

Structure of the Working Time of Nurses in Emergency Departments in Polish Hospitals

Jadwiga Klukow, Anna Ksykiewicz-Dorota

Abstract—An analysis of the distribution of nurses' working time constitutes vital information for the management in planning employment. The objective of the study was to analyze the distribution of nurses' working time in an emergency department. The study was conducted in an emergency department of a teaching hospital in Lublin, in Southeast Poland. The catalogue of activities performed by nurses was compiled by means of continuous observation. Identified activities were classified into four groups: Direct care, indirect care, coordination of work in the department and personal activities. Distribution of nurses' working time was determined by work sampling observation (Tippet) at random intervals. The research project was approved by the Research Ethics Committee by the Medical University of Lublin (Protocol 0254/113/2010). On average, nurses spent 31% of their working time on direct care, 47% on indirect care, 12% on coordinating work in the department and 10% on personal activities. The most frequently performed direct care tasks were diagnostic activities – 29.23% and treatment-related activities – 27.69%. The study has provided information on the complexity of performed activities and utilization of nurses' working time. Enhancing the effectiveness of nursing actions requires working out a strategy for improved management of the time nurses spent at work. Increasing the involvement of auxiliary staff and optimizing communication processes within the team may lead to reduction of the time devoted to indirect care for the benefit of direct care.

Keywords—Emergency nurses, nursing care, workload, work sampling.

I. INTRODUCTION

EMERGENCY departments in Polish hospitals started to receive organizational attention quite recently, in the late 1990s. Effective functioning of an emergency department depends not only on available equipment, suitable infrastructure, but first and foremost on the optimal allocation of human resources. The interdisciplinary nature of emergency medicine and the complexity of clinical problems reported by patients admitted to emergency departments necessitate adequate educational preparation of nurses. In order to improve qualifications in emergency nursing changes were implemented to nursing education in Poland. The subject of emergency nursing was introduced to academic curricula. In 2003, the Minister of Health issued an order establishing the specialty of emergency nursing.

Changes occurring in the functioning of the healthcare system and its increasing costs have compelled many countries to take action to enhance the effectiveness of the performance of all medical personnel as well as auxiliary staff. Special

attention ought to be devoted to nurses, who constitute the most numerous professional group. Expenditure on nursing care is the most difficult to justify when budget constraints are necessary, as it is one of the elements that generates the highest costs in healthcare. On the other hand, studies have demonstrated that the number and selection of nursing personnel are crucial for the quality of care and patient safety [1], [2]. This means that the management of nursing professionals should be a key element in healthcare strategy.

In order to obtain information on the performance of tasks and the progress of work as well as the utilization of nursing qualifications, it is essential to carry out an analysis of how working time is used. In the context of how working time is used by nurses, working methods, organizational and technical conditions in the department, available supplies and deployed techniques of staff management are significant. Emergency departments considerably differ from other departments in a hospital in terms of work dynamics, flow of patients and the variety of tasks performed by nurses. Research has shown that some activities done by nurses are beyond their competence, which results in a sharp decrease in their involvement in direct patient care. Other factors affecting the work of nurses include working hours, work experience, occupational burnout, motivation and dedication.

Determination of the distribution of working time not only constitutes the initial stage of planning nurse staffing but is also increasingly used in other areas, e.g. optimizing care costs, improvement of provided services or reducing the occurrence of adverse events in work environment [3]. The importance of carrying out research in this area is confirmed by the RN4CAST project, joined by 15 European countries including Poland. Questions pertaining to utilization of working time have been contained in studies investigating nurses' opinions on their working environment, patient satisfaction, results of treatment and analyzing organizational structure [4]-[6].

An analysis of working time and the type of activities performed by nurses constitutes a departure point for developing a strategy of reorganization of nursing care.

II. MATERIAL AND METHOD

The research was conducted in an emergency department of a teaching hospital in Lublin, in Southeast Poland. The emergency department provides first aid services to patients whose health or life is endangered on a constant basis, with the support of the hospital to ensure the continuity of care. The

Jadwiga Klukow, Anna Ksykiewicz-Dorota are with the Chair and Department of Management in Nursing, Faculty of Health Science, Medical University of Lublin, 20-059 Lublin, Poland (e-mail: jadwiga.klukow@wp.pl).

average number of patients treated annually at an emergency department amounts to 39,700. The most common reasons for emergency treatment include injuries, circulatory and digestive system diseases.

Nurses work 36.5 hours per week. They perform their duties in two shifts: the day shift (7:00-19:00) and the night shift (19:00-7:00). On average, during one shift the department is staffed by 6 nurses, 3 paramedics and 2 members of auxiliary staff. The entire emergency personnel includes 32 emergency nurses – 28 nurse specialists and 4 registered nurses; a department nurse; 12 paramedics and 6 support workers.

