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DAYANE APARECIDA CÂNDIDA FÉLIX

**QUALITY INDICATORS APPLIED IN A NURSING CONTINUING  
EDUCATION PROGRAM OF A HIGH COMPLEXITY UNIVERSITY  
HOSPITAL FROM BRAZIL: III - TRAINING INDICATOR**

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# QUALITY INDICATORS APPLIED IN A NURSING CONTINUING EDUCATION PROGRAM OF A HIGH COMPLEXITY UNIVERSITY HOSPITAL FROM BRAZIL: III - TRAINING INDICATOR

## INDICADORES DE QUALIDADE APLICADOS A UM PROGRAMA DE EDUCAÇÃO CONTINUADA DE UM HOSPITAL UNIVERSITÁRIO BRASILEIRO DE ALTA COMPLEXIDADE: III – INDICADOR DE TREINAMENTO

Clesnan MENDES-RODRIGUES<sup>1,2,3,\*</sup>; Eliana Borges Silva PEREIRA<sup>1,4</sup>;  
Renata Lemos de SOUSA NETO<sup>1,5</sup>; Fabíola Alves GOMES<sup>1,2,4</sup>; Durval Veloso da SILVA<sup>1,5</sup>;  
Arthur Velloso ANTUNES<sup>1,2</sup>; Rosângela de Oliveira FELICE<sup>1,4</sup>;  
Guilherme Silva MENDONÇA<sup>1,4</sup>; Paula Carolina Bejo WOLKERS<sup>1</sup>;  
Teresa Cristina Ferreira ALVES<sup>1</sup>; Rayany Cristina de SOUZA<sup>1,2</sup>;  
Dayane Aparecida Cândida FÉLIX<sup>1,2</sup>

1. Clinical Hospital of Uberlândia, Federal University of Uberlândia, Uberlândia, Brazil; 2. Nursing, Medicine Faculty, Federal University of Uberlândia, Uberlândia, Brazil; 3. Institute of Biology, Statistics - Mathematics Faculty, Federal University of Uberlândia, Uberlândia, Brazil; 4. Postgraduate Program in Health Sciences from Federal University of Uberlândia; 5. Postgraduate Program in Environmental and Worker Health from Federal University of Uberlândia. \* clesnan@hotmail.com.

**ABSTRACT:** The level of knowledge and training of nursing staff has been related to indicators of quality of care in health, although the application of indicators is still rare related to continuing education programs. The aim of this study was to use the training indicator to evaluate the efficiency of a Continuing Education Program focused on nursing staff in a Brazilian university hospital. In addition, it also checked if different nursing staff characteristics interfere in the training indicator. The number of hours that each nursing professional spent in the program was measured, and this indicator was related to professional features like professional category, unit of work, employment link and department. We note that inpatient sectors and high-complexity care feature a greater average number of hours when compared to units of lower complexity or support or administrative sectors. Another relevant point was the lower number of hours of training of nurses compared to other nursing categories, highlighting the need to consider different strategies for each nursing category. Despite this, nurses that perform assistance compared to those who perform only administrative activities showed no differences in participation. We observe that the profile of professionals was a relevant factor in participating in the program, and that this must be taken into consideration in the planning of continuing education programs. The program in this institution, which has compulsory participation during working hours, was also effective compared to the few studies that have measured the number of hours of training in hospitals of high complexity.

**KEYWORDS:** Quality indicators. Training. Professional category. Public health policy. Nursing staff profile.

### INTRODUCTION

The use of quality indicators in health services aims to ensure the quality of care provided to patients, and is extremely important for the management of services (OLIVEIRA; NICOLA; SOUZA, 2014; FUGAÇA; CUBAS; CARVALHO, 2015). They can also be used by healthcare organizations to assess, monitor and improve service quality levels (HASHJIN et. al., 2014; OLIVEIRA; NICOLA; SOUZA, 2014). However, in Brazil there is a gap related to indicators that represent the quality of nursing care in hospitals (FUGAÇA; CUBAS; CARVALHO, 2015), which is reflected in the indicators of continuing education programs focused on Nursing.

Recent studies have shown a direct relation between quality indicators related to nursing care

and quality of service indicators with the level of knowledge and training of the nursing staff (OLIVEIRA; NICOLA; SOUZA, 2014). Higher levels of training and knowledge are reflected in lower mortality rates and improvement of quality indicators related to patient healthcare (CHO et. al., 2015). Continuing education can serve as an alternative for training and increasing of knowledge in the public institutions that cannot change the profile of their professionals.

