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Sleep, stress and compensatory behaviors in Australian nurses and midwives

Sono, estresse e comportamentos compensatórios por enfermeiras e parteiras australianas

ABSTRACT

OBJECTIVE: To describe sleep, stress and compensatory behaviors in nurses and midwives.

METHODS: The study included 41 midwives and 21 nurses working in Australian hospitals between 2005 and 2009. Participation was voluntary. All participants recorded on a daily basis their work and sleep hours, levels of stress and exhaustion, caffeine intake and use of sleep aids for a month (1,736 days, 1,002 work shifts).

RESULTS: Participants reported moderate to high levels of stress and exhaustion on 20-40% of work days; experienced sleep disruption on more than 50% of work days; struggled to remain awake on 27% of work days; and suffered extreme drowsiness or experienced a near accident while travelling home on 9% of workdays. Age, perceived sleep duration and work hours were significant predictors of caffeine intake. About 60% of participants reported using sleep aids (about 20% reported taking prescription medications and 44% of nurses and 9% of midwives reported alcohol use as a sleep aid at least once during the study). Stress and workdays were significant predictors of sedative use. Overall, 22% reported being indifferent or mildly dissatisfied with their job.

CONCLUSIONS: Sleep problems, high levels of stress and exhaustion and low job satisfaction are prevalent among nurses and midwives. The use of alcohol and sleeping pills as sleep aids, and the use of caffeine to help maintain alertness is also common. Nurses and midwives may use caffeine to compensate for reduced sleep, especially on workdays, and sleeping pills to cope with their daily work-related stress.

DESCRIPTORS: Nurses. Midwife. Physiological stress. Sleep disorders. Job burnout. Australia.

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RESUMO

OBJETIVO: Descrever sono, estresse e comportamentos compensatórios em enfermeiras e parteiras.

MÉTODOS: O estudo incluiu 41 enfermeiras 21 parteiras em hospitais australianos de 2005 a 2009. A participação foi voluntária. Os participantes registraram diariamente as horas de trabalho, sono, stress e níveis de exaustão, cafeína e uso de ajuda para dormir durante um mês (1.736 dias, 1.002 turnos).

RESULTADOS: Os participantes relataram de moderados a elevados níveis de stress e de exaustão em 20%-40% dos dias de trabalho; experimentaram distúrbios do sono em mais de 50% dos dias de trabalho; relataram esforço para permanecer acordado em 27% dos dias de trabalho; e sofreram sonolência extrema ou acidente perto de casa em 9% dos dias de trabalho. Idade, duração do sono percebida e jornadas foram preditores significativos da ingestão de cafeína. Aproximadamente 60% dos participantes relataram utilizar a ajuda para dormir: cerca de 20% relataram uso de medicação prescrita e 44% das enfermeiras e 9% das parteiras consumiam álcool como auxílio para dormir pelo menos uma vez durante o estudo. Estresse e dias de trabalho foram preditores significativos do uso de sedativos. Em geral, 22% relataram ser indiferente, ou ligeiramente insatisfeito com seu trabalho.

CONCLUSÕES: Problemas no sono, estresse e exaustão elevados e diminuição na satisfação no trabalho são prevalentes. São comuns o uso de álcool e de medicamentos para dormir, e consumo de cafeína para se manter alerta. Enfermeiras e parteiras parecem usar a cafeína para compensar a redução do sono, especialmente em dias de trabalho, e usar soníferos para compensar o estresse diário.

DESCRITORES: Enfermeiras. Obstetriz. Estresse Fisiológico. Transtornos do Sono. Esgotamento Profissional. Austrália.

INTRODUCTION

Shift work is typically associated with circadian disruption, reduced sleep, increased sleepiness, and in turn, compromised occupational health, safety and productivity.[2] Nurses in the United States (US) and Australia experience disrupted and reduced sleep, feel drowsy at work and while commuting home, and frequently report moderate to high levels of stress and exhaustion.[6,17,20,21] There are studies linking work hours, sleep, sleepiness and errors at work.[6,17] While literature outlining the negative effects of shift work in nursing is building,[15] little attention has been paid to midwives. Those few studies that included midwives also indicated negative implications of shift work, including tiredness and health problems.[4,9]

