

Self-assessed quality of sleep, occupational health, working environment, illness experience and job satisfaction of female nurses working different combination of shifts.

Running title: Health and shift work

### Abstract

**Aim:** The aim of this study was to describe and compare the self-assessed quality of sleep, occupational health, working environment, illness experience and job satisfaction among female nurses working different combinations of shifts.

**Background:** Evidence from several studies indicates that there is an association between the disruption of the circadian cycle caused by shift work and adverse health effects.

**Methods:** A cross-sectional design was used with a sample of 348 nurses drawn from the registry of the Icelandic Nurses' Association, representing 17% of the workforce of Icelandic nurses. A self-administered questionnaire, measuring occupational health, quality of sleep, the illness experience, job satisfaction and working environment was used. Data were analysed according to type of shift (days only, rotating days/evenings, rotating days/evenings/nights) by use of analysis of variance and chi-square.

**Results:** No difference was found between participants based on type of shift with regard to the illness experience, job satisfaction and quality of sleep. Nurses working rotating day/evening/night shifts reported a longer working day, more stressful environmental risk factors, more strenuous work and that they were less able to control their work-pace. In general, the nurses reported low severity of symptoms; however, nurses working rotating days/evenings shifts experienced more severe gastrointestinal and musculoskeletal symptoms as compared to the others. This was explained by the short rest period provided for between evening and morning shifts.

**Conclusion:** In general Icelandic nurses are satisfied with their work and their shift assignment does not seem to pathologically disrupt their circadian cycle.

Nevertheless, nursing directors are advised to look more closely at the organization of nurses' work during night-shifts, as well as the rest period for nurses changing from evening to day shifts.

Key words: Occupational health, women's health, nurses, shift work

## INTRODUCTION

An important aspect of the work environment of nurses is that they are needed 24 hours a day. Thus, the organization of shifts, so as to best meet the needs of the organization, patients and nurses, is a task that constantly demands the attention of nurse managers. The length of shifts (12 hours vs. 8 hours) and combination (for example rotating, day only, night only shifts) have received the greatest interest in studies on the effect of shift work on performance, physical and psychological well-being (1, 2). The underlying assumption of the studies is that a disruption of the circadian rhythm, coupled with interference with daily routines at work and home, such as commuting, eating and sleeping, may have detrimental influence on physical and/or mental health (3). The exact nature of the consequences of this disruption has, however, been harder to establish. This study looks at the association between combination of shifts and quality of sleep, occupational health, working environment, illness experience, job satisfaction and work environment of nurses.

A number of studies have looked at the association between sleep and shift work. The concern is that sleep disruption may influence performance and consequently patient safety. A study on the impact of the number of consecutive night shifts worked on the health and well-being of British nurses working permanent night shifts versus nurses working rotating shifts found that working the same shift over some period of time improved sleep duration and quality (4). An epidemiological review on occupational sleep among Japanese workers found the prevalence of insomnia and other sleep problems to range from 29% to 38% for shift workers and from 5% to 45% for non-shift workers, depending on studies. Poor sleep was related to health, occupational activities and personal relations. The studies identified risk or associated factors in pathophysiology, life-style behaviour, job-related conditions

(such as job stress, social support, job dissatisfaction, shift schedules), and psychopathology (5). The quality of sleep has been found to be altered in hospital nurses working on rotating shift schedules, especially those working morning and night shifts (6) as well as in hospital nurses working shifts as compared to day nurses (7). A hospital-based survey on shift work, sleep, and accidents that was carried out among 635 Massachusetts nurses found that, in comparison to nurses working only day/evening shifts, those who rotated shifts experienced more sleep/wake cycle disruption and nodded off more at work (8). Barton's findings, in a study on British nurses, were similar but she found fewer sleep complaints reported among nurses working permanent night-shifts compared to rotating nurses (9). In summary the evidence from these studies indicates that rotating shifts, rather than working the same shift over time, has a negative effect on the quality of sleep.

