigue, and emotional fatigue). A statistically significant difference was found between the variable Needed to care for children and help them with school tasks while teaching online classes and physical fatigue (p=0.012), mental fatigue (p=0.001), and emotional fatigue (p=0.000). In addition, a statistically significant difference was found between the variable Needed to perform house chores while also teaching online classes” and the emotional fatigue dimension (p=0.013).

Table 2 – Differences between the means obtained in the dimensions and variables course modality and working hours. Rio Grande, RS, Brazil, 2021.

Variables	PF ||			MF ¶			EF **		
	n	x̄†	*p**	n	x̄†	*p**	n	x̄†	*p**
Course modality			0.041‡			0.001‡			0.019
Online	167	1.82		167	1.79		167	2.12	
Blended	150	1.87		150	1.79		150	2.13	
Face-to-face	1	3.5		1	4.33		1	4.50	
Total	318								
Working hours			0.000‡			0.000‡			0.006‡
Fewer than 8hs/day	18	2.41		18	2.18		18	2.55	0.008§
8h/day	46	2.05		46	2.05		46	2.33	0.003§
Between 8hs/day and 12h/day	178	1.84	0.002§	178	1.75		178	2.13	
More than 12hs/day	76	1.61	0.000§	76	1.61	0.003§	76	1.91	0.021§
Total	318			318			318		

*p<0.05; †x̄: mean; ‡p-value obtained in the ANOVA test; §p-value obtained in the Bonferroni test; PF ||: Physical Fatigue; MF ¶: Mental Fatigue; EF **: Emotional Fatigue.

Table 3 – Comparison between the means obtained in the dimensions and the variables Needed to care for children and helping them with school tasks while teaching online classes and Needed to perform house chores while teaching online classes.

Descriptive Statistics							
Dimensions	**Variables**	**n†**	**x̄‡**	**DP§**	**95% *IC||**		***t-test p-value****
					Li¶	**Ls****	
Care for children and help them with school tasks while teaching online classes.							
PF††	Yes	161	1.76	0.64	-0.44	-0.56	0.012
	No	69	2.01	0.78	-0.46	-0.39	
MF‡‡	Yes	161	1.65	0.65	-0.53	-0.13	0.001
	No	69	1.99	0.78	-0.54	-0.11	
EF***	Yes	161	1.97	0.81	-0.67	-0.20	0.000
	No	69	2.41	0.89	-0.68	-0.19	
Total		230					
Needed to perform house chores while teaching online classes							
PF	Yes	313	1.84	0.67	-0.88	0.31	0.351
	No	5	2.13	0.36	-0.73	0.16	
MF	Yes	313	1.78	0.69	-0.99	0.22	0.215
	No	5	2.16	0.37	-0.84	0.71	
EM	Yes	313	2.12	0.83	-1.68	-0.20	0.013
	No	5	3.06	0.79	-1.92	0.38	
Total		318					

*p<0.05; †: number; ‡: mean; §: standard deviation; ||: confidence interval; ¶: lower limit; **: upper limit; ††: Physical Fatigue; ‡‡: Mental Fatigue; ***: Emotional Fatigue.

DISCUSSION

This study analyzed fatigue at work in three dimensions (physical, mental, and emotional) in a sample of nurse educators in Brazilian public universities. It shows how educators dealt with the occupational demands of online teaching/ blended learning and house chores during the socially distancing measures to control the spreading of the Coronavirus during the Covid-19 pandemic in 2021.

Fatigue at work is the state of physical, mental, and emotional exhaustion and tiredness that may affect a worker's performance during and at the end of a working day[10]. Physical fatigue is a condition experienced after carrying out activities. An individual experiencing fatigue usually performs low activity levels, has low motivation, and is in poor physical condition[17]. In this study, constructs 1 and 7 obtained the highest means (1.53 and 1.66, respectively) among the participants, showing that they identify physical and mental exhaustion during and at the end of the workday. One mixed methodology study[19] addressing educators affiliated with a public university from different fields of knowledge shows that the participants related work overload with feelings of loneliness, fear, anguish, and sadness, lack of motivation to perform work tasks and teach classes in a virtual environment.

