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Physical Work Load and Its Assessment among the Nursing Staff in Nursing Homes

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A study was conducted to investigate the physical work load and the prevalence of musculoskeletal complaints of nurses in nursing homes. Thirty-six female subjects selected from three nursing homes in the Netherlands participated in an observational study. In addition, the total nursing staff (n = 668) was invited to take part in a questionnaire survey (response was 94%). It was noticed that almost 60% of the observed time was spent on nonpatient-related activities. Moreover, activities alternated rapidly and seldom lasted longer than 4 minutes on average. Twenty percent of the observed time was spent in "poor" work postures as defined by the Ovako Working Posture Analyzing System (Action Category 2 to 4). Activities contributing most to these poor work postures were patient care and household and preliminary tasks. Perceived exertion as scored on the Borg-CR10 scale was highest during patient-related activities. This holds also for a relative increase of heart rate. Questionnaire results showed prevalences of 41%, 35%, and 20% respectively, for back, arm/neck, and leg complaints. From this study it can be concluded that not only patient-related activities should be taken into consideration for the improvement of work postures and other potential strenuous aspects of nursing work. Household and preliminary tasks, ergonomic layout of the ward, and work pressure also deserve attention.

Health care workers, especially nurses, have been the subject of many studies to examine how physical stress and other work-related factors may affect their health.¹⁻¹¹ These studies focused in the first instance on low back pain.⁷ Most research has been carried out in general hospitals so far, even though large numbers of nurses work in other but comparable settings, such as psychiatric hospitals or nursing homes. Recent investigation tends to confirm that the physical work load of those working in nursing homes is relatively high.¹² Data collected in the health care in the Netherlands support this conclusion. For example, the percentage of sick leave found in nursing homes (10.8%) was higher in 1990 than that in health care as such (9.3%).¹³ To get a better idea of complaints and health problems affecting nursing staff in nursing homes, a study was carried out in three Dutch nursing homes to search for underlying factors for these problems in the daily work situation.¹⁴ In this paper a particular part of this study is discussed, the one dealing with the assessment of physical work load during a nurse's workday. Because Harber et al^{15,16} showed that it was not only patient-transfer activities that contributed to low back pain, we decided to observe all nursing activities and to investigate each task-specific contribution to physical work load.

To get a clearer understanding of task-specific work loads, 36 subjects working in these nursing homes were selected to participate in an observational study. In this study we tried to establish which activities took up most of their time, in which of them most of the poor work postures occurred, which activities were per-

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ceived as physically strenuous, and which of them caused the highest increase of heart rate compared with the heart rate during breaks in the work. Furthermore, the entire nursing staff of the three nursing homes ($n = 668$) involved was requested to complete a questionnaire that dealt with health, work, and some personal characteristics. This paper also includes a brief summary of the questionnaire results with respect to the prevalence of musculoskeletal complaints.

Subjects and Methods

Selection of Nursing Homes and Study Population

The three nursing homes involved were selected on the basis of location (one urban, two rural) and on the affiliation of the homes with Occupational Health Services because such affiliation might be useful for future intervention. Furthermore, the homes had to be representative of nursing homes in the Netherlands with respect to numbers and types of patients nursed (whether psychogeriatric or somatic).

On the basis of information received from the staff of the nursing homes and from our own walk-through surveys, three wards were selected in each home. Criterion for selection was that these nine wards should be representative of the homes as a whole with respect to type of patients, ergonomic layout of the ward, and the percentage of sick leave among the nursing staff. In each of these nine wards four nurses were invited to participate in an observational study to assess the physical work load during their activities. Criteria for the selection of these 36 subjects were gender, function, and shift. Only women were included in this part of the study because 80% of the nurses who work in Dutch nursing homes are women. We chose non-pregnant subjects engaged in patient-care activities (state-enrolled nurses and state-enrolled nursing students), who worked at the time of our study in day or evening shifts lasting about 8 hours each. The subjects had to be without musculoskeletal complaints

at the time of the research. The main personal characteristics of the subjects participating in the observational study and those of the total study population are summarized in Table 1.

Methods

Physical Work Load. To assess physical work load three methods were used: the Ovako Working posture Analyzing System (OWAS),^{17,18} the Borg CR-10 scale (ratings of perceived exertion),^{19,20} and heart rate.²¹ The 36 subjects in this observational study were observed during one shift: 24 of them during a day shift, 12 during an evening shift. Eighteen subjects were examined by using the OWAS method (12 day and 6 evening shifts), and 18 other subjects were observed with the aid of the Borg scale (12 day and 6 evening shifts). Heart rate was monitored in all these subjects in the course of the same shifts in which OWAS or Borg observations were carried out.

Simultaneously with the assessment of physical work load, we gathered information about the activities performed, listing 10 different nursing tasks, empirically defined to cover the whole working day (Table 2). By combining this information with the results of the observational studies, time consumption and physical work load in each particular activity could be calculated and compared.

