

# Nursing Time Allocation: A Work Sampling Survey in a Turkish Private Hospital

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## Abstract

**Background and Objectives:** Work sampling is a useful technique to characterize how employees allocate their work time to various activities. Given the value of nurses' time for quality health care delivery, characterization of nursing time distribution may provide useful information for optimal use of nursing staff. The purpose of the present study was to explore time allocation by nurses using work sampling method.

**Methods:** The study was conducted in a 150-bed private hospital. Data was collected using a researcher-designed work-sampling tool addressing 259 tasks grouped into four high-level activities, including direct care, indirect care, and unit-related, and personal activities. By conducting a pilot study, a sample size of 669 was determined for observation. In practice, however, a total of 228 nurses were observed in 540 shifts, which provided a robust sample for data analysis. Data were collected at 20–30-minute intervals over a 9-week period. The nurses' activities were randomly observed and recorded by 12 trained observers.

**Findings:** A total of 17517 nursing activities were observed for the day shifts and 12902 for the night shifts. The nurses were found to spend 44%–46% of their work time on direct care, 20%–22% on indirect care, 10%–14% on unit-related duties, and 20%–24% on the personal activities, depending on shift time. The proportion of nursing time specified to direct patient care was the highest in the emergency department (55%, day shift, 57%, night shift) and the lowest in maternity ward (35%, day shift, 32%, night shift). Administration of medication (28.7%, day shift, 28.4%, day shift) and monitoring patients' vital signs (25.6%, day shift, 26.7, night shift) were identified as the most time-intensive patient care tasks. The nursing time distribution was virtually the same in the day and night shifts. The proportion of time spent on personal issued (22%, day shift, 25%, night shift) was found to be higher than that required by the hospital.

**Conclusions:** While the nursing staff spends the majority of work time on direct patient care, the time spent on personal activities is relatively high, requiring specific inspection. Our results identify the most time-intensive nursing tasks and provide potentially useful data for optimal design of nursing schedule.

**Keywords:** Work sampling, Nursing staff, Patient care, Healthcare human resources, Hospital management

## Background and Objectives

Nursing staff is one of the most crucial resources in health care system. While the number of nurses in the health industry is already insufficient, the present nursing staff is not used effectively and efficiently.<sup>1</sup> Nurses often have to spending significant time for activities such as ward rounds, addressing problems related to insufficient drugs, medicines, medical equipment, and clinical documentation, beside focusing on the direct patient care activities, which is their central duty. Moreover, nurses are subject to frequent interruptions in their workplace.<sup>1</sup> The chaotic work situation faced by nurses in their workplace requires

systems and holistic analysis to enable efficient schedule design and remove inefficiency factors.

Work sampling is a statistical technique often used to analyze the time spent by nursing staff on various activities such as direct and indirect patient care, ward-related activities, and personal (non-productive) activities.<sup>1-4</sup> Previous studies have confirmed the reliability of this method to yield a picture of time allocation by nurses in their workplace.<sup>2,5,6</sup> The present study was aimed at exploiting this method to explore distribution of nurses' time in a well-managed and well-equipped Turkish hospital.

## Methods

### Setting

The study was carried out in a 150-bed private hospital

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in Ankara, the Capital of Turkey. The data was collected over a four-month period from seven out of 8 clinical units, including 7 medical/surgical wards (W1-W4 and W6-W8), neurology ward (W5), maternity ward, and emergency department (Table 1). Intensive care unit (ICU) was excluded for some legal and medical reasons. The data was collected by a trained team of observers. Simultaneous observations were carried out in the wards from 7AM–7PM and 7PM–7AM during all week days, in a period of 130 consecutive days.

### Instrument Development

Using nurses' job descriptions as a draft, a work sampling instrument was developed to follow the work activity of nursing staff. Following a comprehensive literature review and a series of discussion meetings with nursing administrators, the draft tool was extended to a comprehensive list of 259 tasks. Literature review also led us to find it appropriate to group these tasks into four major categories, including direct care, indirect care, unit-related, and personal tasks).<sup>4,7-13</sup> The direct nursing care group comprised 212 tasks, which was further categorized into 11 subgroups to simplify the collection and analysis of the data.

