ORIGINAL ARTICLE

OUTPATIENT NURSING TEAM SIZING DURING THE COVID-19 PANDEMIC

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ABSTRACT

Objective: to size the nursing team in a multi-specialty outpatient clinic during the Covid-19 pandemic. **Method:** this is a retrospective study, carried out in an outpatient clinic of a university hospital in southern Brazil. The sample was composed of a compilation of nursing team activities, extracted over a period of 16 weeks (September-December 2020). The variables, steps and equations for staffing at the outpatient clinic respected current national regulations. Data were subjected to descriptive statistical analysis. The Technical Safety Index of 15% and 25% was applied. **Results:** the standard weekly mirror resulted in 12 specific operational areas and two of general content. The total number of functional sites was 30 for nurses and 110 for mid-level workers. The number of nurses in the actual/available workforce was four, and the projected number varied from three to four. Regarding the technical team, a mean of seven professionals was identified in the actual staff and 14 in the dimensioned staff. Thus, there was a mean monthly deficit of -7 for nursing technicians/assistants and adequacy of nurses. **Conclusion:** during the Covid-19 pandemic, the outpatient mid-level nursing staff was insufficient.

Keywords: Downsizing Organizational; Workload; Nursing Staff; Ambulatory Care. Coronavirus Infections.

INTRODUCTION

Nursing staff adequacy is a challenge present at many moments in nursing history. Recently, with the advent of Covid-19 declared by the World Health Organization (WHO) as a pandemic in 2020, health professionals and managers faced numerous obstacles, including the need for nursing staff arrangement and (re)sizing at all levels of health care[1-3]. In the outpatient context, the pandemic implied the need for adjustments in care flows, professional training, patient education and nursing workforce arrangement[3-5].

In the contingency and coping plan for Covid-19 implemented in a university outpatient clinic in the city of Rio de Janeiro[3], unit restructuring aimed to promote improvements in the environment and safety for professionals and patients. Outpatient nursing sizing was assumed as one of the basic management actions to face the pandemic[3]. However, whether in the pandemic context or outside it, the method and stages of outpatient sizing require better detail, especially due to the fact that validated and fixed criteria are not verified – in terms of professional category standardization – regarding the nursing time required for outpatient activities[6-8].

According to current Brazilian regulations[6] that govern the dimensioning of nursing staff, outpatient units are called Special Care Units (SCU), i.e., places where nursing interventions/activities are developed in which it is not possible to apply the sizing method based on the Patient Classification System[6]. Thus, it is reiterated that this care scenario still requires efforts related to the staff dimensioning method to achieve a more scientific status, a fact aggravated by the Covid-19 pandemic health crisis. In view of this, the question was: did the nursing team of a multi-specialty outpatient clinic demonstrate an adequate professional staff during the Covid-19 pandemic? To answer this, the study aimed to size the nursing team in a multi-specialty outpatient clinic during the Covid-19 pandemic.

METHOD

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This is a cross-sectional, descriptive and retrospective study, which respected the STrengthening the Reporting of OBservational studies in Epidemiology (STROBE)[9] criteria in the research report description.

The research field was the multidisciplinary outpatient clinic of a public university hospital in the countryside of Paraná, Brazil. This outpatient clinic provides medium-complexity care and has: 25 medical care offices; room for carrying out more complex dressings; rooms for orthopedic procedures; infrastructure for carrying out pulse therapy, ergometry, medical care for employees (occupational health); and environments for caring for other members of the multidisciplinary team, such as nursing, nutrition, psychology and physiotherapy.

Regarding participants, these were indirect, as data calculation to achieve the objective was the volume of nursing work activities. Even so, all professionals who were part of the nursing team (nurses and nursing technicians/assistants) working in the outpatient clinic during the research period were eligible. There were no exclusion criteria, as participation was conditioned by the number of professionals available at the outpatient clinic, and not the primary source (workers themselves). Therefore, the initial sample included in this study was 11 professionals (four nurses and seven mid-level workers), as there were no losses or ineligibility.

To survey labor demand, the following variables were collected: quantity of medical care; collection of laboratory tests; care provided in the complex wounds outpatient clinic; nursing assistance and technical procedures in the orthopedics outpatient clinic; general outpatient nursing procedures (e.g., medication, nursing assistance in gynecological procedures, assistance in minor surgeries and assistance in clinical exams/tests).