The OWAS method was used to observe and evaluate work postures

adopted during nursing activities. This method is based on work sampling (ie, observations made) with a variable or constant interval, assessing the frequency and time spent in each posture. A total of 252 different combinations of positions of the back, arms, legs, and of the external load were defined as "typical work postures." The original OWAS method was developed by the Ovako Oy Steel Company in Finland.^{17,22,23} Several applications have been published since.^{18,24,25} In our study, OWAS observations were made every 30 seconds, using a hand terminal (Psion Organizer LZ64) and a barcode registration system.²⁶

An evaluation of the load of occurring postures burdening the musculoskeletal system was made with the aid of the four Action Categories (ACs) as defined by Kahru et al^{17,18}:

- AC 1: Normal posture, no action required.
- AC 2: The load of the posture is slightly harmful. Action to change the posture should be taken in the near future.
- AC 3: The load is distinctly harmful. Action should be taken as soon as possible.
- AC 4: The load is extremely harmful. Action should be taken immediately.

The time spent in different postures of parts of the body, ie, the percentage frequency of the position of the back (4 possibilities), the arms (3 possibilities), the legs (7 possibilities) and the head (5 possibilities) can be calculated

TABLE 1
Main Personal Characteristics of the Population Studied by Questionnaire and by OWAS/Borg

Characteristic	Questionnaire Survey (SD)		OWAS/Borg Observations (SD)
	All	Female	
Number of subjects	628*	549	36† (18 Borg/18 OWAS)
Age (y)	29.3 (8.4)	29.1 (8.4)	27.1 (6.6)
Length (cm)	168.8 (9.6)	167.3 (8.9)	170.3 (5.6)
Body mass (kg)	65.4 (11.6)	63.8 (10.2)	65.9 (11.7)
Body mass index‡	23.2 (7.1)	23.1 (7.4)	22.7 (4.0)
Having managerial tasks	16%	15%	-
Working in profession (y)	9.5 (7.3)	9.4 (7.2)	-
Working time (h/wk)	33 (8.6)	33 (8.8)	-

* Women, 87.7%; men, 12.3%.

† All were women.

‡ Calculated from mass/length² (kg/m²).

TABLE 2
Mean Time Spent on Each of 10 Basic Nursing Activities

Activities	Percentage of Observation Time Spent*	Mean Time (min) Spent Uninterrupted† (SD)
1. Making a bed with a patient in it	2.3	1.1 (0.9)
2. Lifting or moving of patient	2.3	0.9 (0.7)
3. Assisting at using the toilet	2.8	1.4 (1.0)
4. Transport with patient in bed, wheelchair, or walking	3.6	1.2 (1.0)
5. Patient care (ie, washing, dressing, etc)	14.7	2.4 (2.3)
6. Assisting with eating/drinking or taking medication	7.0	3.5 (3.0)
7. Social activities (i.e., talking, playing games, etc)	5.2	2.0 (0.2)
8. Medical wound care	3.8	2.6 (3.8)
9. Attendant work and preparations for activities 1, 2, 3, 5, 6, 7, and 8 (ie, housekeeping, get towels before showering, making beds without patients in them, etc)	33.4	2.7 (3.1)
10. Other tasks, mostly administration	24.9	3.7 (6.3)

* Results from all 36 subjects observed with OWAS and Borg method (24 day and 12 evening shifts).

† Results from 18 subjects observed with the Borg method (12 day and 6 evening shifts).

separately and can also be classified in the four Action Categories mentioned (Table 3).

Perceived exertion of specific nursing activities was measured using the Borg CR-10 scale. This scale was developed to meet both the requirements of subjective ratio scaling and those of level estimations. In this validated scale,^{19,20,27} verbal expressions were anchored to the corresponding positions on a ratio scale. In the version used in this study, numbers from 0 to 10 are used (from "very, very light" to "very, very hard, almost maximal") with a defined "maximum" anchor outside the scale. The subjects had been instructed previously how make use of the scale. It was stressed that they had to rate the perceived physical exertion in its totality. In the course of a whole shift each subject was asked at regular intervals to express her ratings of perceived exertion at the end of the tasks just performed. The observer asked for a score for each specific task when a maximum of 10 tasks or when 15 minutes had passed.

All observations with OWAS and Borg were carried out by the first-named author and a Health Science student, who had been trained intensively for the methods to be used.

After training with the OWAS method, using video and slides, one day of observation was carried out in a nursing home to improve and determine interobserver reliability for each part of the body. Three sessions of 15 minutes each (90 observations total) at the end of this observation day were used to calculate interobserver reliability. Interobserver reliability for postures of the back was 90%, the arms 95%, the legs 90%, and the head 87%. Suitable interobserver reliability for BORG results was ensured by issuing a strict protocol for the manner of questioning.