In addition, some studies have reported the association between hours of training and job satisfaction, showing that the higher the number of hours of training, the higher the job satisfaction, which can reduce the turnover of professionals in institutions (HAN et. al., 2014; OLIVEIRA; NICOLA; SOUZA, 2014; FUGAÇA; CUBAS; CARVALHO, 2015).

The aim of this study was to use a training indicator to evaluate the efficiency of a Continuing Education Program focused on the nursing staff in a Brazilian university hospital. In addition, it checked if different nursing staff characteristics could interfere in the results of the training indicator.

## MATERIAL AND METHODS

### Research Field

This is a retrospective, descriptive and exploratory research with a quantitative approach. All data are secondary and were collected in an administrative routine of the hospital. The study was conducted at the Clinical Hospital of Uberlândia (CHU) (“Hospital de Clínicas de Uberlândia – HCU”) of the Federal University of Uberlândia (“Universidade Federal de Uberlândia – UFU”), Brazil. The hospital has 530 beds available, is classified as tertiary care (mainly devoted to care of high complexity patients), is public and macro-regional, with a potential three million users distributed in the population of 86 surrounding cities. The study was approved internally by the CHU.

### Training Cycle description

This study is a sequential study of quality indicators applied to the Training Cycle of CHU (TCCHU) that is a continuing education strategy for the continuing education program of the institution. The Nursing Department proposed the TCCHU as a monthly activity with three to four lectures, which are offered in the morning, afternoon and evening shifts for three days, which gives the professional nine possibilities to participate in each course during work time. The employees participate in the cycle during their working hours (in a compulsory character). Additional details of the TCCHU can be viewed in Mendes-Rodrigues et al. (2018) and Pereira et al. (2018).

The original intention was to offer cycle monthly, but for many reasons it was offered only in some months (e.g. strikes, replacement by other event). The first 12 TCCHU were evaluated, being the 1<sup>st</sup> to the 4<sup>th</sup> TCCHU performed in 2013 and the 5<sup>th</sup> to the 12<sup>th</sup> in 2014. There were 33 courses (“lectures”) offered at the TCCHU with varied themes. See details, themes and attendance indicators in Mendes-Rodrigues et al. (2018).

### Training Indicators

The data were collected from administrative spreadsheets, which summarize the attendance sheets of the training activities signed by the

professionals of the nursing staff of the hospital for the TCCHU. During this period, this and other studies about quality indicators of the TCCHU were assessed in order to provide support for the management of the hospital. Additional information can be found in (MENDES-RODRIGUES et. al., 2018; PEREIRA et. al., 2018). No personal or identification data of the professionals was collected.

We calculated the amount of hours that each nursing professional of the CHU received during the 12 TCCHUs. This indicator only included the CHU nursing staff. Other participants were excluded from the analyses. For all TCCHUs from 2013 to 2014 72 hours of training were offered (six hours for each TCCHU multiplied by 12 events).

The professionals were stratified into three professional categories based on their position (Nursing Assistant, Nursing Technician and Nurse), employment link (Federal Government Server; Federal Government Employee). The employee contract is based on the Consolidation of Labor Laws (“Consolidação das Leis Trabalhistas”) and the servers contract is based on the Unique Legal Regime (“Regime Jurídico Único”). Nurses were also classified according to the function they performed, being classified as management, which refers to nurses responsible for the organization and management of services, or assistance, i.e. those working directly with patient care. In this case, we considered the activity that the nurses carry out more often. In Brazil, nursing auxiliaries and technicians do not occupy management positions.

The nursing staff was also allocated in work units (sections or hospital units). The hospital was divided into 40 units according to the Nursing sizing performed in 2013 (ANTUNES et. al., 2013). All units with fewer than four employees or those that had not been dimensioned in 2013 were grouped with the most related units. After the classification of these units, they were grouped in departments, and this separation followed the most relevant characteristics of units such as the presence of inpatients or not, shared environments in the CHU, and complexity of the patient.

The hierarchical structure of the hospital was not considered in the allocation of work units because of its greater administrative character. After the work unit allocation, the units were grouped in the following departments: Support Department (all services where there are no inpatients and meet or provide services for the inpatient units); Hospitalization Department (all services where there are inpatients and that are allocated in the hospital's physical structure); Intensive Care Department (all

intensive care units); Outpatient Clinic Department (all services that are allocated out of the hospital's physical structure and where there is no full day hospitalization of patients, and are classified as a primary or secondary level of care); and Emergency Department (all admission to urgency and emergency care units, which are allocated in the hospital's physical structure and where there are inpatients and are part of the emergency room).