Another qualitative study[20] addressing American teachers ministering online classes reports that the participants mentioned that the pandemic added pressure because, in addition to teaching children, they needed to provide extra materials and classes for students, further intensifying their work routine.

Considering mental fatigue and the inability to think and concentrate during and at the end of a working day, the following means of constructs 2 (1.68) and 10 (1.70) stood out. A study[13] performed

with nurses identified that workers experiencing mental fatigue throughout a working day find it difficult to think and concentrate, become tired when speaking, are anxious and forgetful, lack confidence, are unable to control their behavior and fail to do a good job. Additionally, they may have poor physical condition, characterized by stiff shoulders, back pain, heavy breathing, thirst, and dizziness[13]. Such a fact may be related to a lack of experience or the necessary infrastructure, which often requires educators to spend much more time preparing for online teaching, particularly to create an environment where students can interact freely[19].

One study[21] conducted with Brazilian educators teaching in Nursing programs at different universities identified that a lack of training in the use of technology and digital tools, especially among older professors, generated insecurity and fear.

The constructs (14,15,16,17, and 18) in the emotional fatigue dimension presented the lowest means (2.32, 2.17, 2.06, 2.15, and 2.14, respectively). These means show that the participants seldom experienced emotional fatigue during or after a workday. Even though this study did not explore energy recovery strategies during and after online work, we believe that the participants psychologically distanced themselves from work and adopted relaxation strategies, possibly explaining these low means. For example, the public school teachers addressed by a qualitative study in England[15] reported psychologically shutting down from work to recover their energy levels and emotional resources, including avoiding checking e-mail, answering work-related calls during resting periods, meditation, reading books, and listening to music.

Another study[5] addressing educators also verified that the participants sought to sleep well, accessed applications less frequently, limited screen time, and interacted and talked with their partners to deal with day-to-day challenges during online teaching.

The pandemic-related restrictions demanded universities to totally or partially interrupt on-campus classes and implement online or hybrid courses.

Significant differences were found in this study between the course modality (entirely online or face-to-face, or hybrid) and the three dimensions of fatigue (physical, mental, and emotional). Likewise, a study conducted with 307 Italian teachers identified that they needed to devise new methods and use appropriate materials to ensure teaching and learning, in which teachers and students mostly had only basic knowledge of the use of digital technologies, which demanded different solutions and strategies for these to be effectively implemented[6].

A significant difference was found between working hours (8 hours/day; 8h and 12 hours/day; more than 12 hours/day) and the physical, mental, and emotional fatigue dimensions. This whole process also caused an increase in these professionals' workload for preparing classes, videos, assessments, and providing guidance[19]. The participants also mentioned that situations constantly changed during the pandemic, making planning the next day or week challenging[20]. Others also mentioned the exhaustive administrative work accompanying this teaching modality,[15] added to the long hours of virtual meetings on videoconferencing platforms[7].

Face-to-face classes/activities in simulation laboratories and health institutions are essential in the training process in the nursing/health field. Thus, undergraduate programs in the health field opted for hybrid courses, combing face-to-face practice with online classes, which significantly transformed the way in which teaching and learning happen in nursing/health programs[22].

However, a study conducted with nurse educators teaching in undergraduate programs in Argentina reported that the confluence of care (hospital) and educational activities (online) overloaded professors even more, imposing an unfavorable context and harming these professionals' health[8].

Difficulties implementing online and hybrid teaching were also reflected in the educational evaluation process, leaving some educators worried and uncomfortable. Online teaching intensified a feeling of uncertainty, as there was no insurance regarding the results of their efforts[1,8].

The increase in online classes during the Covid-19 confinement promoted new practices at home, requiring "domestic life" to be reorganized, which became a significant challenge[23]. While workers in some professions and sectors remained working in their workplaces, others - especially educators - were demanded to work at home, which became their workplaces. Many had to share their work environments with vulnerable family members and teach their children[5,20]. Thus, the participants had to reconcile social distancing and online teaching while keeping an emotional balance and maintaining good physical, mental, and financial health like the remaining population[19,20].