To complement sizing calculation, variables as follows were collected: working period; weekly working hours; total number of functional sites for nurses and nursing technicians.

Data collection took place in February 2021, using the 16 working weeks of the outpatient nursing team as a basis for surveying the variables, corresponding to the period from September to December 2020. Due to the Covid-19 pandemic, many internal relocations and changes in allocation of nursing professionals in different sectors of the institution, including the outpatient clinic, were necessary. Therefore, the definition of the period for carrying out the study was based on the fact that it was a period of time without many changes of professionals, even though the fight against the pandemic was still in force.

The specific place where data collection took place was the institution's Nursing Department, with information collected during the main researcher's work hours, nurse at the investigation outpatient clinic and master's degree holder. Prior authorization was obtained from the Nursing Department and the collaboration of three other nurses who helped with data collection after being previously trained by the researcher. To extract documents of interest, a printed form was used and previously structured for the study in question.

The main source of data was the nursing management spreadsheet, a printed document containing data on labor demand and the daily work schedule, including worker absences as well as the monthly work schedule, in which the working hours of professionals per shift and absences due to benefits (time off, vacations and licenses) are recorded. Additionally, data on the number of unforeseen absences (absenteeism) were exported from institutional electronic spreadsheets.

To cover the step-by-step process necessary for sizing the outpatient nursing team, data were subjected to the treatment recommended by the Federal Nursing Council (COFEN - *Conselho Federal de Enfermagem*)[6] with regard to nursing staff sizing in SCU, with the following steps:

Step 1. Standard weekly mirror structuring

The first step in sizing the outpatient nursing team was to identify and describe the operational areas of SCU to subsequently structure the standard weekly mirror (ESP - *espelho semanal padrão*) (graphic representation of the distribution of operational areas with weekdays, work shifts and professional category). It is noteworthy that current regulations[6] recommend that a historical series of weekly mirrors of at least four to six weeks be used. As explained, the data collection period for establishing the outpatient ESP was 16 weeks.

In ESP, through graphic representation, operational areas existing in the outpatient clinic,

professional nurses and technicians/assistants required for each operational area, in each work shift during service days, and the total functional sites of each category are distributed, divided into shifts and weekdays. Functional sites (FS) are units of measurement based on professional experience (in this case, based on the main researcher's experience) that considers the activities carried out, the activity's operational area or site and the nursing team's weekly workload[6].

Chart 1. Formulas applied for calculations referring to variables for outpatient nursing staff sizing, Cascavel, PR, Brazil, 2020

Technical Safety Index (TSI) calculation
$$TSI\,(\%) = ARA + ARB$$
In which:
ARA = Absence rate due to absenteeism (unplanned absences)
ARB = Absence rate due to benefits
Marinho's constant (KM) calculation
$$KM = \left(\frac{WP}{WWL}\right) X\,(1 + TSI)$$
In which:
WP = work period
WWL = weekly workload
TSI = Technical Safety Index
Calculation of the total functional sites of nurses
$$TSF_{Nur} = [(FSHL_1) + (FSHL_2)\,....\,(FSHL_n)]$$
In which:
TFSNur = total functional site of nurses
FSHLn = number of functional site for higher level
Calculation of the total functional sites of nursing technicians/assistants
$$TFS_{Tec} = [(FSML_1) + (FSML_2)\,....\,(FSML_n)]$$
In which:
TFSTec = total functional site of nursing technicians/assistants
FSMLn = number of functional site for middle level

To calculate TSI, the percentage of unforeseen absences (absenteeism) was added to the percentage of expected absences (due to benefits)[6-8,10]. Using TSI and variables related to working hours (WP and WWL), it was possible to calculate the KM.

Step 3. Calculation of the number of outpatient nursing professionals by category

Step 2. Determination and calculation of sizing variables

The variables identified as necessary to calculate outpatient nursing staff sizing were work period (WP) in days, weekly workload (WWL), Technical Safety Index (TSI), Marinho's constant (KM) and total functional sites (TFS) for both nurses and nursing technicians/assistants, separately. To calculate TSI, KM and TFS, the formulas illustrated in Chart 1 were applied.