**Statistical Analysis**

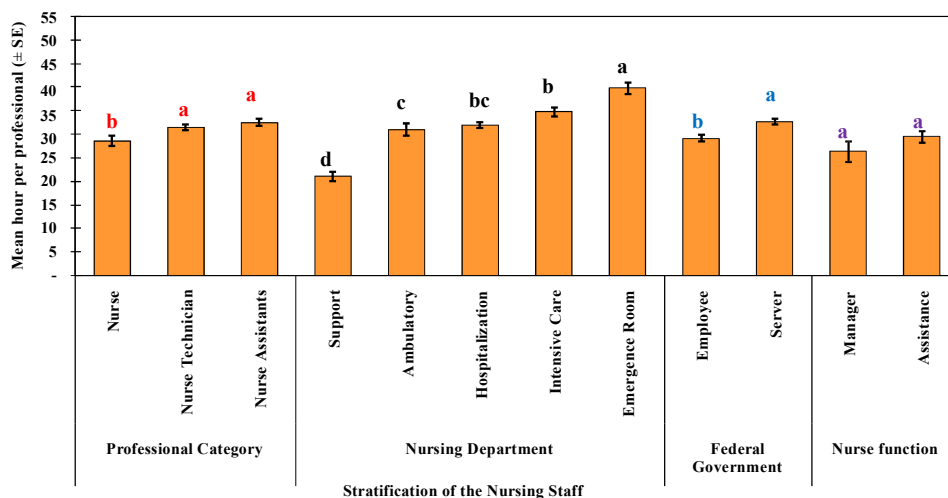
In all analyses, data of professionals who were not part of the CHU nursing staff were discarded; with this there were 1,212 professionals in the analyses. When possible, we tested all interactions between factor levels (nursing professional category, department, employment). For the nurse professional categories, we also tested the effect of the function. In a large part of the analysis it was not possible to calculate the interactions, since there was a low representation or absence of individuals in all factor levels tested. In these cases, the analyses were redone only with main factors. The Generalized Linear Models (adopting Gaussian distribution) were adopted to compare the mean number of training hours between the levels in all cases, and when necessary we use post-hoc comparisons, the least significant difference test was adopted. All analyses were performed using the SPSS 20.0 package and a 5% significance level was adopted for all analyses.

**RESULTS**

The number of training hours per professional varied between 1 and 69 hours; with

mean ± SD of 31.34 ± 15.11 (n = 1212 professionals). When the data were stratified and the analysis of Professional Category, Department and Employment levels was performed, the analysis showed that there is no interaction effect on levels Category\*Department\*Employment ( $\chi^2 = 11.213$ , *d.f.* = 8, *P* = 0.190), Department\*Employment ( $\chi^2 = 6.77$ , *d.f.* = 4, *P* = 0.148), Category\*Employment ( $\chi^2 = 4.92$ , *d.f.* = 3, *P* = 0.085), Category\*Department ( $\chi^2 = 11.295$ , *d.f.* = 8, *P* = 0.186), and for the main factor Category ( $\chi^2 = 5.786$ , *d.f.* = 2, *P* = 0.055). But when the other main effects were evaluated, there were differences for Department ( $\chi^2 = 72.749$ , *d.f.* = 4, *P* < 0.001) and Employment ( $\chi^2 = 12.701$ , *d.f.* = 1, *P* < 0.001). Based on these assessments, analyses were performed separately for each main factor (Category, Department and Employment).

From the analysis performed for each main factor independently, we found significant difference for the different nursing professional categories ( $\chi^2 = 9.033$ , *d.f.* = 2, *P* = 0.011), and pairwise comparisons showed differences between the nursing assistants and nurses or between nursing technicians and nurses, and the nursing assistants were those with the highest mean (Figure 1). We also found differences between hospital departments ( $\chi^2 = 196.767$ , *d.f.* = 4, *P* < 0.001), with the Emergency Department getting the highest mean (39.82 hours per professional) and the Support Departments the lowest mean (21.08 hours per professional). However, Hospitalization Department services obtained intermediate values, such as Intensive Care and Ambulatory Departments. Federal servers also had higher mean hours of training when compared to federal employees ( $\chi^2 = 16.170$ , *d.f.* = 1, *P* < 0.001) (Figure 1).