Stress and exhaustion can lead to job burnout (feelings of emotional exhaustion, depersonalization, and low personal accomplishment).[11] A large study (n = 43,000) across five countries found that more than 40% of nurses were experiencing high burnout.[1] Not only are interactions with patients and their families frequently emotionally intensive for nurses, but their schedules lead to increased energy required to maintain family and social relationships outside of work, leaving little emotional reserve.[15] The relationship between shift work and burnout in nursing has been shown particularly in irregular schedules, with associated reductions in reported work satisfaction.[15] Issues of stress and burnout in midwifery have also been well-established.[19]

Compensatory behaviors to cope with shift work-related circadian disruption, exhaustion and stress have been identified, including caffeine use to maintain alertness at work and consumption of alcohol and other sedatives/hypnotics to wind down from work and promote sleep.[10] Studies have suggested that shift workers consume more caffeine and alcohol and are more likely to use alcohol as a sleep aid than day workers.[16] However, this has not been consistently demonstrated.[12]

Caffeine has positive effects on alertness and performance at relatively low doses (3 mg/kg).[5] At moderate doses, caffeine is generally considered an effective fatigue countermeasure.[3] Repeated caffeine consumption is associated with tolerance. Trembling, tension, anxiety and sleeping problems arise when caffeine is taken in higher doses.[22] The negative consequences of

excessive alcohol consumption have been well-documented.[18] High consumption of caffeine and alcohol has been suggested as a reason for increased health problems in shift workers.[12]

Long and irregular work hours, sleepiness, exhaustion and stress may lead to potentially harmful compensatory behaviors such as high use of stimulants and sedatives and low job satisfaction.

The present study aimed to describe sleep, stress and compensatory behaviors in nurses and midwives.

METHODS

The study was conducted with 21 midwives and 41 nurses in two Australian metropolitan hospitals between 2005 and 2009. The participants completed daily logbooks for 28 days recording work hours, sleep, stress, exhaustion, caffeine and sedative use. Recruitment sessions were held in seven units (with 1–2 repeat sessions per unit). Sessions were organized with hospital directors of midwifery/nursing and unit managers. Twenty-three midwives and 45 nurses were willing to participate and were given an information package, of which 21 and 41 volunteered, respectively.

Participants completed demographic, general health and sleep questionnaires. The demographic questionnaire included an item asking participants to rate their job satisfaction level on a 5-point scale (highly satisfied; mildly satisfied; indifferent; mildly dissatisfied; highly dissatisfied). They completed two 14-day logbooks at approximately the same time each evening (around six pm). If they forgot to complete it on a particular day, they were asked to skip that page rather than complete a page from memory. The logbooks were designed to parallel a comparable United States study.[17,20,21]

The first two pages (single opening) were a sleep diary (completed every day) and a work diary (completed on workdays). This was followed by two pages (single opening) per day. The first page contained nine questions relating to sleep, sleep disruption, stress, exhaustion, caffeine and sedative intake, followed by the mood scale II[24] (data reported elsewhere[13]) and was completed every day. The second page contained 10 questions relating to work, breaks and errors, followed by the NASA Task Load Index workload scale[8] (data reported elsewhere[13]) and was completed on workdays. Information for each day took approximately 5–10 minutes to complete. Midwives were not compensated for their participation.

Logbooks for the nurses covered 28 consecutive days of data. Each page contained 27 questions relating to work hours, sleep and error rates, and took approximately five minutes to complete.

Nurses were compensated for their time at a rate of $5 per day.

Midwives were not compensated for their participation in the study, in contrast to nurses ($5 per day) due to a change in study funding.

Questions related to:

- Work hours: scheduled and actual hours worked.

- Self-reported sleep duration (for all sleep periods, including naps): time at which participants fell asleep and awakened. For each main sleep period, they recorded whether they had disrupted sleep.

- Stress/physical and mental exhaustion/sleepiness: They were asked to "circle a number from 1–5 indicating how strongly each word describes how you felt overall today" (1 = very, 2 = moderately, 3 = a little, 4 = slightly, 5 = not at all) and indicated whether they were struggling to stay awake during each shift. Participants recorded whether they experienced drowsiness (mild; moderate or extreme), and any accidents or near accidents while commuting home following each shift.

- Caffeine/sedatives: Caffeine consumption for each day (cups of coffee, cups of tea, milliliters of cola drink and grams of chocolate). They also recorded whether they used any sleep aids (prescription medication, non-prescription medication, alcohol or other).

A total of 1,736 days of data were collected, including 1,002 shifts. Shifts were classified as morning/day (start time: 0600–0900h), afternoon (start time: 1100–1700h), and night (start time 2000–2200h) shifts (Table).