In addition, all subjects, those who were observed with the OWAS method as well as those who rated their perceived exertion on the Borg CR-10 scale, had their heart rates monitored and recorded with a Sporttester PE 3000²⁸ every minute of the shift. Breaks during shifts were also coded on the Sporttester. The mean heart rate during a break was used as a personal reference point at rest, for comparison with the mean individual heart rate during the performance of specific nursing activities. Relative increase of heart rate (ie, work/rest) was used as a physiological measure of work load. To correct for

a time-lag effect, mean heart rate was determined only for tasks lasting longer than 1 minute each.

Complaints. The questionnaire used was based on a validated Dutch questionnaire intended for working populations in general,²⁹ but in this case especially adapted and extended for the nursing profession. It had been used in a earlier stage for a pilot study¹² and was modified after being pretested once again for this study. The questionnaire deals with, among other things, personal characteristics (age, gender), history of nursing employment (function, duration of employment), musculoskeletal complaints (back, arm/neck region, legs), and perceived physical work load and work-related factors (ergonomic layout of wards, work pressure, etc). Most questionnaires were distributed and completed in group meetings during working hours. Nurses who were unable to attend a group meeting were sent a questionnaire by mail.

Data Analysis. A special computer program was used for the analysis of the OWAS data. Using this program made it easy to investigate the quantitative relation between working postures and specific work activities.²⁶ For the questionnaire results, Borg scores, and heart rates, data analysis was carried out using SPSS for PC (version 4.01). Results of the observations of physical work load and time expenditure are tabulated separately for the 10 defined nursing tasks. The questionnaire results were arranged as percentages of subjects suffering from particular complaints.

RESULTS

Observational Study

In all, 36 subjects were observed during a whole day or evening shift. Because of the multimoment or continuous observations according to OWAS and Borg, a general indication concerning time expenditure on each of the 10 specific activities could be recorded (Table 2). Furthermore, it was possible to specify "poor work postures," perceived exertion, and mean heart rate for each of the activities (Figs. 1, 2, and 3). Total duration

TABLE 3
Distribution of Time Spent in Different Working Postures during Total Observed Time; Percentage Frequency of Each Posture over 10 Basic Nursing Activities (n = 18)

OWAS Code	Total	Tasks*									
		1	2	3	4	5	6	7	8	9	10
Back											
1 Straight	76	1	2	1	4	8	6	7	2	37	30
2 Bent	16	5	8	6	2	27	4	6	6	28	9
3 Straight and twisted	5	4	6	6	5	20	7	4	4	31	15
4 Bent and twisted	4	5	9	8	0	37	2	5	8	21	5
Arms											
1 Both arms under shoulder level	96	2	3	2	4	13	6	7	3	34	26
2 One arm at or above shoulder level	3	5	5	6	1	24	3	3	7	41	5
3 Two arms at or above shoulder level	1	4	10	13	3	25	0	0	6	34	6
Legs											
1 Sitting with legs under buttock level	15	0	0	0	0	1	12	15	0	1	70
2 Standing with both legs straight	45	3	4	4	1	20	7	6	5	33	16
3 Standing with one leg straight	20	3	6	3	3	17	3	5	3	43	15
4 Standing or kneeling with both legs bent at the knee	2	2	5	12	0	29	0	14	5	27	5
5 Standing or kneeling with one leg bent at the knee	0	0	0	0	0	0	0	0	0	0	0
6 Kneeling on one or both knees	0	0	0	0	0	0	0	0	0	0	0
7 Walking or moving	19	0	0	1	15	1	0	3	0	55	25
Head											
1 Free	67	2	3	3	4	13	5	6	3	36	25
2 Bent forward	16	2	3	2	3	15	7	3	6	37	21
3 Bent to one side	2	0	3	7	1	29	10	8	9	12	21
4 Bent backward	1	1	5	6	1	17	0	2	1	57	9
5 Twisted	15	2	2	2	6	8	8	14	2	27	31

* For description of tasks see Table 2.