Once the variables were defined and the respective preliminary calculations carried out, the final step to size the outpatient nursing staff consisted of calculating the number of staff itself, which was carried out separately for nurses and nursing technicians/assistants, based on the formula presented in Chart 2.

Chart 2. Formula for sizing the outpatient nursing staff, Cascavel, PR, Brazil, 2020

Calculation of the number of outpatient nursing professionals
$$NP_{(FS)} = KM\,X\,TFS$$
In which:
NP(FS) = number of professionals for functional sites
KM = Marinho's constant
TFS = total functional sites for each category

The calculation was carried out in two ways: one considering the minimum TSI provided for in current regulations(6), which is 15%, and the other considering the verified/actual TSI at the outpatient clinic. This calculation was based on the mean values between the four months of data collection.

Taking into account that these results refer to people, nursing worker values were presented in absolute numbers, based on universal mathematical rounding.

After collection in printed form, all data were tabulated in a Microsoft Excel® spreadsheet, version 2010. Once this was done, the data were subjected to descriptive statistical analysis.

The study respected the ethical precepts established by relevant legislation, and was submitted and approved by the Institutional Review Board of the institution to which the main researcher is linked, issuing a favorable Opinion number 4,030,375/2020. Furthermore, it is noteworthy that, for developing the study, the Data Processing Commitment Statement (DPCS) was previously signed.

RESULTS

ESP development made it possible to identify 14 operational areas in the outpatient clinic, with the majority (n=11; 78.5%) of nursing interventions being developed mainly by the mid-level team (Table 3). The mean monthly TSI was 25%, varying between 19% and 37%.

Chart 3. Standard weekly mirror of the outpatient clinic studied, Cascavel, PR, Brazil, 2020.

| Operational area (activity site)) | Professional category | Monday to Friday | | | | Subtotal de SF$^{\parallel}$ X 5 | Total SF$^{\parallel}$ Enf. | Total SF$^{\parallel}$ TE/AE |
		M*	T†	N1‡	N2§			
Special care reception	Nur.¶	0	0	0	0	0	0	10
	Tech./Ass.**	1	1	0	0	10		
Gynecology and obstetrics + pediatrics offices	Nur.¶	0	0	0	0	0	0	10
	Tech./Ass.**	1	1	0	0	10		
Ophthalmology + dermatology offices	Nur.¶	0	0	0	0	0	0	10
	Tech./Ass.**	1	1	0	0	10		
Orthopedics offices and plaster room	Nur.¶	0	0	0	0	0	0	10
	Tech./Ass.**	1	1	0	0	10		
Anticoagulation clinic	Nur.¶	0	0	0	0	0	0	10
	Tech./Ass.**	1	1	0	0	10		
Hypersensitivity testing room	Nur.¶	0	0	0	0	0	0	10
	Tech./Ass.**	1	1	0	0	10		
Purge + materials and sterilization center	Nur.¶	0	0	0	0	0	0	10
	Tech./Ass.**	1	1	0	0	10		
Clothes room	Nur.¶	0	0	0	0	0	0	10
	Tech./Ass.**	1	1	0	0	10		
Pulse therapy room	Nur.¶	0	0	0	0	0	0	10
	Tech./Ass.**	1	1	0	0	10		
Sectoral organization	Nur.¶	0	0	0	0	0	0	10
	Tech./Ass.**	1	1	0	0	10		
General dressing room	Nur.¶	0	0	0	0	0	0	10
	Tech./Ass.**	1	1	0	0	10		
Wound clinic	Nur.¶	1	1	0	0	10	10	0
	Tech./Ass.**	0	0	0	0	0		
Nursing supervision	Nur.¶	1	1	0	0	10	10	0
	Tech./Ass.**	0	0	0	0	0		
Nursing coordination	Nur.¶	1	1	0	0	10	10	0
	Tech./Ass.**	0	0	0	0	0		

* M = morning; †A = afternoon; ‡N1 = night 1; §N2 = night 2; $^{\parallel}$FS = functional site; ¶Nur. = nurses; **Tech./Ass. = nursing technicians/assistants.

TSF of nurses and nursing technicians/assistants were 30 and 110, respectively (Chart 4), reinforcing mid-level workers' greater role in developing work activities.