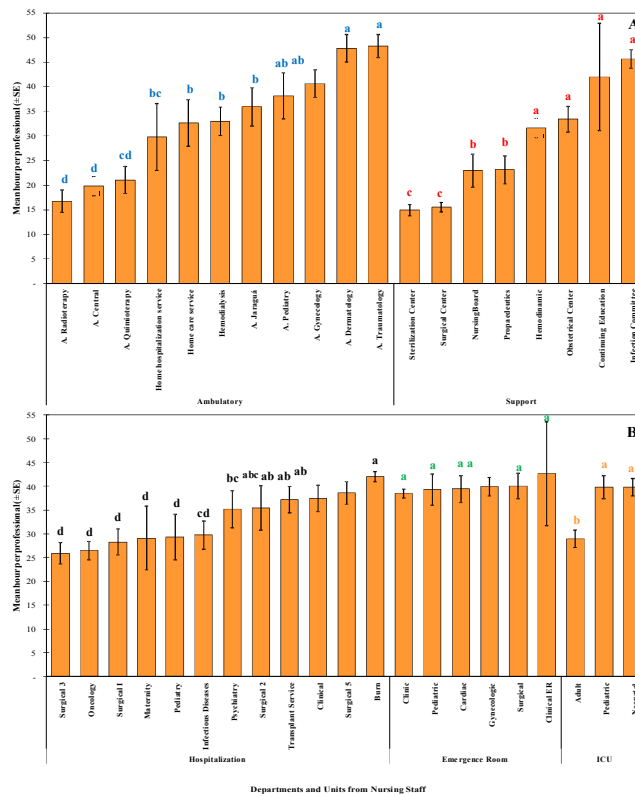
**Figure 1.** Mean hour per professional as a training indicator applied to Nursing staff participation in Training Cycles of Clinical Hospital of Uberlândia, a tertiary university hospital from Brazil, in the period of 2013 and 2014, based in different data stratification. Values followed by different letters, in each stratum, were different based on the Least Significance Difference test.

When sectors were nested in the Departments, differences between the Departments ( $\chi^2 = 52.171, d.f. = 4, P < 0.001$ ) and between the sectors nested in Departments ( $\chi^2 = 295.128, d.f. = 35, P < 0.001$ ) were also detected. Based on this result and to compare the units in each Department, we performed the analyses again separately for each department of the Hospital and compared the sectors only within each department (Figure 2).

The Ambulatory Department also showed different results for units ( $\chi^2 = 122.82, d.f. = 10, P < 0.001$ , Figure 2A), with the highest mean for the Traumatology Ambulatory (48.25 hours per professional) and the lowest for the Radiotherapy Ambulatory (16.73 hours per professional). The Support Department also showed different results for units ( $\chi^2 = 106.57, d.f. = 7, P < 0.001$ , Figure

2A), with the Infection Committee obtaining the highest mean (45.67 hours per professional) and the Sterilizing Center the lowest mean (14.93 hours per professional).

We observed a difference between the mean hours of training between the Intensive Care Department ( $\chi^2 = 37.162, d.f. = 2, P < 0.001$ , Figure 2B), with the Adult ICU getting the lowest values, and Pediatric and Neonatal ICUs the highest mean (28.92, 39.80 and 39.83 hours per professional, respectively). For Hospitalization units, we also observed differences between the units ( $\chi^2 = 62.729, d.f. = 11, P < 0.001$ , Figure 2B), with the Burns unit obtaining the highest mean (42.00 hours per professional) and the Surgical 3 unit the lowest mean (25.91 hours per professional).



**Figure 2.** Mean hour per professional as a training indicator applied to Nursing staff participation in Training Cycles of Clinical Hospital of Uberlândia, a tertiary university hospital from Brazil, in the period of 2013 and 2014. (A) Ambulatory and Support Services; (B) Hospitalization Units, Emergency Room and Intensive Care Units (ICU). Values followed by different letters in each department were different based on the Least Significance Difference test, except in the pairwise comparison A. Dermatology and A. Pediatric, that are also different.

The only exception to differences in mean hours in the units was found in the Emergency Room Department, where there were no differences between them, with the mean ranging from 38.47 to 42.61 hours per professional ( $\chi^2 = 1.097, d.f. = 5, P = 0.954$ , Figure 2B). This department was the one

that showed the highest mean hours per professional in department comparisons.