Employed methods were those of measuring working time, and the technique was continuous observation (individual photographing of a working day) and work sampling (Tippett) at random intervals. This method is useful in measuring time on activities in health care; many observations can be recorded in a short period, thus increasing representativeness of the data

obtained. All nurses present in the department during data collection were observed. Nurses did not know when exactly they would be observed. This condition was meant to ensure the objectivity of conducted research.

The study of the structure of working time of nurses in an emergency department was carried out in two stages. The first stage involved 7 sessions of continued observation in 2011. They took place during 12-hour-long day and night shifts, each day of the week, producing 1,144 entries for tasks performed by nurses. A sheet of individual photographing of a day at work was used for recording all activities done by nurses. A catalogue of nursing activities was thus compiled. The activity list elaborated based on the registers and observation of nurses' work resulted in 241 activities. Nursing interventions were classified in 124 direct and 32 indirect care interventions. (Table I).

TABLE I
THE CATEGORIES OF NURSING WORK ACTIVITIES

Category	Definition of activities and examples
Direct care	Tasks related to providing nursing care to patients and their families, e.g. maintaining hygiene, ensuring safety, administrating medication, transport, ECG, communicating with patients.
Indirect care	Tasks performed without direct contact with patients. They include preparations for direct care activities, e.g. documenting, communication within an interdisciplinary team pertaining to patient care, magnetic induction
Work coordination	Tasks relevant for the functioning of the department, affecting its smooth running, e.g. supplies, cleaning
Personal activities	Activities performed during breaks staff is entitled to, allowing relaxation and catering for physiological needs, e.g. having meals. They also include activities not directly related to professional duties, e.g. private telephone calls

At the second stage of research the results of continuous observation served as the basis for the calculation of the number of entries in work sampling. To calculate the sample period, the equation below was used:

$$N = 4 \frac{P(100 - P)}{L^2}$$

where: N–Number of observations, 4–Number of categories, P – The size of the smallest fraction, determined on the basis of photographing a day at work, L – The mean squared error (absolute error), whose value in this study amounts to ±2.

Work sampling was conducted in 2012-2013 during 12 shifts, each 12-hour-long: 6 day shifts and 6 night shifts, each day of the week, which produced 1,034 observations.

Raw data were entered into an Excel spreadsheet and exported to a Statistical Package (STATISTICA v.10.0) for analysis. The percentage of time spent on each activity was calculated using descriptive statistics.

III. RESULTS

The study of the structure of working time of nurses employed in emergency departments has demonstrated that almost half of their working time is devoted to indirect care (47%), while less than one-third to direct patient care. The remaining time is spent on work coordination – 11.89% and personal activities – 9.67% (Fig. 1).

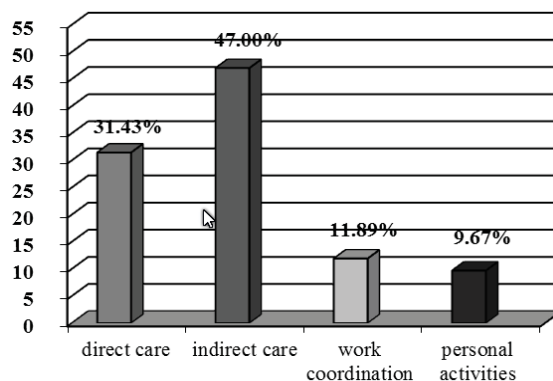


Fig. 1 Proportion of particular categories in the structure of nurses' working time

An analysis of obtained material has shown that nurses devote the most time spent on direct care to diagnostic activities – 29.23% and treatment-related activities - 27.69%, while maintaining patient hygiene come third – 19.38%. Among diagnostic activities the following dominated: assessment of patients' condition, collecting specimens for laboratory investigations (blood, urine), ECG, taking blood pressure, monitoring patients' condition and measuring blood sugar. Treatment-related tasks included inserting catheters, intravenous and intramuscular administration of medication, administration of blood or blood-derived products, oxygen therapy, resuscitation, gastric irrigation, dressing wounds, assisting with the suturing of wounds and application of plaster casts. Maintaining patient hygiene comprised protecting

dentures, taking off or changing clothes/shoes, washing body parts and decontamination amongst others. The smallest proportion of time devoted to direct care was spent on transporting patients (9.85%). Activities performed by nurses mostly included moving patients in wheelchairs or on beds, helping with changing position, verticalization, preventing patients' falling out of bed (Table II).