activities

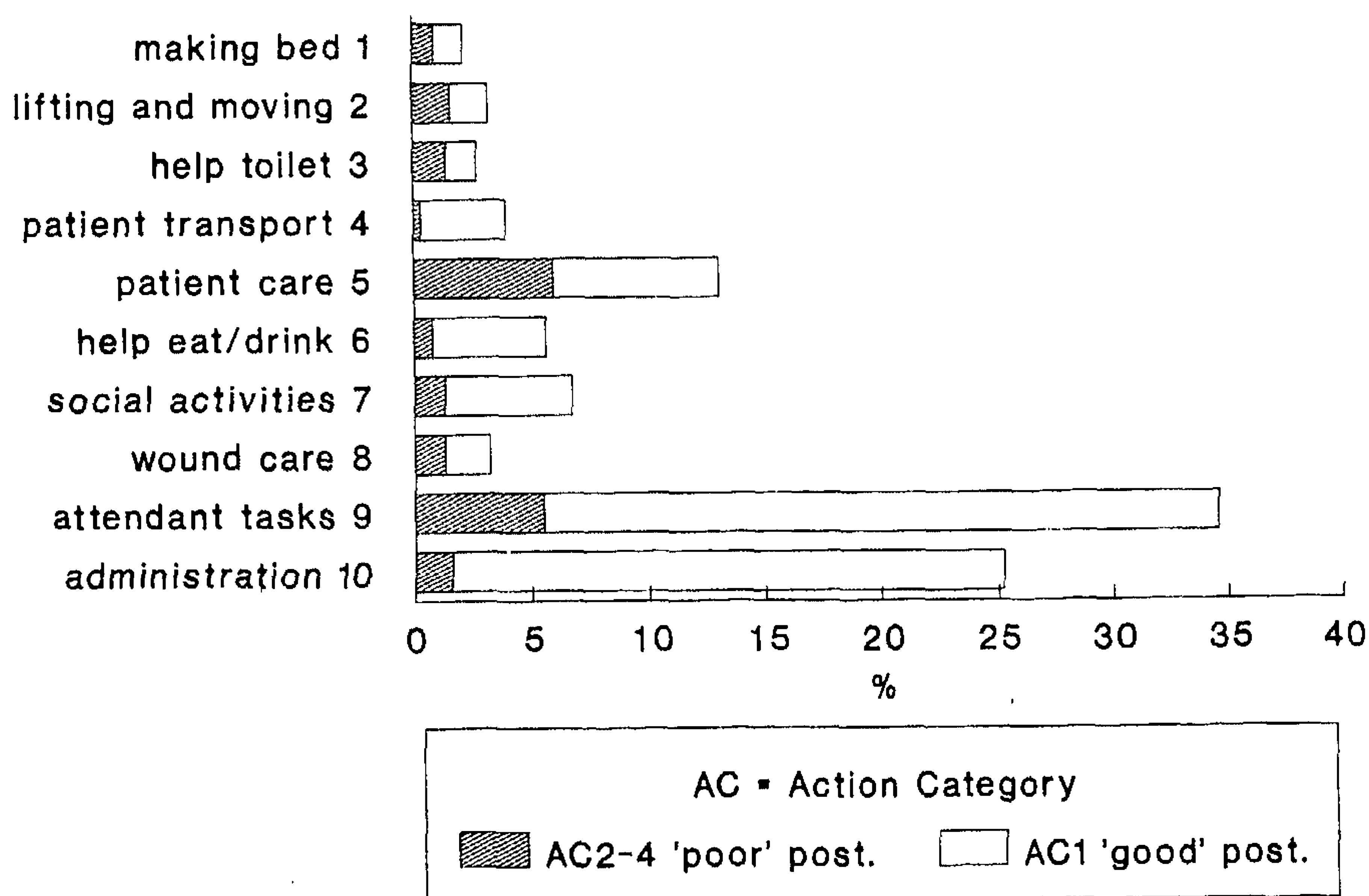


Fig. 1. Proportion of working postures in Action Categories from the OWAS data for 10 nursing activities (n = 18). (For description of tasks see Table 2.)

of breaks during the observed period was nearly 20%. This time included the regular breaks for coffee, breakfast, lunch, or dinner. Tasks found to consume most of the observation period were attendant (ie, house-keeping) and preliminary activities (9), administration (10) and patient care (5). The total time spent on non-patient-related activities (activities 9 and 10) was 58% (see Table 2).

For the OWAS analysis, 12,643 observations were made from 18 persons. During a shift, data were collected for about 6 hours. The remaining time was spent on breaks by the subject, breaks by the observer, and instruction of the subject.

Results from the OWAS observations show that of itself the percentage frequencies of the parts of the body according to the OWAS classification were not harmful. This indicates that the amount of time spent in each posture did not exceed the limits of AC 1 (Table 3). However, as can be read from Table 3, 25% of the observed time was spent in a bent, twisted, or bent and twisted position of the back (positions 2, 3, and 4). Activities that contributed most to these postures of the back were patient care (5) and attendant and preliminary tasks (9). Furthermore, it became obvious that only 15% of the observed work time was spent in a sitting position, whereas 20% was spent walking and 65% was spent standing with one or both legs straight. As can be seen from Table 3, especially the household and preliminary tasks involve much standing and walking.

Looking at the "typical working postures" (combination of back, arm, leg, and external weight), it becomes evident that during 21% of the working day postures adopted were more or less harmful to the musculoskeletal system (scores in AC 2 to 4, further defined as "poor work postures"). Activities that are principally responsible for poor work postures were patient care (5) and attendant and preliminary activities (9) (Fig. 1). These activities were also the more time-consuming ones. In addition, making a bed with a patient in it (1), moving or lifting the patient (2), assisting the patient at using the toilet (3), and medical wound care (8) led to many poor