Chart 4. Variables for sizing the outpatient nursing staff, with the respective values obtained monthly and the mean of the period studied, Cascavel, PR, Brazil, 2020

| Variable | Description | Monthly value | | | | Mean |
		09/2020	09/2020	09/2020	09/2020	
Work period (WP)	Work period (WP)	4	4	4	4	4
Weekly workload (WWL)	Weekly workload (WWL)	40	40	40	40	40
Technical Safety Index	Technical Safety Index (TSI)	0,15†	0,15†	0,15†	0,15†	0,15†

(TSI)		0,20‡	0,19‡	0,21‡	0,37‡	0,25‡
Marinho's constant (KM)	Marinho's constant (KM)	0,1150† 0,1200‡	0,1150† 0,1193‡	0,1150† 0,1215‡	0,1150† 0,1373‡	0,1150† 0,1250‡
Total functional sites (TFS) of nurses and nursing technicians/assistants	Total functional sites (TFS) of nurses and nursing technicians/assistants	TSF-ENF§: 30 TSF-TEC‖: 110	TSF-ENF§: 30 TSF-TEC‖: 110	TSF-ENF§: 30 TSF-TEC‖: 110	TSF-ENF§: 30 TSF-TEC‖: 110	TSF-ENF§: 30 TSF-TEC‖: 110

* SCU = Special Care Unit; †Value considering the minimum Technical Safety Index of 15%; ‡Value calculated considering planned and unforeseen absences from the outpatient clinic; §TFS-NUR = total functional sites of nurses; ‖TFS-TEC = total number of functional sites of nursing technicians/assistants.

Given the volume of work and other variables measured, the quantitative and qualitative number of outpatient nursing staff was measured and compared with the available/actual staff (Table 1).

Table 1. Quantity of nursing professionals present in the actual outpatient clinic staff compared to the sized staff, Cascavel, PR, Brazil, 2020

Period	Actual staff			Sized I*			Sized II†		
	E‡	T/A§	Team	E‡	T/A§	Team	E‡	T/A§	Team
September	4	7	11	3	13	16	4	13	17
October	4	8	12	3	13	16	4	13	17
November	4	7	11	3	13	16	4	13	17
December	4	7	11	3	13	16	4	15	19
Mean	4	7	11	3	13	16	4	14	18

*The minimum Technical Safety Index (15%) provided for in COFEN Resolution 543/2017 was considered; †The mean Technical Safety Index (25%) was considered, calculated based on planned and unplanned absences from the outpatient clinic; ‡Nurses; §Nursing Technicians/Assistants.

DISCUSSION

Through ESP preparation, it was identified that the outpatient nursing team worked in a diverse volume of operational areas and presented a mean monthly TSI higher than the minimum recommended by current regulations. Regarding nursing staff sizing, the actual mean quantity was deficient when considering the mid-level team, which was responsible for the largest volume of outpatient activities. It is believed that this is important evidence, as it signals both a possible need to review the minimum TSI and nursing staff sizing, as it is already widely known that absenteeism rates are alarming in the category, as they raise reflections on nurses' role in the outpatient clinic, since the mid-level nursing team was responsible for care actions.

Sizing nursing staff, regardless of the work context, helps nurses to understand the needs of the workforce under their management[11]. Although this assertion has wide acceptance in a general nursing context[7-8, 11-13], scientific literature is limited when it comes to studies that address the outpatient nursing sizing process, which can be easily verified by searching databases. This is an ambivalence between the limitation and contribution of this study.

As in other nursing practice scenarios, having sufficient staff and training is essential to guarantee and qualify the reception of all users who attend a multi-specialty outpatient clinic. However, one of the main problems of the Brazilian public health system, highlighted by the news at the beginning of the Covid-19 pandemic, was the lack of professionals to respond to this crisis[14].

The nursing team's work in what is called "reception with special care" involves, for the most part, receiving patients treated by different specialties, which covers a series of other activities, including active listening, providing health guidance/education and directing/accompanying patients to clinics. In this regard, it is important to highlight that reception underpins comprehensiveness and humanization of care, and is therefore essential in the process of establishing the bond between

health professionals and the public assisted[15].