### Observer Training

We trained 12 newly recruited nurses to perform the observation. The team of observers used a predetermined list of tasks to observe and record the nursing activities at a predefined and randomly selected time intervals. Each time interval was assigned to an observer. According to their assignments, the observers were asked to monitor the activities of the nursing staff.

### Pilot Study

Before starting the data collection we conducted a pilot testing to determine the required sample size. Twelve rounds of nursing activity observation were performed at predefined and randomly selected time intervals. The activities of all nurses in each round were recorded. The total proportion of time allocated to direct patient care (47%) was used to calculate the sample size. The sample size

was calculated by the formula  $n = \frac{P(1-P)}{\sigma^2}$ , where  $n$  denotes the number of observations;  $p$ , the proportion of time allocated to direct patient care; and  $\sigma$ , the standard error of proportion.<sup>14</sup> Based on this formula, the sample size was calculated to be 669 for each ward in each shift.

### Data Collection

A total of 228 nurses were observed in 540 shifts, which yield a robust sample size for statistical analysis. Data were collected at 20–30-minute intervals, corresponding to a total of 36 time blocks for a 12-hour shift in the day. All nursing staff that was present on the wards was monitored and the activities of each nurse were recorded at the moment he/she was observed.

### Ethical Issues

All nurses who were invited to participate in the study were presented about the study objectives and method and their written consents were obtained. They were also assured that the information on the observed activities of each individual would remain confidential. To prevent Hawthorne effect the participants were also briefed that the study did not seek to evaluate the quality of the work done by the nurses, rather to identify work time distribution among various nursing activities.

### Data Analysis

Data were summarized using descriptive statistical methods. The frequency of observations in each activity group was summed up, and the result was divided to the frequency of total activities to yield the proportion of time spent on each activity. All data analyses were carried out in SPSS version 20 software package.

## Results

### Day Shift Observations

A total of 17517 day-shift nursing activities were recorded. Table 2 shows the proportion of time allocated to each activity in each ward. As seen, the largest part of nurses' time is devoted to the direct activities (46%). Indirect and personal activities take the same amount of nurses' time

**Table 1.** Number of Beds, Nurses, and Observations at Each of Clinical Units

	W1	W2	W3	W4	W5	W6	W7	W8	Maternity Ward	Emergency Department
Number of beds	43	21	20	10	16	18	9	10	15	15
Number of nurses in day shifts	7/8	4/5	3/4	2	2	2	2	2	4	5
Number of nurses in night shifts	5/6	3/4	3/4	1/2	2	2	1/2	1/2	2/3	4/5
Number of observations in day shifts	3260	1929	1612	1155	1280	1069	1088	996	1639	2663
Number of observations in night shifts	2167	1406	1280	996	1010	992	998	992	1114	1944

(20%) standing at the next order. Ultimately, the lowest amount of nurses' time is taken by unit-relate activities (14%). The percentage of the time spent on direct patient care in the day shift varies within 35%-55%, depending on ward.

Table 3 present the distribution of nurses' time over various direct patient care activities. Administration of medication is responsible for the largest part of nurses' time (28.7%), followed by monitoring patients' vital signs (25.6%), and communicating with physicians (9.6%). While in emergency ward the majority of nurses' time is spent on administration of medication (45%), in Maternity ward, the maternity tasks take the largest share of time (30%). In other wards, the largest part of nurses' time is taken by either administration of medication or monitoring patients' vital signs.

### Night Shift Observations

A total of 12902 night-shift nursing activities were recorded. Table 4 shows the proportion of time allocated to each activity in each ward. As seen, the largest part of nurses'

time is devoted to the direct activities (44.2%), followed by indirect patient care (21.6%), and personal activities (24%). The lowest amount of nurses' time is taken by unit-relate activities (10.3%). The percentage of the time spent on direct nursing care in the night shift varies within 32%-57%, depending on ward.

Table 5 presents the distribution of nurses' time over various direct patient care activities. Similar to the day shift, in the night shift the medication is responsible for the largest part of nurses' time (28.4%), followed by monitoring patients' vital signs (27.7%), and communicating with physicians (10%). While in emergency ward the most of nurses' time is spent on administration of medication (55%), in maternity ward, the maternity tasks take the largest fraction of time (30%). In other wards, the largest part of nurses' time is spent on either administration of medication or monitoring patients' vital signs.