Estimated grams of caffeine were calculated using coffee, tea, cola and chocolate intake based on caffeine content from Food Standards Australia New Zealand.[a] Since diaries did not distinguish between percolated or instant coffee, each recorded "cup" of coffee was coded as 80 mg, which is the upper limit for instant coffee (60–80 mg per 250 mL) and is in the lower range for percolated coffee (60–120 mg per 250 mL). The caffeine content for tea ranges from 10–50 mg per 250 mL cup. The caffeine content for chocolate is estimated at 20 mg per 100 mg bar. The caffeine content of Coca-Cola is 48.75 mg/375 mL can. However, the estimated caffeine content of cola drinks can vary from 32 mg to 54 mg/375 mL, which is the maximum allowable in Australia.[b] A conservative estimate of 36 mg/375 mL was used in the formula: coffee (cups) * 80 mg + tea (cups) * 45 mg + chocolate (g) * 0.20 g + cola (mL) * 0.096 mg.

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[a] Food Standards Australia New Zealand. Caffeine [cited 2010 Jan 28]. Available from: http://www.foodstandards.gov.au/consumerinformation/adviceforpregnantwomen/caffeine/
[b] Smith PF, Smith A, Miners J, McNeil J, Proudfoot A. Report from the Expert Working Group on the Safety Aspects of Dietary Caffeine. Canberra: Australia New Zealand Food Authority; 2000.

Mixed-effects ANOVA (random effect = subjectID) was used to investigate differences in stress, physical exhaustion, mental exhaustion and self-reported sleep duration according to workdays versus days off, group (midwives, nurses) and their interaction. Mixed-effects ANOVA was also used to investigate differences in these variables within workdays according to shift type (morning/day, afternoon, night). Models included covariates of age and body mass index (BMI) where significant.

Mixed-effects regression (random effect = subjectID) was used to investigate predictors of estimated caffeine intake (mg) per day. Predictors of sedative use per day (yes/no) were investigated using mixed-effects binary logistic regression. Initial models included predictors of group (midwives, nurses), age, BMI, prior 24-hour work history, stress, mental exhaustion, self-reported sleep duration and workdays versus days off. Physical exhaustion was not included in the models to avoid multicollinearity as there was a high correlation with mental exhaustion (r = 0.8). Final models included significant predictors only.

While data for all participants was included in all analyses (including figures), ANOVA and regression analyses only included shifts with a valid sleep history (at least 24 hours), leaving 306 shifts for midwives and 696 of shifts for nurses.

Mixed-effects binary logistic regression was also used to investigate predictors of job satisfaction (highly or mildly satisfied/indifferent or mildly dissatisfied). Models were constructed with added predictors of caffeine intake and sedative use.

Study approval was granted by the University of South Australia Human Research Ethics Committee and the ethics committees of the participating hospitals following the Declaration of Helsinki set of principles.

RESULTS

Nurses were significantly younger than midwives by a mean difference of eight years. Five percent of midwives were single compared to 27% of nurses; 57% of midwives and 20% of nurses had children living at home (Table).

The majority of nurses were full-time workers (85%) and all worked at least 0.8 of full-time work hours. In contrast, the midwives were predominantly part-time workers (67%). Nurses work hours per 24-hour period were significantly longer (p<0.01). Midwives worked a lower proportion of night shifts than nurses (19% compared to 43%).

The majority of midwives (62%) and nurses (54%) reported that they napped sometimes or frequently. None of the participants reported napping during work time and most napping occurred prior to night shifts and on days off.

Mean perceived sleep duration was 0.5–1 h lower on workdays (nurses = 7.9; SD = 2.6 h; midwives = 6.5; SD = 2.1 h) compared to days off (nurses = 8.7; SD = 2.5h; midwives = 7.1 SD = 1.9 h). Differences were significant between workdays and days off ($F_{1,1516.1} = 40.36$, p<0.01), and between nurses and midwives ($F_{1,60.5} = 26.09$, p<0.01), with no significant workday/day off x group interaction. Stress ($F_{1,1541.6} = 93.73$, p<0.01), physical exhaustion ($F_{1,1537.3} = 32.67$, p<0.01) and mental exhaustion ($F_{1,1531.2} = 79.43$, p<0.01) were significantly higher on workdays compared to days off, with no significant effects of group or workday/day off x group interactions (Figure 1).