The association between shift work and cardiovascular disease is considered particularly valuable as risk factors in the environment of shift workers can only be eliminated but not the shifts themselves (10). One of the risk factors found to be prevalent among shift workers is smoking (11). The first prospective data on the relation of shift work to risk of coronary heart disease came from the Nurses' Health Study, which was done on 79,109 American nurses who all worked rotating night shifts (12). The findings were compatible with the possibility that 6 or more years of shift work might increase the risk of coronary heart disease in women. In a review, published in 1999, of the literature on shift work, morbidity and mortality from cardiovascular disease, and changes in traditional risk factors among female nurses, 17 studies were found that had dealt with shift work and the risk of cardiovascular disease. Findings showed that shift workers were found to have a 40% increase in risk. The authors mentioned a number of causal mechanisms of this risk. Their

conclusion is that it probably is multifactorial and mention that the literature has focused on the behaviour of shift workers and has neglected other possible causal connections (10). Findings from Japan point in the same direction (13). In summary, the evidence provided by these studies indicates that disruption of circadian rhythm has some role in the development of heart diseases.

Study findings vary on the association between shift work and various physical and mental health indicators. A review on the effects of extended shifts on health outcomes found mixed results. Some of the studies identified reported a positive association and others a negative association (14). In examining the effect of 9 hour shifts on Dutch nurses health outcomes as compared to nurses working 8 hour shifts, Josten et al. found nurses working 9 hours to be more fatigued and reporting more health complaints (14). A study that examined the effect of shift work on the physical and mental depression of female nurses in five US hospitals found no significant association between physical and mental depression and shift work (15). Findings from the same sample showed, however, that nurses working rotating shifts experienced greater stress than those working fixed shifts. In particular, rotating shift nurses experienced the most job-related stress, followed in turn by the afternoon, day, and night shift nurses (2). A Japanese study that examined the short-term effects of shift work on mood changes in 1,608 female nurses working on rotating 3-shift schedules observed changes in subjective fatigue, activity and confusion, especially when shift changes occurred (16). The changes of mood were contingent on changes of sleep hours; however, since they were also observed after adjusting for the effect of sleep hours, the authors concluded that other factors than irregular sleep pattern affect the mood of nurses working rotating shifts. Another Japanese study that compared subjective symptoms experienced by nurses working 16 hour night shift and 8 hour

evening/night shifts did not find any difference between the two groups regarding symptom experience (17). The prevalence of symptoms was assessed in 258 Brazilian female hospital nurses who worked either nights or days. Main findings were that migraine, need of medical care during a 2 week period prior to the study and reports of mild emotional symptoms (mild depression, tension, anxiety, or insomnia) were less frequent among night nurses and ex-night nurses than nurses who had never worked nights. The authors suggest a possible role of exposure by day nurses to some risk factors, such as stress, in explanation of these findings (18). Another Brazilian study found nurses working two shifts to experience more psychological symptoms compared to nurses working the same shift always (19). A study that assessed the incidence of health complaints in 131 female Israeli nurses working rotating day/evening/night shifts found 39.7% of them to report job related stress. Additionally they found that 4.6% of their sample used hypnotics and 3.1% anxiolytics once or more a week. Over-the-counter antacids were used more than three times weekly by 19.1% of the rotating nurses (11). In summary, there is conflicting evidence regarding the association between shift work and mental and physical health outcome, though, as with sleep problems, rotation of shifts seems to have a more negative impact on symptoms than working the same shift continuously. Additionally, there is evidence in the literature towards less negative health outcomes among workers who can choose their own type of shifts or combination of shifts (14, 20.)

A number of factors have been suggested as possibly affecting the job satisfaction of nurses, the most common being over-work, stress and non-supportive work environment (21). The relationship between shift-work and job satisfaction has, however, not been studied in any detail. Study findings have been contradictory,

showing a positive relationship among nurses (22) and military police (23) and no relationship among nurses (24).

Mostly, the nurses' job is service related and performed indoors. Indoor environmental conditions have been associated with increased risk of non-specific, flu-like symptoms, such as headache, nausea, congestion, drowsiness, dizziness and general respiratory distress and impaired performance (25). Moreover, important features of the work environment include characteristics of the task itself (for example workload, pacing, deadlines and repetition), of the organization (such as decision control and job ambiguity), interpersonal relationships with co-workers and supervisors and physical and environmental hazards (26, 27). The influence of these factors has been studied among nurses. However, no studies were found that do so in a similar way as is done in this study that is comparing the effects of these factors on nurses working different combinations of shifts.

In Iceland, where this study took place, there are no published studies on the relationship between nurses shift work, their self-assessed health, quality of sleep, job satisfaction and working environment. There, the health service is primarily publicly financed and all citizens have national health insurance. Hence, most registered nurses are employed by the state or the communities. The health sector is regulated according to the Health Service Act of 1990, under which all inhabitants should have access to the best possible health service. Most of the health care service is divided into two major components: primary health care centres and hospitals. The primary health care centres are responsible for general health examination, community care, and home nursing as well as preventive measures, such as family planning, maternity care and child health care and school health care. Operations and procedures in all specialist medical fields are mostly performed at hospitals and are free of charge.