## Discussion

### Direct and Indirect Care

The purpose of this study was to explore the nurse time

**Table 2.** Distribution of Day Shift Nursing Time Among Various Activities at Each Clinical Unit (%)

Activities	W1	W2	W3	W4	W5	W6	W7	W8	Maternity Ward	Emergency	Mean
Direct care	51	48	46	40	53	40	43	48	35	55	46
Indirect care	16	19	23	20	21	21	20	24	23	12	20
Unit-related	14	16	18	15	12	12	13	10	17	11	14
Personal	19	17	13	25	14	27	24	18	25	22	20
Total	100	100	100	100	100	100	100	100	100	100	100

**Table 3.** Distribution of Day Shift Nursing Time Among Direct Patient Care Activities (%)

Activities	W1	W2	W3	W4	W5	W6	W7	W8	Maternity Ward	Emergency Department	Mean
Psychological care activities	6	4	7	8	6	3	4	5	3	3	4.9
Nutritional assistance	1	0	1	0	3	2	1	0	2	0	1
Hygiene	3	1	5	2	12	3	2	1	2	0	3.1
Toilet assistance	2	2	2	1	4	2	5	6	4	1	2.9
Administration of medications	29	35	27	25	24	28	31	28	15	45	28.7
Assistance in patient ambulation	6	5	4	3	5	6	7	5	3	2	4.8
Monitoring vital signs	24	25	26	36	21	28	24	29	23	20	25.6
Obtaining specimens	5	7	4	6	5	6	6	7	3	8	5.5
Nursing care	6	7	4	6	10	8	3	5	3	0	5.7
Transfer process	4	4	2	2	1	1	1	2	1	2	2.1
Patient discharge	3	2	9	2	1	2	3	2	2	4	3.1
Visiting with physician	11	8	9	9	8	11	13	10	9	8	9.6
Tasks for maternity	0	0	0	0	0	0	0	0	30	0	2.9
Within ambulance	0	0	0	0	0	0	0	0	0	7	0.5
Total	100	100	100	100	100	100	100	100	100	100	100.4

**Table 4.** Distribution of Night Shift Nursing Time Among Various Activities at Each Clinical Unit (%)

Activities	W1	W2	W3	W4	W5	W6	W7	W8	Maternity Ward	Emergency Department	Mean
Direct care	44	44	44	43	52	38	40	47	32	57	44
Indirect care	24	25	24	23	21	23	20	18	28	10	22
Unit related	16	11	12	9	8	10	10	8	10	8	10
Personal	16	20	20	25	19	29	30	27	30	25	24
Total	100	100	100	100	100	100	100	100	100	100	100

**Table 5.** Distribution of Night Shift Nursing Time Among Direct Patient Care Activities (%)

Activities	W1	W2	W3	W4	W5	W6	W7	W8	Maternity Ward	Emergency Department	Mean
Psychological care activities	3	2	4	5	5	5	5	3	2	2	3.6
Nutritional assistance	0	0	0	1	4	0	0	0	0	0	0.5
Hygiene	1	2	1	1	18	2	1	0	0	0	2.8
Toilet assistance	0	0	1	4	3	5	6	0	0	1	1.8
Administration of medications	20	31	30	25	22	28	30	32	11	55	28.4
Assistance in patient ambulation	10	3	3	7	5	7	5	3	1	2	4.6
Monitoring vital signs	32	32	27	26	19	25	27	33	25	21	26.7
Obtaining specimens	12	8	7	6	5	5	9	7	7	7	7.3
Nursing care	6	9	7	9	10	7	3	9	4	2	6.6
Transfer process	3	2	3	1	1	1	2	0	0	1	1.4
Patient discharge	3	4	5	2	1	3	2	4	5	3	3.2
Visiting with physician	10	7	12	13	7	12	10	9	15	5	10
Tasks for maternity	0	0	0	0	0	0	0	0	30	0	3
Within ambulance	0	0	0	0	0	0	0	0	0	1	0.1
Total	100	100	100	100	100	100	100	100	100	100	100

allocation as an indicator of nursing staff efficiency in a well-equipped and well administrated private hospital in Turkey.