On workdays, there was a significant effect of shift type ($F_{2,519.1} = 35.89$, p<0.01) and nurses versus midwives ($F_{1,66.67} = 21.29$, p<0.01) on sleep, with no significant shift type x group interaction. There was a significant effect of shift type on stress ($F_{2,716.3} = 6.11$, p<0.01), physical exhaustion ($F_{2,699.4} = 19.19$, p<0.01) and mental exhaustion ($F_{2,493.6} = 15.63$, p<0.01), with no significant effects of group or shift type x group interactions. Afternoon shifts were associated with significantly (p<0.05) more sleep and less exhaustion compared to morning and night shifts. Stress ratings were significantly (p<0.05) higher on morning shifts compared to afternoon and nights (Figure 2).

Participants frequently reported moderate to high levels of stress and exhaustion (20%-40% of workdays), sleep disruption (more than 50% of workdays), struggling to stay awake (16%-32% of workdays), and extreme drowsiness or near accident while commuting home (6%-11% of workdays) (Figure 3). Of these variables, percentages were significantly higher for nurses for stress ($\chi_1^2 = 4.2$, p<0.05), physical exhaustion ($\chi_1^2 = 12.01$, p<0.01), mental exhaustion ($\chi_1^2 = 8.37$, p<0.01), struggling to stay awake ($\chi_1^2 = 28.81$, p<0.01) and extreme drowsiness or near accident while commuting home ($\chi_1^2 = 6.68$, p<0.01).

Caffeine consumption occurred on 90% of shifts (Figure 3). Eighty-one percent of midwives and 93% of nurses reported caffeine intake (Figure 4). Caffeine intake was 100 mg or less (37%), 100–200 mg (25%), 200–300 mg (18%), 300–400 mg (11%), 400–500 mg (5%) and greater than 500 mg (3%) of days. Age (coeff: 4.80, 95%CI: 1.94;7.65, z=3.30, p=0.001) sleep duration (coeff: –2.95, 95%CI: –4.94;–0.95, z= –2.89, p= 0.004) and workdays versus days off (coeff: 15.21, 95%CI: 6.41;24.01, z=3.39, p= 0.001) were significant predictors of caffeine intake, such that older age, reduced sleep and being at work were associated with increased intake (χ^2_3: 36.50, p<0.001).

Participants over 40 consumed on average more than twice as much caffeine as those below 40: 216.87 mg

**Table.** Summary table for demographics and work hours variables. Australia, 2005–2009.

Variable	Midwives	Nurses	Total	Group Sig.
N	21	41	62	-
Gender (male)	2	7	9	-
Age (y)	44.1 (11.4)	36.3 (11.3)	38.9 (11.9)	$F_{1,60} = 6.57^a$
Body mass index (kg/m²)	26.6 (6.3)	25.9 (5.8)	26.2 (6.0)	$F_{1,50} = 0.15$
Midwife/nurse (y)	16.5 (11.2)	12.1 (10.0)	13.6 (10.6)	$F_{1,60} = 2.41$
Commute time (min)	21.9 (8.8)	19.4 (11.8)	20.2 (10.8)	$F_{1,60} = 0.74$
Job status (%)				
Full-time	33	85	67	-
Part-time	67	10	30	-
Agency	0	5	3	-
Marital status (%)				
Partner	76	61	66	-
Separated/divorced	19	12	15	-
Single	5	27	19	-
Partner work status (%)				
Full time	76	59	66	-
Part time	12	19	16	-
Not working	12	22	18	-
Children living with you (%)	57	20	32	-
Naps frequently or sometimes (%)	62	54	56	-
Work hours				
24-h work history	4.11 (4.21)	8.91 (1.35)	6.71 (3.86)	$F_{1,44}.1 = 4.39^b$
28-day work history (%)	53	62	59	-
Morning/day (%)	52	34	40	-
Afternoon (%)	26	23	25	-
Night (%)	19	43	35	-

[a] Univariate ANOVA indicates a significant difference, $p<0.05$
[b] Mixed-effects ANOVA indicates a significant difference, $p<0.01$