When establishing the minimum parameters for outpatient nursing staff sizing, Resolution COFEN 543/2017 recommends that a minimum percentage of 15% be "added" to the calculation of the amount, called TSI, which aims to ensure coverage of expected absences and not foreseen[6]. The TSI in the multi-specialty outpatient clinic investigated ranged between 19% and 37%, i.e., high rates compared to the recommended minimum.

If the empirical minimum TSI of 15% were considered, the sized nursing staff would possibly not have a more direct relationship with the reality of outpatient staff dynamics. The TSI calculated, based on the team's absences, limited to 25%, resulted in the difference of two more professionals in the sized team (n=18), compared to the sized team with the TSI of 15% (n=16). Focusing exclusively from a mathematical/statistical perspective, this may not seem so important; however, in work practice, it is more than relevant to consider any increase in the nursing staff, both for workers' health and quality of care[3]. Therefore, demonstrating this difference, although slight between staff sized by TSI, is a contribution of this study.

The TSI calculated at 10% more than the minimum recommended by current regulations[6] is a sign that there are problems linked to workers' health and/or organizational climate quality in the outpatient clinic, in addition to the possibility of increased absence due to the pandemic itself, as questioned. Analyzing the general numerical deficit (Table 1) and arrangement/distribution of activities in the sector, it is suggested that mid-level nursing professionals working in the studied unit are exposed to high workload pressure.

Nursing staff undersizing is a national reality, as it affects different practice scenarios and was affected by the Covid-19 pandemic[2]. Among its implications, we can mention possible deviations in quality of care and a drop in safety standards for both patients and professionals[16-20].

The fact that the category of nursing technicians was responsible for a much larger volume of FS (n=110) compared to nurses (n=30) in the outpatient clinic was the reason why the mid-level staff presented a deficit (-7)

of workers when comparing the projected versus actual staff. This reality deserves to be analyzed critically, for instance, the scarce participation of nurses in some activities. However, it is worth questioning whether it is possible (or appropriate) to attribute the same value to working time for nurses' private activities, with complex and systemic content, such as nursing supervision and coordination, instead of those linked to specific care procedures.

Considering the above, it is clear that the methodology based on FS is necessary for the SCU context, however, the lack of systematic and standardized parameters, in accordance with each type of activity developed, is a major barrier. Therefore, this study is also an invitation for nurses and researchers to dedicate themselves to this issue and leverage scientificity in the process of sizing outpatient nursing staff.

Unlike what occurs in hospital inpatient units, a scenario that involves several studies detailing how to identify workload and, based on this, size the number of professionals, few studies are dedicated to presenting appropriate methodologies for establishing workload in the outpatient context, and, when they do so, data come from specialized environments, such as oncology[21-22].

In addition to the lack of provision of positions and careers through competitions, when talking about public institutions, there is a social commitment to guarantee direct assistance to patients affected by Covid-19. Thus, inevitably influenced by pressure from government and institutional managers, direct nursing sector leaders tend to prioritize inpatient units, leaving the outpatient nursing staff management in the background. Outside the pandemic context, this fact can also be verified, since patients' clinical complexity and technical-instrumental nursing interventions in the hospital hospitalization scenario are elements that can direct management decisions by providing more staff to these environments. It is not the responsibility of this study to judge this possible reality, but rather to demonstrate the importance of systematic, systemic, technical and scientific sizing.

Despite the possible low visibility of outpatient nursing, regarding staff adequacy

instead of prioritization given to inpatient units, we must currently think about the scenario called the "post-Covid-19 era". The number of scientific studies reporting the numerous chronic complications of Covid-19 is increasing, which will routinely be monitored in outpatient settings[23].

As limitations of this study, there is, in the first instance, the fact that the definition of operational areas and FS follows an intuitive judgment and based on personal practical experience, which makes the description of areas subject to variations, depending on the researcher's point of view, and this may compromise data expansion to other locations. Furthermore, there may have been interference in the number of staff sized for the period of analysis (last four months of the year), since, routinely, activities tend to gradually decrease at the end of the year and, consequently, there is an increase in absence rates due to benefits (holidays), consequently changing the TSI rate calculated for the unit researched. However, compiling four months of data possibly mitigated this issue.