The distribution of nurses' working time on various activities was found to be similar in day and night shifts. The amount of time specified by our nurses for patient care (direct and indirect) falls within the range of 46-75% reported from literature.<sup>2,5,8,10,11</sup> The time spent by nurses on patient care activities differ depending on hospital, ward, and the degree of patients' needs and dependency. Also difference in the content of nursing practice and ward architecture may have an impact on nurses' time distribution.<sup>2,5,8,10,11</sup>

### The Content of Direct Care

The mean fraction of time spent by nurses on direct care varied from around one third to over the half. Regardless of medical ward, nurses generally spent most of their work time on administration of medications and monitoring the patients' vital signs. Exception was observed in Maternity Ward, where nurses spent most of their time on maternity tasks. Neurology ward (W5), was second to the emergen-

cy department in taking the nursing time for direct care which is explained by the need high dependence of neurologically damaged patients for higher level of care.

### Unit-Related Activities

As health care providers, nurses are also responsible for managing the care environment, which is crucial for appropriate health care delivery.<sup>12</sup> Our nurses spent 14% of their time on unit-related activities during day shift which is longer than that reported by Pelletier<sup>4</sup> and shorter than that reported by Hendrich et al,<sup>11</sup> Fitzgerald et al,<sup>6</sup> Korst et al.<sup>13</sup> Evidence shows that intelligent hospital ultrastructure design can reduce the time for unit-related activities such as writing of requisitions, ordering transcripts, and communication.<sup>10,11,14</sup>

### Personal Time

Naturally, nurses need adequate time for rest and relaxation.

In our hospital surveyed the nurses are allowed to have 40 minutes for break and 60 minutes for meal in a 12-hour shift. This means that nurses are allowed to spend 16%

of their shift time for rest. According to the literature the break time is quite suitable if it is no higher than 16% of the working time. It has also shown that breaks longer than 16% of the working time negatively affects the efficiency and productivity of the work.<sup>15</sup>

In our study the fraction time spent on personal issues ranged from 13% to 27% averaging at 20% during day shift. Nurses of some of medical/surgery wards (W4, W6, W7) and maternity ward spent higher percentage of time for personal activities (24%-27%) during the day shift compared with other wards. This amount of time for personal activities is not only higher than what allowed in the workplace, but is also higher than that in several surveyed hospitals.<sup>2,5,6,14</sup> In certain wards such as W4, W6, W7 and maternity wards the personal time was found to be higher than other wards in day shifts (24%-27%). Whereas, in the aforementioned wards the time allocated to direct patient care was lower (35%-43%) than average (average 46%). The situation is similar for the nurses' time spending pattern over the night shift. According to the hospital regulations, the nurses are due to work 45 hours a week. The above situation indicates that the adequate time for patient care was compromised by the nurses' need to address their personal affairs. One reason may be the long weekly working hours (more than 45) required from our nurses which causes psychological and physical fatigue. In addition, in the surveyed hospital, break and meal time is not considered as a part of work time which results in prolonged stay of the nurses in the hospital (up to 54 hours per week). The long weekly hospital stay and the stress associated with by the long working hours could be the reason for the need for more personal time during work shift.

### Study Limitation

Although we used a large sample to explore work time distribution of nurses, this sample was limited to a single private hospital. Therefore, caution should be exercised in generalizing the nursing time distribution pattern as observed in the present study.

### Conclusions

Our work sampling study revealed the pattern of nursing time allocation in the survey hospital. The nurses allocate near half of their time to their primary task, i.e. direct patient care. The proportion of nursing time specified to direct patient care was the highest in the Emergency Department and the lowest in maternity ward. Administration of medication and monitoring patients' vital signs were identified to be the most time-intensive patient care tasks. The nursing time distribution was virtually the same between the day and night shifts. While the nursing staff

spent two third of their work time on patient care (either direct or indirect care), the time spent on personal activities is higher than that in several previous reports. This could be partly attributed to the relatively prolonged stay of nurses in the hospital which would leave limited time for nurses' personal affairs off the work. Thus the information obtained here may be useful for optimal design of nursing time and schedule to achieve higher nursing staff performance.

### Authors' Contributions

The authors made equal contributions to the present study.

### Competing Interests

The authors declare no competing interest.

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