When the training indicator was evaluated separately for nurses, the mean hours per professional was not affected by the interaction Department\*Function ( $\chi^2 = 1.252, d.f. = 4, P =$

0.869), and by the effect of the Function performed ( $\chi^2 = 0.167$ ,  $d.f. = 1$ ,  $P < 0.683$ ), meanwhile, there were differences for the various Departments of the hospital ( $\chi^2 = 11.688$ ,  $d.f. = 4$ ,  $P < 0.020$ ). We were unable to test the interaction of the Employment with other factors, since there is only one management nurse as a Federal Employee in the sample; all the others are Federal Servers. When analyses were performed separately for each sub-level of the nurse category, we observed that the Employment did not affect the training indicator ( $\chi^2 = 0.200$ ,  $d.f. = 1$ ,  $P = 0.655$ ), or the function that the nurse occupied ( $\chi^2 = 2.137$ ,  $d.f. = 1$ ,  $P = 0.144$ ), and that only nurses from different departments had different mean hours of training per professional ( $\chi^2 = 14.363$ ,  $d.f. = 4$ ,  $P = 0.006$ ). The nurses of the Support Department obtained the lowest mean of training (21.07 hours per professional) with differences for all other departments. We did not find other differences among the other Departments (mean 34.39 hours per professional).

## DISCUSSION

The global amount of mean training hours per professional was low, when assessing the number of hours offered. This shows a clear segmentation of nursing services and their participation in the Continuing Education Program. The maximum achieved was 69 hours of a total of 72 hours offered. Among the professionals, 74.34% achieved more than 20 hours, 32.01% achieved more than 40 hours and 1.89% more than 60 hours. The criterion of 20 hours is the minimum adopted by the federal government incentive qualification program in Brazil for a server to be eligible for career advancement (BRASIL, 2005). When only federal employees were evaluated, these percentages were even lower ( $\geq 20\text{hrs} = 47.85\%$ ,  $\geq 40\text{hrs} = 22.44\%$  and  $\geq 60\text{hrs} = 1.23\%$ ), but higher when compared to federal servers ( $\geq 20\text{hrs} = 26.48\%$ ,  $\geq 40\text{hrs} = 9.57\%$  and  $\geq 60\text{hrs} = 0.66\%$ ). These results also demonstrate a low utilization by professionals, even though participation is mandatory. The managers of the services commonly make the participation in Training Cycles voluntary, which impairs or prevents the participation of staff in the courses.

Nevertheless, there is still a benchmark and a standard training indicator missing for this type of program to assess the Continuing Education Program efficiency. A study applied to Nursing staff showed that nurses received 16.20 hours of training and nursing technicians and assistants 3.98 hours in a period of 14 months at a university hospital

(OLIVEIRA; NICOLA, SOUZA, 2014), although in this case it is not clear whether there was a difference in the hours offered to each category. A study conducted in 2001 found 12.6 hours of training per employee per year for nursing workers (JERICÓ, 2001). In another institution there were 13.8 hours per employee per year (PERES; LEITE; GONÇALVES, 2010). As the Continuing Education Program lasted 16 months, in our study, this indicator would be approximately 20.9 hours per employee per year, well above the studies mentioned above, evidencing the positive impact of the methodology used by the Training Cycles in the studied hospital.

Nursing assistants and technicians with greater participation in hours than nurses may reflect a nurse vision that the cycles are geared towards these professionals, or it shows the need of a specific Continuing Education Program for nurses to focus on the demands of this category. In the TCCHU, the attendance of nurses reduced over time (MENDES-RODRIGUES et. al., 2018), that corroborates this vision. However, the nursing professionals did not show dissatisfaction with course content and quality, but some evidences demonstrated that the satisfaction indicator could be related to the professional category without a clear proof of association (PEREIRA et. al., 2018).

Thus, the increased participation of assistance-focused units can only show a greater focus on assistance issues by the Continuing Education Program. Apparently the focus of continuing education programs has been aimed at solving organizational problems or in technician knowledge improvement with a better perspective of technical performance and reduction of failures in the procedures (MONTANHA; PEDUZZI, 2010), strengthening the care character of many Continuing Education Programs and this is perhaps related to the greater participation of nursing assistants and technicians. The nurse must have an active performance as group leaders, both participating and encouraging participation in the training (JESUS et. al., 2011). The success of the Continuing Education Program is directly related to the involvement of all parties (GRISCTI; JACONO, 2006), whether professional categories, managers or vigilance agencies. The larger number of servers may also reflect a financial return of intent that is offered by the progression program of the federal government in Brazil (BRASIL, 2005), which does not occur for employees. The lack of financial return for continuing education activities has been widely reported as a mechanism that discourages professionals to participate in educational activities

(BREWER; ZAYAS; SIENKIEWICZ, 2006). There is still a lack of criteria to identify the public focus and the level of prior knowledge required for each of the proposed continuing education activities (ANCC, 2012).

