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### Utilization of Working Time by Nurses in Intensive Cardiological Care Units

Zużycie czasu pracy przez pielęgniarki odcinkowe w oddziałach intensywnej opieki kardiologicznej

Использование рабочего времени палатными медсестрами в отделениях интенсивного кардиологического наблюдения

Effective and full utilization of working time is of great importance for health strategy because the significant shortage of health care staff is observed in the recent years. The possibility to have maternity leaves when so many women are employed in health care sector caused great decrease of manpower. Moreover, the reduced load of working time (free Saturdays) caused the decrease of nominal working time. And its utilization by nurses and midwives employed in in-patient medical services remained unchanged revealing the decrease of coefficient of calendar working time utilization from 65% in 1980 to 59.5% in 1982 (5).

Few authors were concerned with measuring nurses' working time. Górajek showed that in surgical clinic of Medical Academy in Lublin the activities carried out by a nurse away from a patient took 44.1% of time during morning shifts and 37% of time during afternoon shifts (1). Kotowska and her co-workers examined utilization of working time by nurses in internal disease and surgical wards during the morning shifts but only from 8 a.m. to 12.30 p.m. (3, 4). Mazurek with others used a questionnaire to collect material in child departments and hospitals. The collected material proved that charge nurses used effectively 100% of their working time (7).

The present studies were undertaken to determine the amount of effective and wasted working time used by nurses, to determine the intensity of work especially in connection with the kind of shift (morning, afternoon, night), with the day of the week, hours of the day and evaluation of the degree of nurses' work organization. The diagnosis of the real state will be used in further stage of the studies to draw out the

proposals aiming at improvement of effective employment of workers from this professional group as well as at improvement of nursing care level.

### MATERIAL AND METHOD

The studies were carried out in five intensive cardiological care units belonging to two provincial joint hospitals, two hospital clinics and one departmental hospital. Besides, two intensive medical care units of internal disease wards were included in the studies. In further part of the paper the intensive medical care units were included into a group of intensive cardiological care units because they provide services mostly for the patients with circular system disorders.

The material was collected in 1983 by means of the work sampling method (10). There was assumed  $P=0.95$ , the required relative accuracy  $\epsilon=7\%$  and estimated percentage share of the least fraction in total time of working shift  $p=10\%$ . The required number of observations was calculated according to formula 110 (11) and figured 7344. In each of the seven organizational institutions taking part in the studies the utilization of time was observed at least for seven days and nights. 7872 recorded observations were done inclusively. That is why the material may be treated as statistically reliable.

Working time of nurses was divided into four basic fractions, i.e.:

- I. Direct nursing care (carried out directly for/with a patient).
- II. Indirect nursing care (activities connected with fraction I but carried out away from a patient).
- III. Current coordination and organization.
- IV. Personal activities.

### RESULTS AND DISCUSSION

Nurses employed in intensive cardiological care units use for direct nursing care 27.2% of their disposal working time on the average. The range of values of this fraction is rather considerable in separate units of intensive cardiological care; it ranges from 17.2 to 36.3% of the working time (Table 1, Fig. 1). The following activities compose the mentioned above average value 27.2% of working time: assisting doctors and carrying single-handed diagnostic procedures — 11.3%, therapeutic interventions — 6.9%, conversations with patients and visitors — 3.1%, higienic interventions — 2.6%, delivering meals, feeding and enabling the conditions of elimination — 2.5%, taking care for comfortable position in bed and motion of a patient — 0.8%.

The diagnostic-therapeutic interventions take about 67% of time of nurses main working time. The following interventions may be listed according to recorded frequency of their occurrence: measuring arterial pressure — 228, intravenous injections — 170, electrocardiogram — 124,

Table 1. Utilization of working time by nurses in intensive cardiological care units

No of words	N	Fraction of time							
		I		II		III		IV	
		n	%	n	%	n	%	n	%
1	990	170	17.2	162	16.4	111	11.2	547	55.2
2	993	309	31.3	184	18.5	100	10.1	400	40.3
3	1003	282	28.1	309	30.8	95	9.5	317	31.6
4	989	257	26.0	276	27.9	148	15.0	308	31.1
5	1080	393	36.3	207	19.2	110	10.2	370	34.3
6	1588	437	27.5	516	32.5	202	12.7	433	27.3
7	1229	291	23.7	163	13.3	106	8.6	669	54.4
Total	7872	2139	-	1817	-	872	-	3044	-
$\bar{x} \pm \sigma$			27.2 $\pm$ 1.9		23.1 $\pm$ 1.6		11.0 $\pm$ 0.8		36.7 $\pm$ 2.7

Explanation: N — number of observations in each intensive cardiological care unit; n — number of observations within distinguished fractions of time.