In another study,[21] college educators reported four situations related to changes in online work: increased workload, adaptation process, having to dedicate considerable time and effort to research, and difficulty separating professional from personal life.

A statistically significant difference was found in this study between taking care of children and helping them with their school tasks during online classes and physical, mental, and emotional fatigue. In addition, a significant difference between the need to perform house chores and online teaching and the emotional fatigue dimension was also identified. Parents needed to care for their children as kindergarten and elementary schools were closed during the pandemic. As a result, in addition to their daily work routine, educators needed to care for and play with their children while educating them,[23] paying attention to their online classes and helping them with school assignments and tests[24].

Although for some, the social distancing measures meant an opportunity to be with their families, some studies[6,19] show that mothers working from home faced difficulties reconciling work and family within the same environment. During the critical phase of the pandemic, this situation is related to excessive working hours, as family and social lives became almost inexistent, causing uncertainty, frustration, emotional and mental fatigue, anxiety, stress, and depression[25].

Home has a long history of meanings attached to relationships and family. In this study, family and care activities were highlighted as aspects that intensified fatigue among educators in its three dimensions (physical, mental, and emotional). Experts note the intensification of maternal guilt and the tension created between care practices and domestic responsibilities while at the same time struggling to maintain one's "ideal worker" identity during online work[23].

This study did not focus on gender; however, mothers and fathers needed to coordinate their work schedules with household chores and the expectations of other family members; such coordination was not needed before remote work. In this context, the role of men at home also changed. Studies addressing women and men indicate that men are much more involved with housework and childcare than three or four years ago. However, women still carry a more significant burden of housework and childcare[23–24].

This study's results corroborate the scientific literature on fatigue among educators. These findings present the complex work and effort involved in establishing teaching activities during online and hybrid teaching. The fact that teaching tasks were added to childcare and housework favored physical, mental, and emotional fatigue.

Note that in times of accelerated and imposed changes, everyday life, often divided between the work "world" and family "world," clashed, creating friction between the different components of life. In addition to everyday life at home being disturbed,[25] educators were exhausted, experiencing physical, mental, and emotional fatigue.

However, despite the challenges to adapting pedagogical content and practices, coupled with workload and daily family tasks, online/hybrid classes highlighted positive aspects in the professional development of nurse educators, as they acquired new skills that enabled them to continue providing training, shortening geographical distances, integrating digital technologies, and significantly contributing to nursing education[23].

Even though further research is needed to understand online and hybrid teaching practices, this study presents an essential context to understanding the spatial, material, and social organization of teaching work practices during the Covid-19 pandemic and its repercussions on these workers' health, enabling a better understanding of work/home/family/health relationships.

One of this study's limitations concerns its cross-sectional design, which does not allow us to establish cause-and-effect relationships. Hence, longitudinal studies addressing larger samples are needed. Another limitation is the scarcity of studies conducted in Brazil on physical, mental, and emotional fatigue, hindering comparisons. Finally, note that this is the first study thus far assessing the three dimensions of fatigue among nurse educators affiliated with Brazilian public universities. Thus, we suggest fatigue be assessed in its three dimensions among educators at different points in time within the context assessed here to compare results.

CONCLUSION

This study revealed that nurse educators teaching undergraduate nursing programs at public universities experienced fatigue during online and hybrid courses. Significant differences were found between the fatigue dimensions, course modality, and working hours.

We also investigated associations between the dimensions of fatigue and the variable Needed to care for children and help them with school tasks during online classes and between Needed to perform housework while teaching online and the emotional fatigue dimension. Finally, this study showed that the activities demanded during online teaching promoted fatigue, making the participants feel physically, mentally, and emotionally exhausted.

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NOTES

ORIGIN OF THE ARTICLE

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CONFLICT OF INTEREST

There is no conflict of interest.

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