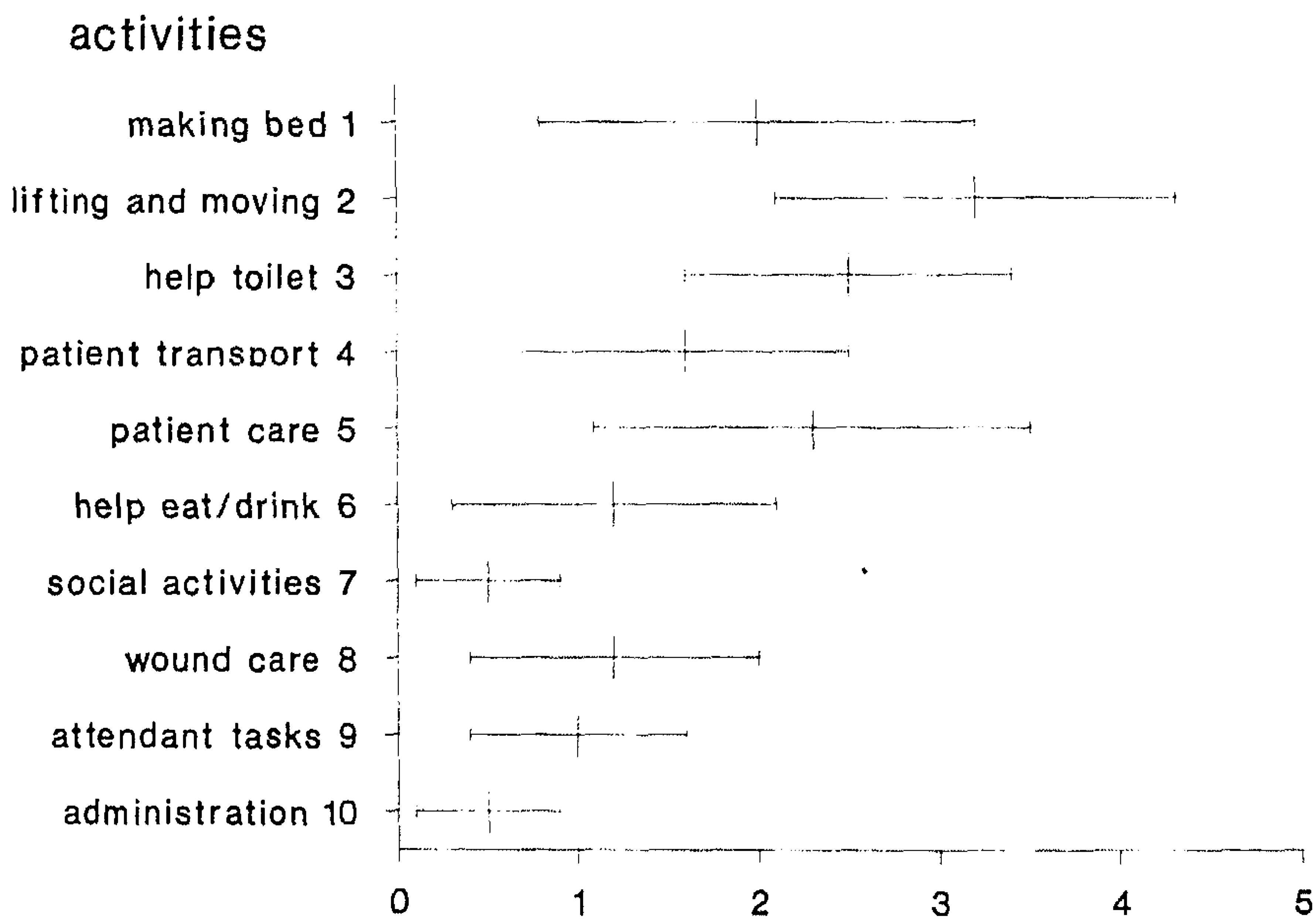


Fig. 2. Mean and standard deviation of perceived exertion on the Borg CR-10 scale for 10 nursing activities ($n = 18$). (For description of tasks see Table 2.)