Despite the limitations, it is believed that this study contains important contributions to understanding the methodology for dimensioning outpatient nursing staff during the Covid-19 pandemic. New investigations must be conducted, especially considering the systematic elaboration/validity of more appropriate and/or specific workload measurement parameters for this type of nursing practice scenario, and, consequently, staff sizing.

CONCLUSION

During the Covid-19 pandemic, the available number of nursing technicians/assistants in the multi-specialty outpatient clinic was below the sized number, while the number of nurses proved to be adequate for its projection, whether considering the calculated TSI or the recommended minimum value.

The verification of an TSI specific to the outpatient unit is important evidence of this research, as, added to many previous studies on absenteeism in nursing, it indicates that the minimum TSI of current national recommendation may be out of date. Another relevant piece of evidence is the possible need to review outpatient nurses' work activities, at least in the space studied, given the mid-level team's evident role in direct care.

DIMENSIONAMENTO DA EQUIPE DE ENFERMAGEM AMBULATORIAL DURANTE A PANDEMIA DE COVID-19

RESUMO

Objetivo: dimensionar a equipe de enfermagem em um ambulatório de múltiplas especialidades durante a pandemia de Covid-19. **Método:** estudo retrospectivo, desenvolvido em um ambulatório de hospital universitário do sul do Brasil. A amostra foi composta pelo compilado de atividades da equipe de enfermagem, extraídas em um período de 16 semanas (setembro-dezembro 2020). As variáveis, as etapas e as equações para o dimensionamento de pessoal no ambulatório respeitaram a normativa nacional vigente. Os dados foram submetidos à análise estatística descritiva. Aplicou-se o índice de segurança técnica de 15% e 25%. **Resultados:** o Espelho Semanal Padrão resultou em 12 áreas operacionais pontuais e duas de teor geral. O Total de Sítios Funcionais foi de 30 para enfermeiros e 110 para trabalhadores de nível médio. O quantitativo de enfermeiros do quadro real/disponível era de quatro, e o projetado variou de três a quatro. Com relação à equipe técnica, identificou-se média de sete profissionais no quadro real e 14 no quadro dimensionado. Assim, verificou-se déficit mensal médio de -7 para técnicos/auxiliares de enfermagem e adequação de enfermeiros. **Conclusão:** durante a pandemia de Covid-19, o quadro de pessoal de enfermagem de nível médio do ambulatório era insuficiente.

Palavras-chave: Dimensionamento de pessoal. Carga de Trabalho. Recursos Humanos de Enfermagem. Assistência Ambulatorial. Covid-19

DIMENSIONAMIENTO DEL EQUIPO DE ENFERMERÍA AMBULATORIA DURANTE LA PANDEMIA DE COVID-19

RESUMEN

Objetivo: dimensionar el equipo de enfermería en un ambulatorio de múltiples especialidades durante la pandemia de Covid-19. **Método**: estudio retrospectivo, desarrollado en un ambulatorio de hospital universitario del sur de Brasil. La muestra fue compuesta por el compilado de actividades del equipo de enfermería, extraídas en un período de 16 semanas (septiembre-diciembre 2020). Las variables, las etapas y las ecuaciones para el dimensionamiento de personal en el ambulatorio respetaron la normativa nacional vigente. Los datos fueron sometidos al análisis estadístico descriptivo. Se aplicó el índice de seguridad técnica de 15% y 25%. **Resultados**: el *Espelho Semanal Padrão* (Espejo Semanal Estándar) resultó en 12 áreas operativas puntuales y dos de contenido general. El Total de Sitios Funcionales fue de 30 para enfermeros y 110 para trabajadores de nivel medio. El cuantitativo de enfermeros del cuadro real/disponible era de cuatro, y el proyectado varió de tres a cuatro. Con relación al equipo técnico, se identificó promedio de siete profesionales en el cuadro real y 14 en el cuadro dimensionado. Así, se verificó déficit mensual promedio de -7 para técnicos/auxiliares de enfermería y adecuación de enfermeros. **Conclusión**: durante la pandemia de Covid-19, el personal de enfermería de nivel medio del ambulatorio era insuficiente.

Palabras clave: Dimensionamiento de personal. Carga de Trabajo. Recursos Humanos de Enfermería. Asistencia Ambulatoria. Covid-19.

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