TABLE II
CLASSIFICATION OF ACTIVITIES PERFORMED IN THE CATEGORY OF DIRECT CARE

Activities	n = 325	%
Hygiene duties	63	19.38
Transport	32	9.5
Diagnostic activities	77	29.23
Treatment-related activities,	71	27.69
Communication with patients/family	29	13.85

In indirect care, activities performed by nurses as preparation for direct care were the most time-consuming (57.61%). They mostly comprised preparing equipment for obtaining material for laboratory investigations and administration of medication, suturing wounds and applying plaster casts. This category also covered the state of alert of the nursing staff ready to take over a patient from paramedic teams, e.g. waiting for a patient in the area where medical transport vehicles arrive, preparing beds, or checking equipment. Nurses spent almost one-third of their working time (30.86%) on communicating with members of the interdisciplinary team, e.g. laboratory, paramedic teams and external institutions (police, social services, childcare centres, clergymen) and radio monitoring. The lowest percentage of working time was devoted to documentation – 11.52% (Table III).

Nearly 60% of working time was devoted by nurses to communicating with the team regarding coordination and organization of work in the department, rather than patient care. This category also comprises all activities related to training interns and personnel as well as instructing students and volunteers in the department (Table IV).

Classification of activities performed in personal time is presented in Table V.

TABLE III
CLASSIFICATION OF ACTIVITIES PERFORMED IN THE CATEGORY OF INDIRECT CARE

Activities	n = 486	%
Documentation	56	11.52
Communication with other staff in the department, in the hospital, paramedic teams, other institutions, e.g. police, regarding patients; radio monitoring	150	30.86
Preparing for the performance of activities categorized as direct care, e.g. hand washing, preparation of medication	280	57.61

IV. DISCUSSION

The proportion of direct care in an emergency ward (31.43%) was compared with results presented by other authors. In an emergency department in the United States, the proportion was similar and amounted to 31% [7], comparable results were also obtained in an emergency department in Sao Paulo – 35% [8].

A smaller proportion of direct care in the structure of working time was observed in an emergency department in Iran – 27.18% [9] and in North Carolina – 25.6% [9]. Decidedly the largest proportion of tasks related to direct care was noted in pediatric emergency department – 42% of working time [11].

TABLE IV
CLASSIFICATION OF ACTIVITIES PERFORMED IN THE CATEGORY OF WORK COORDINATION

Activities	n = 124	%
Passing information within the team, training personnel	73	58.87
Supplying the department	15	12.10
Ordering workplace	22	17.74
Office tasks	14	11.29

TABLE V
CLASSIFICATION OF PERSONAL ACTIVITIES

Activities	n = 99	%
Physiological breaks, having meals, drinking	59	59.60
Other: telephone calls, going to a shop, reading newspapers, talking to friends	40	40.40

Different observational methods adopted in various studies of nursing working time and varying classifications of nursing activities make the comparison of results difficult. In one study, documentation of care was classified as indirect care, while this study interprets it as an element of direct care [7]. Some authors did not qualify communication with patients as direct care [7]–[9]. Gholizadeh et al. completely omitted transporting patients as an activity performed by nurses in an emergency department [9]. Some activities classified as direct care in Polish emergency wards were perceived by another author as tasks not requiring the presence of a nurse, e.g. performing ECGs, maintaining patient hygiene, collecting specimens for laboratory investigations (blood, urine), monitoring vital signs, respiratory therapy or transporting patients [10].

As regards indirect care (47%), obtained results are comparable with those observed in another study which has demonstrated that nurses devote 48.4% to it [10]. A decidedly lower proportion of activities related to indirect care were noted in an emergency department in Brazil – 35% and in the United States – 38.9% of working time [7], [8]. Indirect care depends on how well a ward, and a hospital, is organized, the presence of supply and technical services and outsourcing.

Personal activities amounted to 10% of the working time of nurses in an emergency department. A study conducted in Brazil has shown that nurses devote almost twice as much time to breaks and rest [8]. Hobgood et al. have also observed a larger proportion of personal activities performed by nurses [10]. Other studies have demonstrated that the percentage of breaks in the working time of emergency nurses is 3 times higher [7]. A comparison of studies suggests that the lower percentage of breaks in the structure of working time results from a heavier work burden bore by nurses in Polish emergency departments.

Attempts are made all over the world to develop organizational methods that would help optimize working time. Tasks related to indirect care and coordinating work in a ward

tend to the ones sought to be maximally reduced, for instance by means of introducing auxiliary staff to the healthcare system, e.g. medical secretaries, medical assistants, medical technicians as well as auxiliary services – outsourcing. Information system is a vital element in the enhancement of work efficiency, allowing better communication and faster flow of information.