(SD: 6.24 mg, $n_{\%:}$ 52%) compared to 107.10 mg (SD: 3.56 mg, $n_{\%:}$ 48%) per day, and had a 10-fold increase in the odds of consuming more than 300 mg (OR: 10.19, 95%CI: 1.56;66.53, z=2.43, $p<0.05$). On nights where less than 8-hour sleep was reported, participants consumed on average 196.6 mg (SD: 5.55 mg, $n_{\%}$: 57%) compared to 124.26 mg (SD: 4.91 mg, $n_{\%}$: 43%) when more than 8-hour sleep was reported, and had a
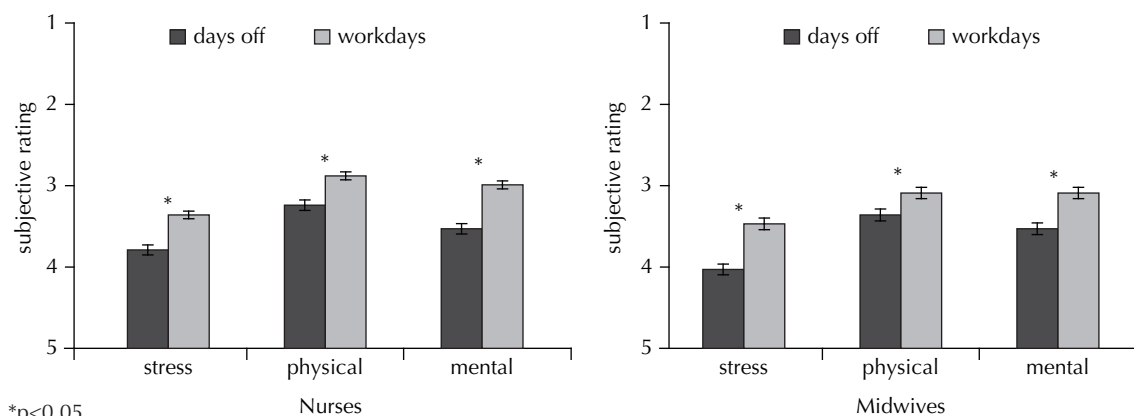
Figure 1. Mean (SE) stress and physical and mental exhaustion ratings (1=very, 5=not at all) on days off compared to workdays. Australia, 2005–2009.
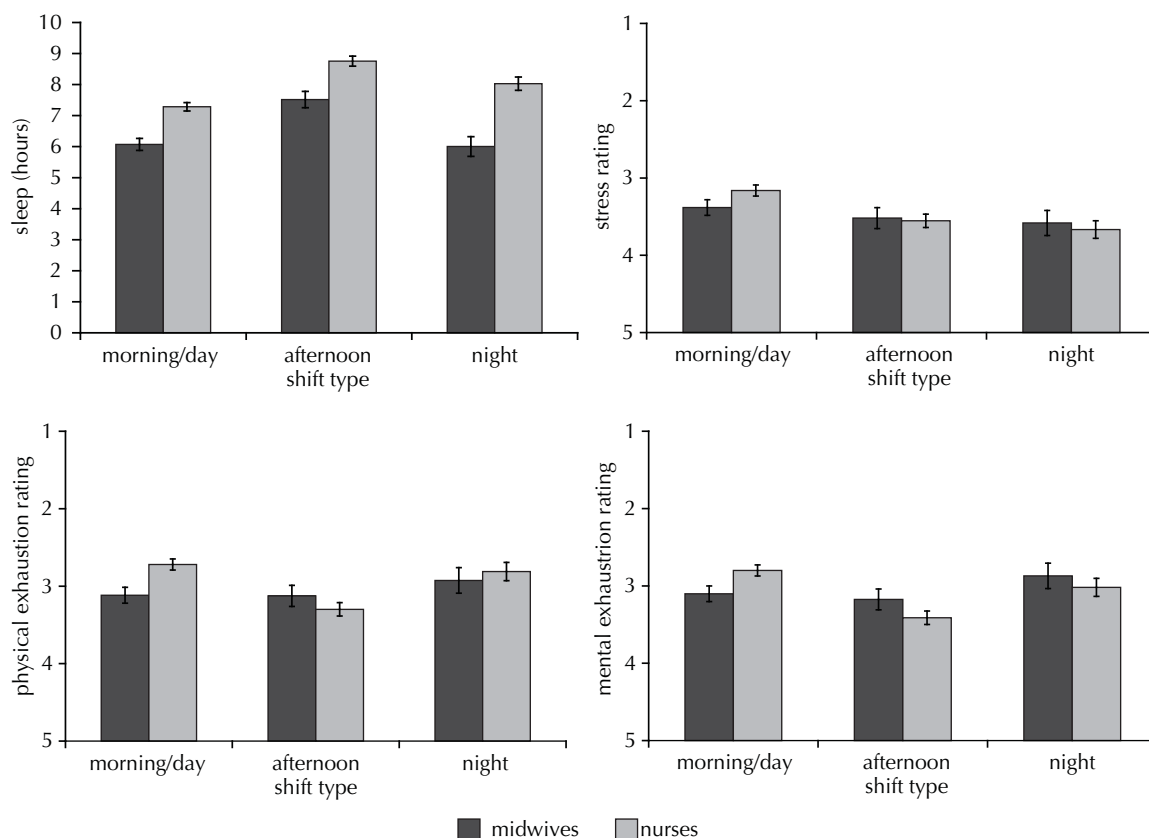
Figure 2. Mean (SE) stress and physical and mental exhaustion ratings (1=very, 5=not at all) for each shift type (morning/day, afternoon, night). Australia, 2005–2009.