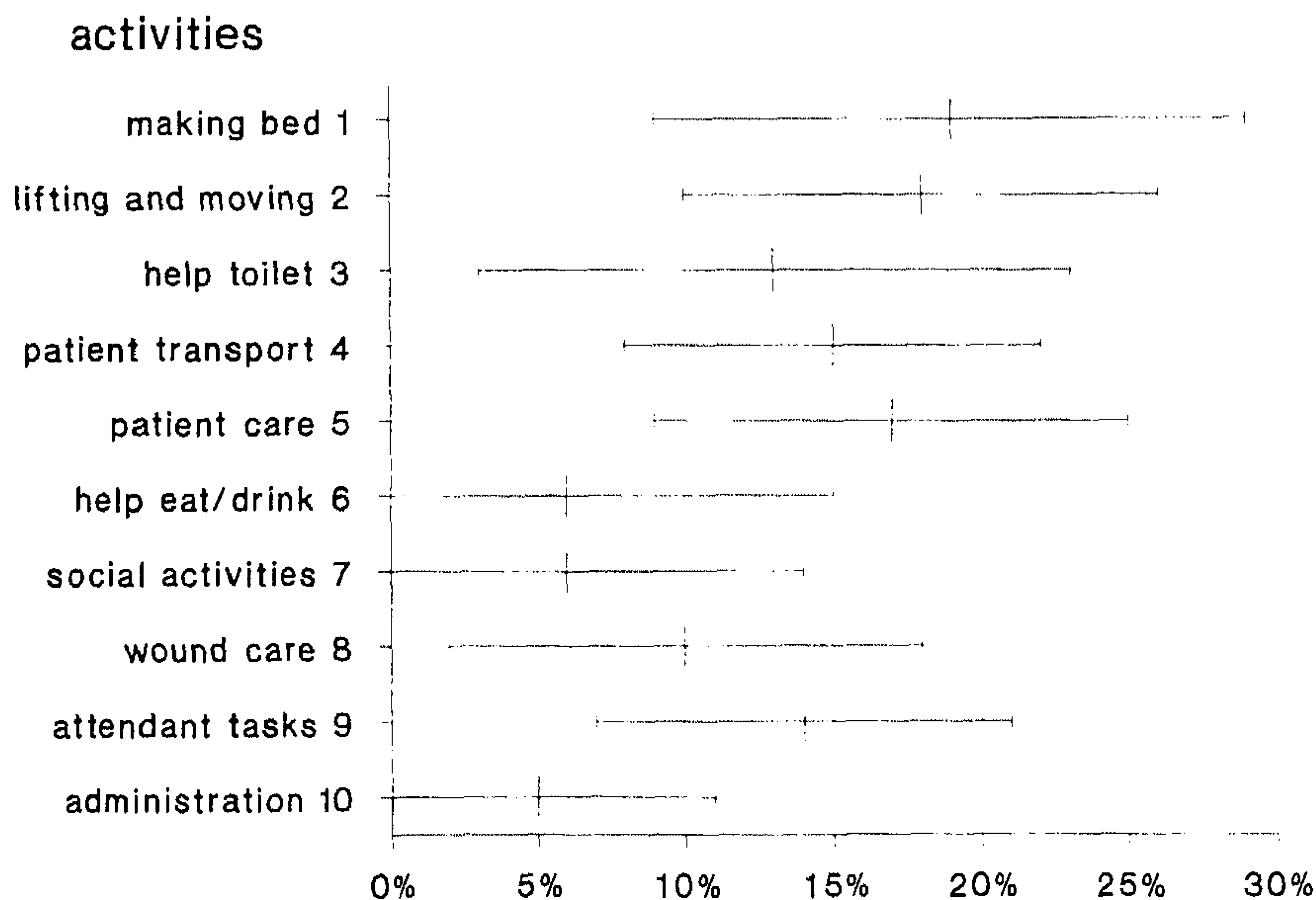


Fig. 3. Mean and standard deviation of relative increase in heart rate during 10 nursing tasks compared with the heart rate in breaks ($n = 36$). (For description of tasks see Table 2.)

work postures (40% of the postures in AC 2 to 4) (Fig. 1), but relatively little time was spent on these tasks.

When a comparison is made between day (7 AM to 3 PM) and evening (3 PM to 11 PM) shifts, it becomes obvious that in the evening shift more time was spent on patient-related activities (1 to 8), whereas during the day shift more time was spent on administration and attendant and preliminary tasks (9, 10). Significantly more poor working postures were adopted in the evening shifts than in

the day shifts (χ^2 analysis, $P < .01$) (specific data not shown).

The perceived exertion on the Borg CR-10 scale was highest for lifting or moving the patient (2), assisting at using the toilet (3), and patient care (5). Perceived exertion ranged between 0.5 ("very, very light exertion") in administration (10) and 3.5 ("moderate exertion") in lifting or moving the patient (2) (Fig. 2).

The relative increase in heart rate was found to be the highest for the tasks of making a bed with a patient

in it (1), moving or lifting the patient (2), and patient care (5) (Fig. 3). During these tasks average heart rates were found to be 110 beats/min (1) 109 beats/min (2) and 109 beats/min (5), respectively. The lowest mean heart rates during working time (97 and 99 beats/min, respectively) were found during administrative activities (10) and helping with eating, drinking, and administering medicines (6). The mean heart rate during the shift of all subjects put together was 103 beats/min, whereas the mean heart rate during the breaks was 93 beats/min.

During our own observation in the wards, it became evident that the actual length of time spent on patient-related activities was very short. Moreover, these activities alternated incessantly with preparatory activities. The mean time taken up by any specific task did not exceed 4 minutes (see the last column in Table 2). For example: Activity 1, making a bed with patient in it, took up 2% of the total observed time. The mean time spent on this task, when performed consecutively, was only 1.1 minutes. Furthermore, sometimes two tasks appeared to be performed at the same time. For example: while washing the patient, subjects had to comfort the patient or any of the patient's relatives at the same time. This "double" work load could not be registered.