Apart from working at hospitals and community health care centres, nurses employed by the state work in institutions for the elderly and in rehabilitation centres (28). In the primary health care sector, excluding nursing homes, day shifts only are the most common work arrangement. The majority of nurses that work day shift only at hospitals work in outpatients clinics or hold administrative positions. At hospitals and nursing homes rotating shift schedules are more the norm in units that provide 24 hour service. The shifts are most often organized as 8 hours day shifts, 8 hours evening shifts and 9 hours night shifts, though other combinations, such as twelve hour shifts, are also in use. In this study the focus is on the combination of shifts rather than on their length. The study is a part of a larger study assessing health and working environment among female members of three occupations. The specific aim of this part of the study was to describe and compare the self-assessed quality of sleep, occupational health, working environment, illness experience and job satisfaction among female nurses working different combination of shifts.

## MATERIALS AND METHODS

### Sample and data collection

In April 2002, a questionnaire was mailed to a random sample of 600 female nurses drawn from the registry of the Icelandic Nurses' Association (INA) that totalled 2,312 working female nurses at the time. The sample included nurses working in hospitals, and primary health care centres, as well as those working in various other capacities within health care sector. In June a reminding phone call was made to all non-



respondents and in August the questionnaires were re-mailed to those who had not responded. The response rate was 65.7% (N=394).

### Ethical considerations

The study was approved by The National Bioethics Committee (VSN 01-26) and the Data Protection Agency was informed as required by the law. Along with the questionnaire, which did not have a number or code of any type, a numbered card of confirmation was posted. The participants returned the card together with the filled-in questionnaire and in the same envelope. A research assistant, who took care of the responses, removed the cards before any analyses were initiated to ensure that the questionnaires could not be traced. The assistant did not participate in any data analysis. This method was used in order to detect non-respondents and ease the procedure of re-posting the questionnaires.

### Instrument

Data were collected with a questionnaire called *Women's Health: A Questionnaire about Health, Well-Being and Working Conditions of Female Nurses/Cabin Crew/Teachers*. The questionnaire is divided into nine chapters: 1. Background and socio-demographic information (13-15 questions depending on the profession answering the questionnaire); 2. Reconciliation of work and family life (5 questions); 3. Health and lifestyle (17 questions); 4. Sleeping habits (19 questions); 5. Gynaecology and reproductive life (20 questions); 6. Health prevention, symptoms,

treatment (20 questions); 7. Work-related factors (5 questions); 8. Harassment in the workplace (7 questions) and 9. Working conditions (18 questions).

The questionnaire was based on a number of questionnaires that have been used in different studies in Iceland (29-33), as well as questions developed for this study specifically.

Different types or combinations of shift work were assessed with the question “What of the following describes your workday as it has been during last month?” Possible response were: “I only work during the day”, “I work days and evenings”, “I only work during the evening”, “I work days, evenings and nights”, “I work evening and nights”, “I only work during the night” and “Some other type of shifts” (see table 1).

Demographic variables assessed were age, length of nursing work experience, cohabitation, number of children under the age of 18 in the custody of the participant (no child (1); one child (2), two children (3), three children (4), four children or more (5)), and caring for aged parents/relatives (very little or not at all (1), rather little (2), somewhat (3), rather much (4), very much (5)) were assessed.

Quality of sleep was measured with five questions. Participants were asked how many hours they normally slept per day. Their self-perceived adequacy of length of sleep was assessed by asking if they felt they had slept too little (1), adequately (2) or too much (3). Finally, they were asked how often during the last six months they had: awakened due to heartbeat; used sleep medication or did not feel rested upon awakening. The possible responses were never (1), less than once a week (2), one or two times per week (3), three to five times per week (4) or daily (5).

Occupational health was assessed by using five symptoms scales (see Table 2) developed by the authors and based on work done by Mitchell, Woods & Lentz (34)

and Williams (35). The *Musculoskeletal scale* is composed of 5 symptoms, the *Stress and exhaustion scale* of 11 symptoms, the *Common cold scale* of 5 symptoms, the *Gastrointestinal scale* of 3 symptoms, and *Sound perception scale* of 2 symptoms. The internal consistency of the scales was good with Chronbach's  $\alpha$  ranging from 0.66 for the Sound perception scale to 0.82 for the *Musculoskeletal scale*. Participants were asked to answer as to each symptom if they had never (1), sometimes (2), often (3) or constantly (4) experienced the relative symptom during the last 12 months.