2.4-fold increase in the odds of consuming more than 300 mg (OR: 2.35, 95%CI:1.45;3.84, z=3.44, p<0.01). On workdays, participants consumed on average 178.19 mg (SD: 5.20 mg, $n_{\%:}$ 41%) compared to 167.98 mg (SD: 6.13 mg, $n_{\%:}$ 59%) on days off.

Participants consumed most caffeine on night shifts (m: 203.53 mg, SD: 16.17 mg), followed by morning (m: 177.99 mg, SD: 6.91 mg), then afternoon shifts (m: 167.70 mg, SD: 9.11 mg). After controlling for age (coeff: 5.75, 95%CI: 2.82;8.69, z=3.84, p<0.001), there was a significant difference between night (coeff: 19.72, 95%CI: 0.85;38.59, z=2.05, p=0.04) and morning shifts (coeff: 14.56, 95%CI: 1.25;27.87, z=2.14, p=0.032) compared to afternoons.

Approximately 60% of participants reported sleep aid use, with about 20% using prescription medication at least once during the study. Forty-four percent of nurses and 9% of midwives reported using alcohol as a sleep aid at least once during the study (Figure 4). Age (OR: 1.10, 95%CI: 1.01;1.20, z=2.31, p=0.021), BMI (OR: 0.81, 95%CI: 0.67;0.98, z=−2.12, p=0.034), group (nurses vs. midwives: OR: 9.72, 95%CI: 1.32;71.32, z=2.24, p=0.025), work history in the prior 24 h (OR: 0.81, 95%CI: 0.67;0.98 z=−2.19, p=0.029), stress ratings (OR: 1.29, 95%CI: 1.01;1.66 z=2.00, p=0.045)

and workdays compared to days off (OR: 10.05, 95%CI: 2.02;50.03, z=2.82, p=0.005) were significant predictors of sedative use (χ^2_6=20.83, p=–0.002). After controlling for age, BMI and 24-hour work history, nurses had nearly a 10-fold increase in the odds of taking sedatives than midwives, every 1-point increase on the stress scale was associated with a 29% increase in the odds of using a sedative and being at work was associated with a 10-fold increase in the odds of sedative use. Within workdays, stress remained a significant predictor of sedative use (p<0.05).

Fourteen to 27% of participants reported being either indifferent to, or mildly unsatisfied with their job (Figure 4). No relationships were found between job dissatisfaction and sleep, stress, exhaustion, caffeine intake or sedative use.

DISCUSSION

Disrupted sleep, high levels of stress and exhaustion, and low job satisfaction are prevalent among Australian nurses and midwives. Caffeine is used to compensate for reduced sleep, particularly on workdays, and sleep aids are used to compensate for daily stress. Sleep aid use was more frequent on workdays and more common among nurses than midwives.
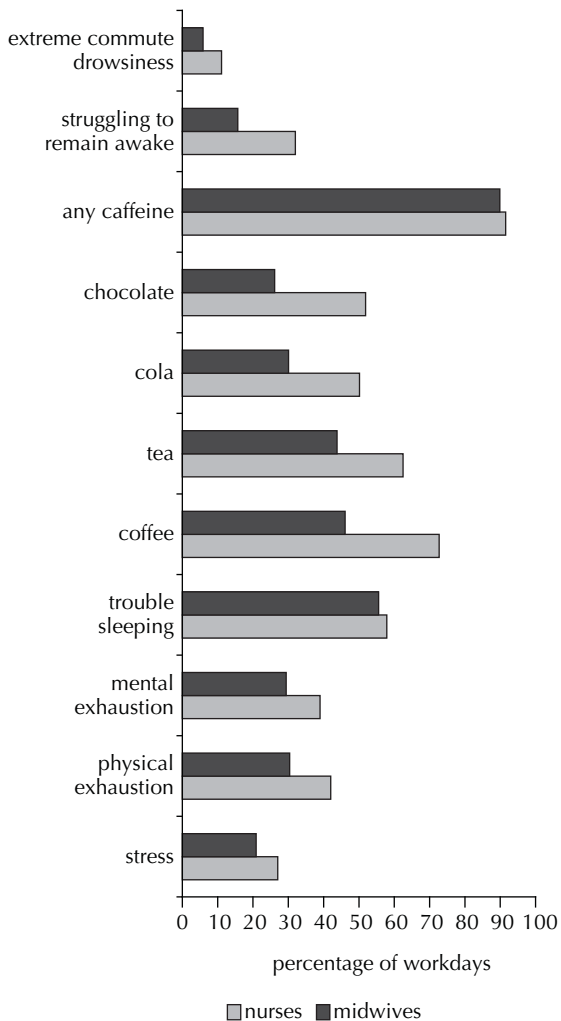
Figure 3. Percentage of workdays where participants reported drowsiness, caffeine use, trouble sleeping, exhaustion and stress. Australia, 2005–2009.