Questionnaire Survey

The overall response rate in the questionnaire survey was 94%: 628 questionnaires of 668 were returned. Most of the respondents, who averaged 29.3 years of age (SD 8.4), were women (87.7%) (Table 1). Sixty-one percent were state-enrolled nurses 21% were state-enrolled nursing students, 10% were state-registered nurses, and 8% represented other functions (eg, kitchen assistant, student nurse).

One of the questions was whether the subjects suffered regularly from back, arm/neck, or leg complaints. Thirty-seven percent of the respondents did not have any musculoskeletal complaints at all. Complaints about the back in general were mentioned by 41%; 38% of the respondents suffered from low back complaints.

Arm/neck problems (mentioned by 35%) were located mostly in the shoulder and the neck region, whereas leg symptoms (20%) were chiefly to be found in the knees (Table 4).

Discussion

In this study we have tried by means of several methods to assess the extent of physical work load, the postural load, and the prevalence of musculoskeletal complaints of nursing staff in nursing homes. Physical work load in occupational situations is often difficult to assess. Usually it is not possible to use valid (stationary) methods. Because of the mobility inevitable in most of the jobs, the applicability of these methods in the work environment is limited.²⁵ The methods chosen for this study were selected on assessing different aspects of exposure. With reference to the exposure-response model for musculoskeletal disorders recently described by Hagberg,³⁰ the OWAS method can be seen as an instrument to assess exposure (external to the person), the Borg scale as an assessment of dose (amount of physical stress in the biological target at some specific time), and the heart rate registration as an assessment of the response on this dose.

The OWAS method is an observational method that has proved to be useful in dynamic work situations.²⁵ Observations were made every 30 seconds of the shift, which is a usual observation interval for extended observation periods of work sampling (>4 hours). Interobserver reliability for OWAS observations was expressed as a percentage of agreement and set at 85%. It was found to exceed this percentage for observations of all parts of the body.

Although it is possible to observe postural load with OWAS, it is difficult to assess external load in a valid way, especially in nursing work.³¹ The OWAS specifies three categories to differentiate external loads: 10 kg or less, between 10 and 20 kg, and more than 20 kg. The load above 20 kg is not further differentiated. So, handling weights of, for example 50 kg, which is not uncommon in nursing activities, has the same value (ie, is classified in the same AC) as one of 20 kg. Furthermore, it is not possible to code whether the load was pushed, carried, or lifted. This may lead to an underestimation of risks, because in nursing work external loads will tend to be heavier than the maximum of 25 kg prescribed by the norm established by the National Institute for Occupational Safety and Health.

The Borg scale is a validated method. However, validation is arrived at in a laboratory setting with standardized work loads.^{19,20,27} Its application in a field study has rarely been tried before. From some studies^{32,33} performed in work situations it can be concluded that Borg data gathered in the field can be useful all the same. Heart rate was used as the most convenient and simple physiological norm of job stress.²¹ Factors that may cause an increase in heart rate are physical work load, but also temperature, time pressure, and psychological stress. It is not always possible to differentiate between these factors.

Although the separate methods used have some limitations, as mentioned above, it was expected that a combination of these methods should give a better insight in a wide range of possible risk factors in specific tasks and in physical and postural loads of nurses' work. Moreover, the methods

used were applicable to work situations and were also rather unintrusive to subjects and patients alike.

The group of 36 subjects who participated in the observational study were judged to be a fair representation of the total (female) population in the selected nursing homes for the characteristics given in Table 1. In total, 628 subjects completed a questionnaire. The response rate was high: 94%. The questionnaire used was a modified version of a validated questionnaire that has been applied frequently in occupational health care in the Netherlands. This modified version had proved to be a suitable instrument when it was pretested among nurses.

Data obtained in the observational study suggest that up to 60% of the workday is devoted to nonpatient-related activities (Table 2). A remarkable finding is the short average duration of tasks (roughly 4 minutes). Activities are often interrupted and it was also noted that frequently more than one task had to be achieved at the same time. The way nursing work is organized can contribute to—at least the experience of—a heavy work load. From the results produced by the OWAS method for separate parts of the body it can be concluded that no percentage frequency overstepped the criteria of AC 1. However, from Table 3 it can be concluded that during up to 85% of the observed work time, subjects are either standing or walking. Especially the attendant and preliminary tasks (housekeeping and preparing other tasks) contribute to these postures. Another important finding is that during 24% of the observed work time the back is in a bent, twisted, or bent and twisted position.