Working environment was measured by questions on the average total hours of work performed per day, control of work-pace, job security, the degree of physical monotony of the work, assistance from co-workers or patients in performing work, physical difficulty of the work, physical exhaustion after work and ability to work comfortably and the *Physical environment scale* developed by the authors based on work done by Kuorinka et al. (29) and Lindström et al. (32). Control of work-pace was addressed with a five faceted question with responses being rarely or never (5), seldom (4), sometimes (3), often (2), very often or always (1). Participants were asked how secure they were of their job with responses ranging from 1 to 4 with 1 indicating high security and 4 indicating low security. Degree of physical monotony/diversity of the work was assessed with responses being very diverse (1), rather diverse (2), rather monotonous (3) and highly monotonous (4). Assistance from co-workers or patients was addressed by the question "Do you consciously try to reduce physical strain at work by asking others, like other nurses or patients, to assist you?" Responses ranged from 1 to 4 with 1 indicating that they always ask for assistance and 4 that they never do. Ability to work comfortably was assessed by asking "Are the work arrangements such that you can work in comfortable work positions?" Responses were yes, mostly (1), yes to some extent (2), yes, but only to a very small extent (3), no, in no way (4).

Questions addressing physical difficulty of the work, physical exhaustion after work and ability to work comfortably were combined into one variable, labelled *Physically strenuous work* (Cronbach's  $\alpha$  was 0.70). Higher score on this variable indicates more strenuous work. *The Physical environment scale* consists of the following factors: stuffy air, dry air, high temperature, uncomfortable odour, close quarters, too much cold, static electricity, noise and draft. Participants were asked if any of the factors had caused them distress often (3), sometimes (2) or never (1) during the last month. Reliability analysis of this scale revealed a Cronbach's  $\alpha$  of 0.83.

The illness experience was assessed by three questions. Participants were asked "How often did you visit a physician during the last year?" and "How often were you away from work due to your own illness during last year?" Possible responses for these two questions were never (1), 1-3 times (2), 4-6 times (3), 7-11 times (4) and 12 times or more often (5). In the third question participants were asked "Have you, during the last 12 months, taken any of the following: anxiety medication, anti-depressants, sedatives, pain medication or medication for Asthma. Possible answers were yes and no.

Job satisfaction was measured by asking the participants to mark on a numerical scale from one to ten the number that best described their job satisfaction, with one indicating very unsatisfied and 10 very satisfied.

Finally participants were asked if they smoked. This was considered as one indicator of risk factors for cardiovascular disease. The other variable indirectly influencing cardiovascular diseases that were probed for was the aforementioned question on awakening due to heartbeat.

## Analysis

All calculations were done using SPSS 13.0. The data are presented as mean  $\pm$  standard deviation (SD). Differences between nurses working different types of shifts were calculated using analysis of variance for ordinal/continuous variables, and chi square test for categorical variables. Significance level was set at  $p < 0.05$ .

## RESULTS

### *Shift work*

Table 1 displays the distribution of participants according to shifts. As can be seen 88.8% of them work three combinations of shifts, that is only day shifts, rotating days/evenings shifts and rotating day/evening/night shifts. Due to the low number of nurses working only evening shifts, only night shifts and a rotation of evening and night shifts, it was decided to exclude them in all further analysis.

### INSERT TABLE 1

Therefore the analysis is based on nurses working only day shifts, a rotation of days/evenings shifts and rotating day/evening/night shifts. Table 2 shows the means, standard deviations and the outcome of the ANOVAs conducted to find differences between the three groups on the various variables, socio-demographics, symptom scales, illness experience, working environment, job satisfaction and quality of sleep.

### INSERT TABLE 2

### *Socio-demographics*

No differences were found between the groups regarding number of children under 18 in the participant's custody and in taking care of an elderly relative. However, nurses working rotating three shifts are significantly younger and have less work experience than nurses working the other two combinations of shifts (see Table 2). Fifty-seven of the participants (16.5%) lived alone while 288 were either married or cohabiting. A significantly higher proportion of those in cohabitation (50.0%) worked only day shifts as compared to those living alone (28.1%) ( $\chi^2(2) = 9.795$ ;  $p \leq 0.007$ ).