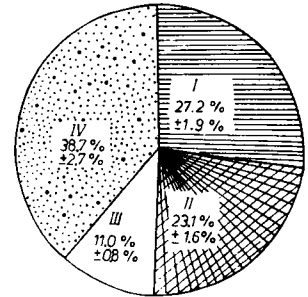


Fig. 1. Structure of utilization of working time by nurses in intensive cardiological care units

I.V.'s starting, giving medicines or other bottles, maintaining flow, making tubing — 113, participating in doctor rounds — 94, observing physical condition and behaviour of patients — 86, counting pulse and/or breathing rate — 75, oral administration of medicine — 74, taking temperature — 71, starting and maintaining monitoring devices — 70, blood gathering — 62, intradermal and intramuscular injections — 57, helping in consultative examinations — 54, resuscitation — 39, administration of oxygen — 32, management of assisted breathing — 10, aspirating respiratory system secretions — 10, measuring intravenous pressure — 8, changing dressing materials — 7, making compresses — 5, catheterization — 5, implanting pacemakers — 4, temporary stimulation — 4, gathering urine for examination — 4, exchanging drains and tubes — 3, other — 22.

The other interventions recognized to be typical of nursing care took only 9.0% of nurses' working time. Although the observation was conducted for 49 days, the following interventions were not recorded: mouth cavity toilet, full body bathing, washing hair, cutting nails, training deep

breath and cough, training in active or passive motion, walking, teaching in self-care.

During the morning, afternoon and night shifts the values of fraction I of time of main work were accordingly: 33.0, 26.8, 21.2% (Table 2). The value of this fraction during the morning and afternoon shifts (6 a.m. — 10 p.m.) is the highest on Fridays — 32.6%, then on Wednesdays — 32.2% and it is the lowest on Tuesdays — 27.3% (Table 3). In the Fig. 2 the loading with tasks in the field of direct nursing care during the working days is marked with a fluent line; the line is characterized with rather low peaks on Mondays, Wednesdays and Fridays and decrease on Tuesdays and Thursdays. It was expected that free from work days would be marked with significant decrease, whereas on Saturdays and Sundays nurses spend rather much time on direct care for a patient. It does not mean that during the weekend the level of nursing care is improved. The increase of proportional portion of fraction I in global working time on Saturdays and a bit lower than the average portion of this fraction on Sundays results from the fact that nursing is limited to conducting the vital actions which must be performed nearly in the same scope also during the weekend, and a less numerous nursing staffing during these days produces the mentioned above result.

Fraction II is the indirect nursing time i.e. time when nurses prepare: equipment, instruments, treatment trays and record the carried out tasks. The time values of indirect nursing range in the studied units of

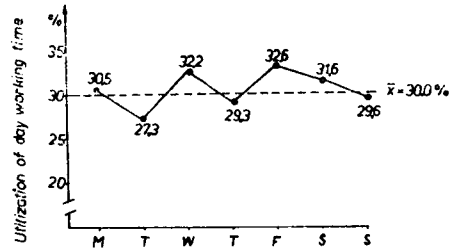
Table 2. Utilization of working time by nurses in intensive cardiological care units in 24 hrs time

Hours	N	Fraction of time							
		I		II		III		IV	
		n	%	n	%	n	%	n	%
6 a.m.-2 p.m.	2774	913	33.0	704	25.4	300	10.8	854	30.8
2 p.m.-10 p.m.	2576	691	26.8	683	26.5	310	12.1	892	34.6
10 p.m.-6 a.m.	2525	535	21.2	430	17.0	262	10.4	1298	51.4
$\bar{x}$ %		27.2		23.1		11.0		38.7	

Table 3. Utilization of working time by nurses during morning and afternoon hours (6 a.m.—10 p.m.) in succeeding days of the week

Fractions %	Days of the Week						
	Mon.	Tue.	Wed.	Thu.	Fri.	Sat.	Sun.
I	30.5	27.3	32.2	29.3	32.6	31.6	29.6
II	25.7	25.7	26.6	24.8	25.4	27.8	27.7
III	9.8	13.7	13.3	9.2	12.5	7.8	11.3
IV	34.0	33.3	27.9	36.7	29.5	32.8	31.4

Fig. 2. Time used for direct nursing care from 6 a.m. to 10 p.m. during the separate days of the week



intensive cardiological care from 13.3 to 32.5% and the average value is 23.1% of disposal working time (Table 2). During the succeeding week days it remains rather at the same level (Table 3).