Other studies have also shown that continuing education can be affected by the characteristics of the professionals evaluated. Nurses in rural areas versus urban or young versus older nurses have distinct access and perspectives of continuing education from each other (BREWER; ZAYAS; SIENKIEWICZ, 2006). Perceived differences in hospital and non-hospital nurses are the economic incentives they receive, work perception and satisfaction in addition to the organizational commitment to continuing education (BREWER; NAUENBERG, 2003).

Knowledge assessments were not applied, since reviews of knowledge with release of the individual results can be factors that would lead to an increase in bullying between professionals and lead to a strategy of "secret studies" (TAME, 2011) among health professionals. Nevertheless, in 2015, the same cycles were evaluated for knowledge acquired by the participants without nominal disclosure of professionals in the category of topics related to Patient Safety, and we observed a growth rate of 4% of correct answers (70.64 to 74.23% accuracy) after the course, with nurses having a higher level of knowledge than nursing technicians and assistants (PEREIRA et. al., 2017a). The presence of different nursing professional categories is a key factor in planning and carrying out continuing education programs.

In 2013, training for health professionals was conducted in seven hospital units in the same hospital studied here and the results showed a low attendance rate for the educational sessions (39.66%) (PEREIRA et. al., 2017b). Apparently, the low attendance in short term or long term courses or in continuing education programs seems to be a constant in continuing education independently from the adopted strategy (e.g. MENDONÇA et. al., 2016), although the mandatory regimes improve the

attendance indicators when compared to the voluntary (NETO; MENDES-RODRIGUES, 2017).

Besides that, the use of quality indicators is currently directed towards external accountability purposes, but strategies are needed to support internal quality improvement processes at hospital level (HASHJIN et. al., 2014), and in our case in future planning of Continuing Education Programs. The encouragement and improvement of quality indicators applied to continuing education should be a mandatory part of the evaluation of health services; primarily because of the positive results on the quality of health services provided and patients' health indicators (CHO et. al., 2015).

## CONCLUSIONS

We observed a strong positive effect of offering continuing education courses during work hours in the institution dependencies under mandatory participation regime of the nursing staff. Therefore, the TCCHU was effective in offering training to the professionals.

The variation in participation was related to the unit profile, professional category, employment and Department, which can be associated to the themes of the Continuing Education Program. We were able to establish that in units with more complex patients, as the emergency room and intensive care units, we found more training hours per professional compared to administrative and support sectors, where these indicators decrease, showing that the professional that performs more complex care is looking for more updates and technological advancement.

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**RESUMO:** O nível de conhecimento e treinamento das equipes de enfermagem tem sido relacionado a indicadores de qualidade da assistência em saúde, embora ainda são raros a aplicação de indicadores relacionados a programas de educação continuada. O objetivo deste estudo foi usar um indicador de treinamento para medir a eficiência de um programa de educação continuada focado na equipe de enfermagem em um hospital universitário brasileiro de alta complexidade. Além disso, verificar se diferentes características do perfil do pessoal de enfermagem são capazes de interferir nos indicadores de treinamento. Foi mensurado o número de horas que cada profissional de enfermagem obteve no programa e este indicador foi relacionado a características do profissional como categoria profissional, unidade de trabalho, vínculo empregatício e departamento. Observamos que setores de internação e de alta complexidade apresentam um número médio de horas maior quando comparados a unidades de menor complexidade e setores de apoio e administrativos. Outro ponto relevante foi o menor número de horas de treinamento dos enfermeiros comparados a outras



categorias, evidenciado a necessidade de se considerar diferentes estratégias para cada categoria. Apesar disto enfermeiros assistenciais comparados a aqueles que efetuam somente atividades administrativas não mostraram diferenças na participação. Observamos que o perfil dos profissionais foi fator relevante na participação no programa, e que estes devem ser levados em consideração no planejamento de programas de educação permanente. O programa, que nessa instituição tem participação obrigatória durante as horas de trabalho, também foi efetivo comparado a poucos estudos que tem mensurado o número de horas de capacitação em hospitais de grande complexidade.

**PALAVRAS-CHAVE:** Indicadores de qualidade. Treinamento. Categoria profissional. Políticas públicas de saúde. Perfil Enfermagem.

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