### *Quality of sleep*

As can be seen in Table 2 the participants did not report much disruption in the quality of sleep. No difference was found between the three groups of nurses on any of the variables measuring quality of sleep (Table 2).

### *Symptom scales*

In general, participants did not often experience symptoms, as reflected in their mean scores on the symptoms scales. However, the mean score of nurses working rotating day and evening shifts was higher on the Gastrointestinal symptom scale and Musculoskeletal symptom scale than among nurses working only days and rotating days/evenings/nights. This indicates that they experience more gastrointestinal and musculoskeletal discomfort compared to the others. No difference was found between the groups regarding the other three symptom scales (Table 2).

*Working environment*

There was a significant difference between the groups on five out of the seven variables that measured working environment. In all five instances, nurses who work rotating day, night and evening shifts differ from the others. Their mean score was higher on the Physical environment scale, the Physically strenuous work scale, the Work-pace variable and lower on the Physically monotonous work variable. This indicates that they find the environmental risk factors more stressful, their work more strenuous, that they are less able to control their work-pace and that they find their physical work more diverse. Additionally, nurses working rotating shifts report a longer working day (Table 2).

*Illness experience*

No difference was found between the groups regarding how often they visited a physician and how often they were absent from work during the last year (Table 2).. No difference was found in use of anxiolytics, depressives, sedatives and asthma medication, but a significantly lower proportion of nurses working day shifts only reported using pain-relievers (see Table 3).

INSERT Table 3

*Job satisfaction*

No difference was found between the three groups of nurses regarding job satisfaction (Table 2).

*Smoking*

The majority of participants (56%) had never smoked and 26% had stopped smoking for more than a year ago. Fourteen percent smoked with 8% smoking daily.

No difference was found between the groups of nurses regarding smoking ( $\chi^2(8) = 11,7; p=\text{n.s.}$ ).

## DISCUSSION

The findings of this first national study on the relationship between quality of sleep, self-assessed symptoms, working environment and shift work among Icelandic nurses do not strongly support a relationship between shift work and adverse health outcomes. In general, the main findings are firstly, that nurses working rotating night shifts experience their work environment differently from the other two groups and secondly, that working rotating day/evening shifts is associated with gastrointestinal and musculoskeletal symptoms. This supports previous propositions that disruption of the circadian rhythm per se is not the only factor that influences the well-being of shift nurses (3, 23). Other factors related to the work environment need to be considered.

The finding that nurses working rotating day/evening shifts differed from the others regarding gastrointestinal and musculoskeletal symptoms experience was surprising. Nothing was found in the literature that might explain this. However, a closer look at the Icelandic context provided a plausible explanation. The European Working Time Directive that is effective in Iceland states that all workers should have a minimum of 11 hour rest period between shifts. The working contract nurses have made with the state exempts them from the 11 hour rule at specific times like when changing from an evening shift to a morning shift. Nurses working day/evening shifts may therefore find themselves in situations where they finish their evening shift late and are required to be at work early the following morning. Thus, they may not function at their full potential due to tiredness which again may be reflected in their



higher scores on the Gastrointestinal and Musculoskeletal symptom scales.

Additionally, the work is organized in such a way that it demands more of individual workers working only days and evenings. In comparison, when nurses change from a morning shift to a night shift the tradition is for them to go home at noon, thereby fulfilling the 11 hour rest period requirement and providing them with adequate time to rest. Furthermore, nurses' working day/evening shifts are significantly older than those working the rotating three shifts. This is another factor that may contribute to their higher experience of symptoms.

No studies were found that compare the working environment and shift work in a similar way as is done in this study. The findings that nurses working rotating day/night/evening shifts found the environmental risk factors more stressful, their work more strenuous and had less control of their work-pace than the others, can most likely be explained by the different social working environment during different shifts. The number of nurses, as well as the number of supporting staff, working day-shifts and evening-shifts is higher than during night-shifts. Furthermore the organisation of nursing care during the day is different as compared to evenings and nights. Work-pace can also be better controlled during the day shifts as there is a higher number of staff attending to the tasks at hand. Finally this might reflect different working environment of nurses working in health care centers as compared to those working in hospitals.