Figure 4. Percentage of participants who reported indifference or mild job dissatisfaction and consumption of sleep aids and caffeine. Australia, 2005–2009.

Perceived sleep duration on workdays was 6.5 h for midwives and 7.9 h for nurses. These findings are consistent with studies in other shift working populations indicating an average of approximately 7-hours sleep on workdays.[23] In line with previous literature,[7] on average, sleep was reduced by 30–60 min on workdays compared to days off. It is likely, therefore, that study participants were accruing a sleep debt across workdays and compensating with longer sleep durations on days off. This idea is further supported by the fact that the majority of participants reported supplementing main sleep periods with naps. In support of previous findings,[7] sleep was reduced on morning/day and night shifts relative to afternoon shifts.

On average, midwives reported more than one hour less sleep than nurses. The main difference in terms of demographic variables collected was for age, with midwives being on average 8 years older. Sleep differences could reflect a difference in sleep patterns with
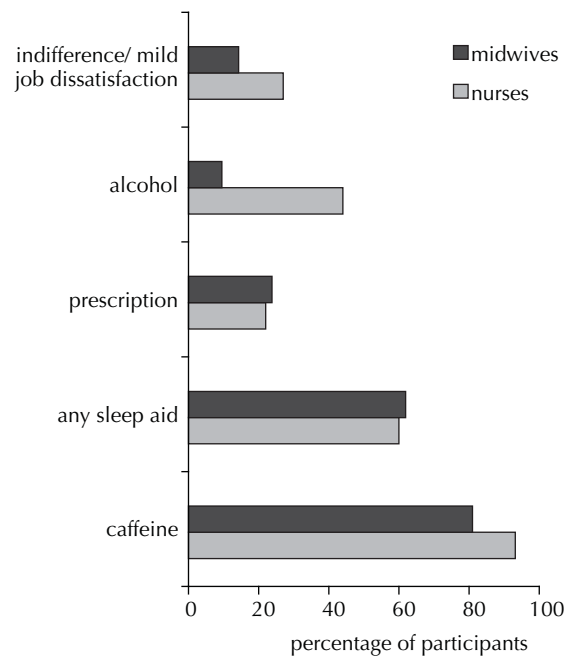
age. Since this data is based on subjective reports, data could simply reflect differences in perception between groups. The differences may reflect increased difficulties in coping with shift work with age.[9] However, nurses who were younger reported higher stress, physical and mental exhaustion, struggling to stay awake and extreme drowsiness. This study is more consistent with research suggesting that older, more experienced shift workers have developed strategies to better cope with the negative impact of their schedules,[14] and/or that only those who cope well continue working in shift work.

High levels of sleepiness and exhaustion were frequently reported by participants, strengthening the idea that participants were not achieving adequate sleep on workdays. Stress and exhaustion were significantly higher on workdays than days off and morning/day and night shifts were more stressful and exhausting than afternoon shifts. Participants reported struggling to stay awake at work with similar frequency to a large United States study of critical care nurses (20% of shifts).[20] In another study, this same United States group also found that 16% of nurses reported accidents or near accidents while commuting home from work.[21] While this is higher than in the current Australian study (3%), reports of extreme drowsiness or near accident did occur on approximately one in 10 shifts. This is of operational concern.