In Denmark, whiteboards were mounted in every room, each containing information on patients: Time of arriving on the ward, triage category, preliminary diagnosis, doctor's and nursing orders as well as other facts important for patient care, e.g. when examination results are to be expected. This new method improved the flow of information in the therapeutic team and allowed more time to be spent on direct patient care. Upon the introduction of whiteboards, time devoted to direct care increased in the case of nurses by as much as 28% of working time, and in the case of doctors by 20% of working time [12].

A team of American researchers presented an intriguing study aimed at determining the relations between introducing electronic documentation and distribution of the working time of nurses and doctors in emergency wards. The study has demonstrated that nurses failed to spend more time on direct care, they actually devoted less time on it – by 1.5%. Introduction of electronic documentation resulted in a decrease in time dedicated to indirect care by 10.5%, while the proportion of breaks grew by 8.2%. In the case of doctors, the percentage of direct care was higher by 2%, while personal time was reduced by 5.8% [13].

REFERENCES

- [1] J.M. Pines, J.F. Hollander "Emergency department crowding is associated with poor care for patients with severe pain". *Ann Emerg Med*, vol. 51, pp. 1-5, 2008.
- [2] D.B. Richardson "Increase in patient mortality at 10 days associated with emergency department overcrowding". *Med J*, vol.184, n. 5, pp. 213-216, 2006.
- [3] J.I. Westbrook, C.Li.L. Duffield, N.J. Creswick "How much time do nurses have for patients? a longitudinal study quantifying hospital nurses' patterns of task time distribution and interactions with health professionals". *BMC Health Serv Res*, vol.11, pp. 319, 2011.
- [4] W. Sermeus, L.H. Aiken, K. Van den Heede, A.M. Rafferty, P. Griffiths, M.T. Moreno-Casbas, R. Busse, R. Lindqvist, A.P. Scott, L. Bruyneel, T. Brzostek, J. Kinnunen, M. Schubert, L. Schoonhoven, D. Zikos "Nurse forecasting in Europe (RN4CAST): rationale, design, and methodology". *BMC Nursing*, vol. 10, n. 6, <http://www.biomedcentral.com/1472-6955/10/6>, 2011.
- [5] L.H. Aiken, W. Sermeus, K. Van den Heede, D.M. Sloane, R. Busse, M. Martin McKee, L. Bruyneel, A.M. Rafferty, P. Griffiths, M.T. Moreno-Casbas, C. Tishelman, A. Scott, T. Brzostek, J. Kinnunen, R. Schwendimann, M. Heinen, D. Zikos, I. Strømseng Sjetne, H.L. Smith, A. Kutney-Lee "Patient safety, satisfaction, and quality of hospital care: cross-sectional surveys of nurses and patients in 12 countries in Europe and the United States". *Br Med J*, vol. 344, e1717, <http://dx.doi.org/10.1136/bmj.e1717>, 2012.
- [6] L.H. Aiken, D.M. Sloane, S. Clarke, L. Poghosyan, E. Cho, L. You, M. Finlayson, M. Kanai-Pak, Y. Aunguroch, "Importance of work environments on hospital outcomes in 9 countries". *In J Qual Health Care*, vol. 23, n. 4, pp. 357-364, 2011.
- [7] J.C. Hollingsworth, C.D. Chisholm, B.K. Giles W.H. Cordell, D.R. Nelson "How do physicians and nurses spend their time in the emergency department?" *Ann Emerg Med*, vol. 31, n. 1 pp. 87-91, 1998.
- [8] E.A. Garcia, R.M. Fugulin "Nurses' work time distribution at the emergency service". *Rev Esc Enferm USP*, vol. 44, n. 4, pp. 1027-1033, 2010.
- [9] M. Gholizadeh, A. Janati, N. Kabiri, B. Nadimi, A. Samayeh "How Do Nurses Spend Their Time in the Hospital?" *J Clin Res Gov*, vol. 2, pp. 27-33, 2014.
- [10] C. Hobgood, J. Villani, R. Quattlebaum "Impact of emergency department volume on registered nurse time at the bedside". *Ann Emerg Med*, vol. 46 n.6, pp. 481-489, 2010.
- [11] K. Yen, E. L. Shane, S.S. Pawar, ND Schwendel, R.J. Zimmanck, M.H. Gorelick "Time motion study in a Pediatric Emergency Department before and after computer physician order entry". *Ann Emerg Med*, vol. 3, n. 4, pp. 462-468, 2008.
- [12] M. Hertzum, J. Simonsen "Work-Practice Changes Associated with an Electronic Emergency-Department Whiteboard". *Health Informatics J*, vol. 19, n. 1, pp. 46-60, 2013.
- [13] D. Aronsky, I. Jones, K. Lanaghan, C.M. Slovis "Supporting patient care in the emergency department with a computerized whiteboard system". *J Am Med Inform Assoc*, vol. 15, pp. 184-94, 2008.