Nurses working rotating day/evening/night shifts worked longer hours than the other two groups. Interestingly, this did not adversely affect their health outcome as measured in this study. However, they, as well as those working rotating day/evening shifts, used more pain medication than nurses working days only. Nurses working days only found their work more physically monotonous than the others. This is most

likely explained by different work assignments for nurses working in health care centers or holding administrative jobs as compared to nurses doing clinical work at hospitals.

The probability of an association between cardiovascular diseases and shift-work was simplistically assessed in this study. One variable measured a known risk factor (smoking) to cardiovascular disease, smoking, and another variable measured the subjective experience of night palpitations (awakening due to heart beat). Nevertheless, the findings do neither support previous findings regarding increased smoking among shift workers (11) nor the subjective experience of another indicator of cardiovascular disease, namely heart palpitations.

A single item measurement was used to assess job satisfaction. It was found to be quite satisfactory and no difference was revealed between the three groups. This is in accordance with previous findings on job satisfaction among Icelandic nurses (36, 37).

No association was found between quality of sleep and types of shift. This is somewhat in contrast to findings from other studies which have mainly shown that shift workers working rotating-shifts experience more disruptions of quality of sleep compared to workers working same shift continuously or working day shifts only (4, 6-9).

A review on the health effects of work schedules, including quality of sleep, in health care professions found no conclusive evidence to favour any particular work system (3). However, summary findings of the studies reviewed are in accordance with the guidelines issued by the European Foundation for the Improvement of Living & Working Conditions in 1990. These are listed here below:

1. Reduce night work as much as possible. If this is not possible, quickly rotating shift systems are preferable to slowly rotating ones.
2. Extended workdays (9-12 h) should only be contemplated when the nature of work and the workload are suitable for extended working hours, and the shift system is designed to minimize the accumulation of fatigue and toxic exposure is limited.
3. Avoid early (e.g. 06:00) start for the morning shift.
4. Avoid quick changeovers (e.g. from night shift to afternoon shift the same day).
5. Limit the number of consecutive working days to five to seven. Every shift system should include some free weekends with at least two consecutive days off.
6. Provide a forward rotation (phase delay, clockwise rotation: morning/evening/night shift) (3, p. 21).

These guidelines are in accordance with the general principles of safety and health at work that the Icelandic Act on Working Environment, Health and Safety in the Workplaces is based on (38). The scheduling system in Icelandic hospitals and nursing homes has for years been based upon these guidelines, excluding in most cases item 6. At the time of the study, head nurses were in charge of organising the shift schedule for nurses at their unit. By tradition they consider the personal choice of individual nurses as to their preferred combination of shifts. Additionally, in most places efforts are made so that nurses can have every other weekend off. Fixed schedules are and have been rare, though exact information on their prevalence is not available. The findings of this study indicate that in general the scheduling system in Icelandic health institutions is beneficial to nurses in consideration to their health.

At present, a new self-scheduling system has been introduced to the largest workplace of Icelandic nurses, the University hospital where over 50% of the total nurse workforce is employed, and an even higher percentage when only those working shift work are considered. The system, that uses the software ?WORKHOUR? provides for a user-friendly interface on the Internet. This self-scheduling system is offered as a choice to nurses, but traditional ways of scheduling are also applied. The system was introduced in January 2004 and a survey done in November 2004 found that 64% of all nursing shift workers used it (39). The effect of this new system on health outcome, job satisfaction, and other variables addressed here requires further attention.

## CONCLUSION

In general Icelandic nurses are satisfied with their work and their shift assignment does not seem to pathologically disrupt their circadian cycle. However nurses working rotating days/evening shifts report more severe symptoms as compared to the others. Nursing directors are therefore advised to look more closely at the organization of the work of nurses working these shifts as well as their rest period when changing from evening to day shifts.

Diversity of work schedules and flexibility in working time arrangement seem to be important factors regarding health outcome and shift work. The findings of this study indicate that this is the practice in Iceland and that choices of individual nurses regarding combination of their shifts are highly respected. Nevertheless, nurse directors are advised to look more closely at the organization of nurses' work during night-shifts, as well as the rest period for nurses changing from evening to day shifts.

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**Table 1.** What of the following describes your workday as it has been during the last month?

<b>Description of workday</b>	<b>N</b>	<b>%</b>
I only worked during the day	161	40.9
I worked days and evenings	86	21.8
I only worked during the evening	6	1.5
I worked days, evenings and nights	101	25.6
I worked evening and nights	2	0.5
I only work during the night	4	1.0
Some other type of shifts	34	8.6
Total	394	100