The intensity of direct and indirect nursing care from 6 a.m. to 10 p.m. is depicted in Fig. 3. The diagram shows that the greatest intensity of direct and indirect nursing care appears in the scope of time from 6 a.m. to 10 a.m. and from 12 p.m. to 2 p.m. And then, during the afternoon shift from 4 p.m. to 7 p.m. These results are very important when we consider the possible employment for part time or extra time, because they point out that enlargement of nursing staff is most desirable from 6 a.m. to 10 a.m. and from 4 p.m. to 7 p.m.

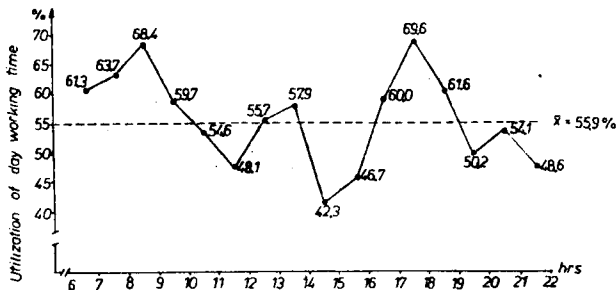


Fig. 3. Intensity of direct and indirect nursing care, together, during the separate hours of the day

Fraction III — coordination and organization activities enabling functioning of intensive cardiological care units takes from 8.6 to 15.0% of disposal working time of nurses (Table 1). The average value of fraction III is 11.0% and it includes: office work — 1.0%, giving information — 2.2%, supplying ward — 2.5%, cleaning, tidying, and disinfecting — 5.3%. Within this fraction of time only giving information (reports, inward training, acquainting new workers etc.) requires professional nursing qualifications. The other tasks are not necessarily to be done by nurses themselves but the total elimination of these tasks would be inadvisable. The analysis of this fraction values during the working

shifts in succession does not indicate significant distinctions (Table 2) but in a week schedule the lowest value was observed in Saturdays — 7.8% and the highest on Tuesdays — 13.7% (Table 3).

Portion of personal activities and non-productive time amounted to, on the average, 38.7% of disposal working time of a nurse (Table 1). It is the lowest during morning shift — 30.8%, a little bit higher during the afternoon shift — 34.6%, and the highest at night — 51.4% (Table 2). In a week schedule the least time for a rest and other private activities is used by nurses on Wednesdays, and the most of it on Thursdays, and then, on Mondays and Tuesdays (Table 3). The absence of supervisors in hospital does not influence, in higher degree, the increase of fraction IV values; on Saturdays the value of this fraction remains on the average level and on Sundays it is lower than average value (Fig. 4). Taking into consideration the size of intensive cardiological care units the non-productive time is as follows: intensive cardiological care unit with 4 beds — from 40.3 to 55.2%, with 5 beds from 31.1 to 31.6%, with 8 and more beds — from 27.3 to 34.3%. It can be concluded that in intensive cardiological care units with the number of beds 5—8 fraction IV is the lowest. The above statement is only of general indicatory nature. The utilization of working time can be influenced even more by number of patients, the degree of patients' dependence upon the environment and the number of nursing staff.

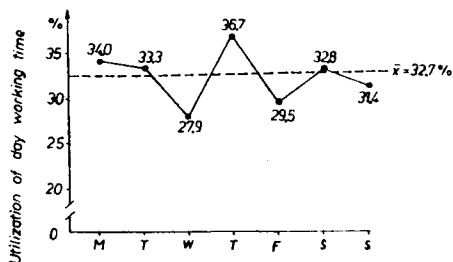


Fig. 4. Time used for personal activities and breaks from 6 a.m. to 10 p.m. during the separate days of the week

Because there are no reports dealing with the problem of utilization of working time by nurses in intensive cardiological care units which would be of similar profile, the obtained results will be compared with assignments received from other hospital wards and they will be interpreted in the light of theoretical assumptions. Nurses from intensive cardiological care units use a little bit more time for a direct care for/with a patient than nurses from cardiological wards — 26.0% (6) but less than in clinical wards in Jena — from 38 to 51% (quoted acc. 8) and far less when compared to the results given by Sapiński. On the basis of the material collected using the constant observation method called photo-

graphy of day work — Sapiński stated that nurses use for direct work with/for a patient during the morning and afternoon shifts in a surgical ward — 76 and 78%, in paediatric wards 75 and 71%, in internal disease wards — 63 and 66% of their working time. During the night shift in all wards mentioned above they spend less time for a direct care i.e. 37 to 59% (9).