There was a high degree of caffeine use in various forms, particularly on night shifts. One in five days was associated with a caffeine intake conservatively estimated at

greater than 300 mg. Such doses have been associated with increased anxiety in certain individuals.[22] Being older, and having less than 8-hour sleep significantly increased the odds of consuming caffeine in such amounts. One participant consumed more than 1,000 mg of caffeine on three days during the study. This level of ingestion has been identified in caffeinism.[22]

It should be considered whether this caffeine use represents a habit (which may be a general adaptation strategy to cope with shift work) or if it is more of a dynamic compensatory behavior in response to sleep fluctuations. In other words, do participants ingest similar amounts each day, or will they have more on days following reduced sleep? Caffeine was consumed nearly every workday and caffeine levels were higher on workdays and were predicted by sleep duration, such that higher sleep durations were associated with reduced caffeine intake. This appears to support both ideas. Caffeine use may broadly represent a general shift work-related strategy and the amount consumed a specific dynamic compensation strategy for sleep loss. There is also an indication of increased use with age. This warrants further investigation since increased caffeine use has not been consistently shown in shift work.[22] If we understand why, how and when shift workers use caffeine and if it is indeed a contributor to health issues in these groups (and maybe even adding to sleep disturbance) this knowledge may be applied in promoting health awareness and reducing health problems for shift workers.

More than half of the participants reported use of sleep aids. One in four participants reported using prescription sleep aids at least once during the study. While some authors have made general recommendations against hypnotic use, others argue that strategic use can be beneficial.[25] The sleep aid use reflects the fact that sleep-related issues are frequent in this group, at levels severe enough to result in visits to doctors with medication prescribed. After controlling for age, BMI and 24-hour work history, nurses had increased odds of using sleep aids compared to midwives, and being at work and reporting increased stress were associated with increased use. Furthermore, one in three study participants reported using alcohol as a sleep aid. The harmful consequences of excessive alcohol consumption have been well-established.[18] We did not collect details of the amount of alcohol taken to aid sleep. This would have allowed us to investigate whether

participants were observing healthy alcohol intake directions in Australia (less than two standard drinks per day), as exceeding these, particularly for women, has been associated with negative health outcomes.[c]

Several study limitations should be noted. Sleep data were self-reported. More details about use of alcohol and sedatives would have been of benefit, including amount taken and motives for consumption (especially whether motives were work- or non-work-related). While the study yielded sufficient details of caffeine ingestion to estimate total caffeine intake, the values were based on conservative estimates for the caffeine content of a cup of coffee or tea, milliliters of cola and grams of chocolate. Since cup size and content can vary, future studies would profit from increased detail (e.g., type of coffee: instant, brewed, filtered, cup size). Specific monitoring (weighing/measuring) food and drinks containing caffeine would be preferable. A more detailed measure of job satisfaction would have been useful. The absence of a clear relationship between job dissatisfaction and sleep, stress, exhaustion, caffeine intake and sedative use could be due to the lack of sensitivity of the measure. The comparably small sample size should be acknowledged. While the longitudinal design results in relatively high study power, 62 participants were involved. As nurses and midwives with sleep-related issues may have been more likely to volunteer for a study conducted by sleep researchers, results are not necessarily a reliable indicator of the prevalence of caffeine and sedative use. Nevertheless, even if data from these participants provide an overestimation of prevalence, it is still likely that sampling health care professionals will result in a cohort experiencing these issues within each hospital.

This cohort frequently report reduced sleep, stress and exhaustion. Use of caffeine and sleep aids, particularly alcohol, appears common, in levels that may not be optimal for health.[12] Furthermore, one in four participants reported being indifferent to or mildly dissatisfied with their job. Therefore, this group of midwives and nurses may be at risk of "burnout".[1,11,19] Given current discussion regarding shift worker health and the problems with recruitment and retention of health care professionals in Australia and around the world[d] knowledge regarding the relationship between work hours, sleep loss, sleepiness, exhaustion, stress, compensatory behaviors and job dissatisfaction is of critical importance. Advocating for strategic choice of, and use of stimulants and sleep aids, in appropriate amounts, could improve shift worker health.

[c] Ministerial Council on Drug Strategy. National Alcohol Strategy 2006–2009: towards safer drinking cultures. Perth: Commonwealth of Australia; 2006. (Publication Approval, 3900)
[d] Schemack M, Turner C, Brooks P, Moloney B. A review of the Nursing Workforce in Australia. Melbourne: Australian Health Workforce Institute; 2009.

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