Closer examination of typical working postures (ie, combinations of postures of parts of the body) shows that patient care (5) and attendant and preliminary tasks (9) were found to contribute most to the physical work load. This last finding is remarkable because other studies stress that patient-care activities, chiefly patient lifting, act as the predominant risk factor in nursing work. The results of the study of Harber et al,^{15,16} however, also suggest that nonpatient-related activities like carrying and pushing

TABLE 4
Responses (in %) to Questions about Musculoskeletal Complaints (n = 628), Including Sufferers from More Than One Complaint on Different Locations

Topic	Back	Arm/neck	Legs
Complaints	41%, all	35%, all	20%, all
Location	38%, lower back 9%, upper back	27%, neck 22%, shoulder/upper arm 3%, elbow/forearm	9%, hip/upper leg* 13%, knee/lower leg† 4%, ankle/foot

* Upper leg = leg from buttocks to knees.

† Lower leg = leg under knee.

furniture may add substantially to physical (eg, postural) work load. Our study shows that the amount of time spent on nonpatient-bound activities (ie, attendant and preliminary tasks) is the main reason why these account most for the "poor" work postures in AC 2 to AC 4. This becomes more obvious when each activity is considered separately. For example, the relative share of "poor" work postures in activity 9 (attendant and preliminary tasks), on which 33% of the time is spent, is about 16%. The relative share of "poor" work postures during assisting at using the toilet (activity 3), taking up 3% of the time (see Table 2), is about 50% (Fig. 1).

A division between day and evening shifts has been made. As will be seen from the results, in the evening shifts more time was spent on patient-related activities. Also, significantly more poor work postures were adopted. This might be due to the fact that only two nurses work in the evening shift. Because less time is spent on administration activities, the benefits of physical "resting" moments allowed by these activities are also diminished.

When perceived exertion measured with the Borg scale (Fig. 2) and heart rate data (Fig. 3) are taken into consideration the main trouble seemed to come from the patient-related activities. The highest average perceived exertion was found in lifting or moving the patient (2) and was rated as 3.5 on the Borg scale. This numeral index corresponds to "moderate," going up to "somewhat heavy" exertion. At first sight it seems somewhat surprising that the score is not higher, because this specific task is in various studies^{8-11,32} and is stated as being physically strenuous for the musculoskeletal system. A possible explanation is that the subjects were asked to rate the perceived exertion after 10 tasks or after about 15 minutes. High exertion during short moments cannot be determined reliably in this way. Besides, some nursing activities were possibly too generally defined. Both shortcomings may lead to an underestimation of dose assessment.

Heart rate data measures should be regarded with some caution. Influences of temperature, etc, were disre-

garded in the relative increase of heart rate during work compared with the heart rate in breaks as a rough estimation of physical work load, on the assumption that heart rate during breaks was equally influenced. The highest relative increase was then found during patient-related activities. However, it is not clear whether it is in fact the energetic work load that causes this highest relative increase. Another problem was the time-lag effect for which we compensated. Tasks were found to alternate rapidly, which could have contaminated the results. Further research should be carried out to evaluate whether heart rate measurement is indeed a useful method to study individual responses to physical work load in the nursing profession.

From the questionnaire results (Table 4), the most striking finding was the prevalence of subjects suffering from arm/neck complaints (35%). In our study population these were almost on a level with those of low back pain (38%). In addition, one-fifth of the subjects suffered from symptoms of the legs. It was difficult to compare these results, because to the best of our knowledge, in no other studies has the occurrence of arm/neck or leg complaints among nurses been investigated.

In future intervention studies it seems important to look carefully into the occurrence of all these musculoskeletal complaints. It is possible that, for example, preventive programs concentrating on back pain may lead ultimately to a decrease of complaints of the back but—unintentionally—result instead in an increase of arm/neck or leg complaints due to a change in work posture. Therefore, the same holds true for the analyses of work posture loads. For future research the importance and usefulness of particular methods, when used in combination with other methods, should thereby be taken into account.

Within the limits of this study it can be concluded that for nurses in nursing homes, not only should patient-related activities be taken into account as potential risk factors but other activities like attendant and preliminary tasks as well. The organization of nursing work should be con-

sidered also. If an improvement in occupational conditions is to be achieved, interventions on both patient-bound and nonpatient-bound activities are important.

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Myths: Dominance of the Minority

Although there are plenty of exceptions, "the data show that middle age is the very best time in life," says Ronald Kessler, a sociologist and MIDMAC fellow who is a program director in the survey research center of the University of Michigan's Institute for Social Research. "When looking at the total U.S. population, the best year is fifty. You don't have to deal with the aches and pains of old age or the anxieties of youth: Is anyone going to love me? Will I ever get my career off the ground? Rates of general distress are low—the incidences of depression and anxiety fall at about thirty-five and don't climb again until the late sixties. You're healthy. You're productive. You have enough money to do some of the things you like to do. You've come to terms with your relationships, and the chance of divorce is very low. Midlife is the 'it' you've been working toward. You can turn your attention toward being rather than becoming."

Whereas Kessler's picture of middle age is drawn from facts and figures, the image in most Americans' minds is based on myths, derived not from the ordinary experiences of most people but from the unusual experiences of a few. Although these make for livelier reading and conversation, they generate an unnecessarily gloomy attitude about the middle years which limits people's horizons. . .

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