The values of subfraction concerning direct nursing care recorded in intensive cardiological care units do not much differ from the results in cardiological wards. Although in intensive cardiological care units more times is devoted to diagnostic-observation interventions — 11.3% while 7.4% in cardiological wards, nurses spend 10.3% of time in cardiological wards on therapeutic procedures and in intensive cardiological care units they spend only 6.9% of their working time.

The share of fraction II — the indirect nursing care and of fraction III — the coordination and current organization, in disposal working time is lower in intensive cardiological care units than in cardiological wards — 28.7 and 13.0% (6). It proves better organization of work and equipment of nurses in intensive cardiological care units. In Sapiński's studies similar fraction was called auxiliary activities and it figured from 12 to 21% but during the night shift from 27 to 40%.

Fraction IV — personal activities and non-productive time figured 38.7% on the average (3 hrs during 8 hrs working shift) and it is the highest while compared with the results of mentioned above studies. The stated value of fraction IV is determined by various factors. The explanation that it is caused by the fact that nurses must be ready to start immediate intervention when human life is in danger is not fully convincing. A nurse maintains ready to start urgent tasks when she stays far from a patient but also when she stays at his bed, talks with him, carries out toilet, adjusts his bed. She can, at any moment, interrupt it and start an immediate intervention. So, the possible free time during the day hours may be devoted to nursing actions, which occupy only 9.0% of working time and during the night hours — she can use it to preparatory and auxiliary actions.

Taking into account the amount of non-productive time in intensive cardiological care units the problem of loading with work should be at least emphasized. In every work one has to face certain difficulties and it causes discomforts of physical and psychological nature. Work in intensive cardiological care unit, intensive medical care unit, oncology ward or incurable disease ward occasions a great number of stresses having an influence upon people employed there (2). The peculiar character of work in intensive cardiological care unit is connected with paying constant attention, systematic observation, quick evaluation of

changes in patient's health conditions, numerous and abrupt making decisions and more frequent than in other wards instances of death of people often fully active in professional and family life, and also with hard work, lifting and physical injuries. Also the surrounding with specialistic equipment, complicated and numerous devices, a certain level of hum, differentiation of sounds and noises causes permanent excitement and relatively high level of physical tiredness and psychological pressure. That is why an explicit evaluation of fraction IV values is rather hard.

### Conclusions

The level of work organization in a particular institution is revealed by, among others utilization of disposal working time. It is efficient when the time used for other tasks than the main work and the time of breaks is possibly the lowest. Settling that nurses in intensive cardiologial care units spend on the average 27.2% of their working time for their main work, i.e. for the direct interventions carried out with/for a patient and 72.8% of time they stay far from a patient, entitles us to formulate the following conclusions:

- 1) the degree of organization of nursing work in intensive cardiologial care units is low;
- 2) in nurses work, there are some reserves of time which may be properly used for the direct nursing work.

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### STRESZCZENIE

Za pomocą obserwacji migawkowych ustalono strukturę zużycia czasu pracy przez pielęgniarki odcinkowe w 7 odcinkach (oddziałach) intensywnej opieki kardiologicznej. Stwierdzono, że czynności wykonywane bezpośrednio przy chorych zajmują średnio 27,2%, a pielęgnacja pośrednia 23,1% dyspozycyjnego czasu pracy. Na koordynowanie i organizowanie bieżące pielęgniarki przeznaczają 11,0%, natomiast na zajęcia pozaszpitalne i przerwy — 38,7% czasu pracy. Ustalono rozkład tych wartości podczas zmian roboczych w poszczególnych dniach tygodnia oraz godzinach dnia. Ponadto określono procentowy udział wyróżnionych grup czynności w obrębie pielęgnacji bezpośredniej oraz koordynowania i organizowania.

### РЕЗЮМЕ

Благодаря кратковременным наблюдениям определена структура использования рабочего времени палатными медицинскими сестрами в 7 отделениях интенсивного кардиологического наблюдения (ОИКН). Установлено, что функции выполняемые медсестрами непосредственно около больного занимают в среднем 27,2%, косвенный уход — 23,1% имеющегося в распоряжении времени. На координирование и текущую организацию медсестры предназначают 11,0%, а на внеслужбные занятия и перерывы — 38,7% рабочего времени. Установлено такое соотношение расходуемого времени на рабочих сменах, в разные дни недели и часы дня. Кроме того определено процентное соотношение вышеуказанных функциональных групп в границах непосредственного ухода, а также координации и организации.

