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Mood Change and Perception of Workload in Australian Midwives

Jessica L. PATERSON[1]*, Jillian DORRIAN[1], Jan PINCOMBE[2], Carol GRECH[2] and Drew DAWSON[1]

[1]Centre for Sleep Research, School of Psychology, Social Work and Social Policy, University of South Australia, Adelaide, SA 5001, Australia

[2]School of Nursing and Midwifery, University of South Australia, Adelaide, Australia

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Abstract: Investigations of mood and workload in health care settings have focussed primarily on nurses and junior doctors. Given the critical shortfall in the Australian midwifery workforce, and the specialised nature of midwifery as an occupation, it is important to understand how mood and workload are experienced by midwives. Twenty midwives (18F, 2M) in an Australian metropolitan hospital completed logbooks assessing daily fluctuations in subjective mood and workload. Participants also provided information about history of psychopathology and sleep quality. Results revealed that midwives were relatively stable in terms of mood but did experience increased fear and decreased happiness when at work. Further, workload factors significantly predicted mood at work. Specifically, when participants felt that their work was more demanding and frustrating and required more effort, or when they felt that they could not accomplish all that was expected, mood was negatively influenced. This supports the connection between workload and negative mood change in healthcare. Given the potential for mood to influence a multitude of functions relevant to safety, performance and psychosocial wellbeing it is important to understand the factors which influence mood, particularly in light of the current shortfall in the Australian healthcare workforce.

Key words: Shift work, Midwifery, Mood, Workload, Sleep

Introduction

Mood has been demonstrated to influence many factors important to shift work. Positive mood has been associated with increased helpfulness[1)], behaviour related judgments[2)] and expectations of success[3)]. In contrast, negative mood can increase self-defeating behaviour[4)], perceptions of vulnerability to illness and intensity of health complaints[5)], decrease job satisfaction[6–8)] and increase the probability of making an error[3)]. The impact of negative mood on behaviour and cognition is intensified by sleep loss[9)], as experienced frequently by shift workers.

The dangers of shift work are well recognised. The health care industry in particular has been the focus of numerous investigations given its reliance on shift work schedules and the potential consequences of these schedules for health care workers and patient safety[10)]. The chronic sleep disruption experienced by this group of shift workers has demonstrated consequences for cognitive efficiency[11)], incidence of errors and near-misses[10, 12)] and drowsiness whilst travelling to and from work[13)]. In their meta-analytic review of laboratory studies, Pilcher and Huffcutt[14)] identified mood to be more affected by sleep loss than either cognitive or motor performance. However, detailed investigations of mood change in health care populations are rare and have primarily focussed on the experiences of nurses and junior doctors.

Existing research investigating mood change has identified the shift work schedules of nurses to be associated with increased stress[12, 15)], confusion[16)] and general mood disturbance[16, 17)]. Nurses also reportedly

*To whom correspondence should be addressed.
E-mail: jessica.paterson@unisa.edu.au

experience increased emotional trauma and depression as a result of daily exposure to illness and death[18]. Evidently, the sleep loss associated with nurses' working time combined with aspects of their workload can have significant negative consequences for mood. More specifically though, there is evidence that within nursing practice sources of distress differ according to role. Tyler and Ellison[19] found that within high-dependency nursing, oncology nurses experienced a majority of work-related stress from patient death in comparison to theatre nurses whose primary concerns related to materials, funding and management organisation. It is clear then that the generalisation of findings from nursing studies is limited not only within different departments of nursing, but most importantly for the present study, in its application to a midwife population. While it has been identified that midwives face unique challenges in regard to burnout[20] and sources of emotion at work[21, 22], the mood experiences of midwives are yet to be systematically addressed.

Investigations into the possible relationship between workload and mood for midwives are also limited. Within the health care industry, and nursing in particular, workload has been demonstrated as a significant contributor to occupational stress[23, 24]. Psychological demand, as a dimension of workload, has been shown to have a significant effect on sleep quality and the recovery value of sleep and to therefore be highly predictive of maladaptive stress and fatigue at work[25]. It has been acknowledged that nursing staff shortages and cutbacks may have significant consequences for nurses' workload and consequent stress[26], however this is yet to be addressed comprehensively in nursing and specifically in midwifery; a workforce facing similar problems.

In the most recent report issued by the Australian Institute of Health and Welfare, midwives are still included in the classification for registered nurses[27]. As discussed above, generalisations even within areas of nursing can be problematic and it is likely that given the highly specialised nature of midwifery, midwives experiences at work require independent consideration. This seems especially important now, a time when the Australian midwifery workforce is experiencing a critical shortfall[28] and the rate of natural increase in the Australian population is comparable to the post World War II baby boom of the 50's and 60's[29]. Concerningly, the average age of midwives is also increasing. In 1999 the average age was 40.7 yr[28], in 2004 it was 43.8 yr[27]. In 2008, only 12% of South Australia's registered nurses and midwives were less than 30 yr old[30]. When considering the reasons why midwifery is struggling to attract new members, the nature of shift work should not be underestimated. Whilst the average numbers of hours worked per week for midwives is 28.7 (part-time), for many midwives these hours are not during the 'typical' working day[27], usually including a combination of morning, evening and night shifts. In light of what is known about the negative effect of such shift work schedules on mood in other shiftworking populations, and the detrimental effect of negative mood on performance and behaviour, it is important to understand how mood fluctuates during work time for midwives. Further, an understanding of how midwives perceive their workload at a time of critical shortfall may be valuable when seeking to address issues of recruitment and retention. The present study will be the first to examine the relationships between shift work and mood in a sample of midwives, and also the first to look at the effect of workload on mood within this specialised workforce.

Subjects and Methods

Participants

Twenty midwives (18F, 2M; 44.5yr ± 11.5yr) were recruited from an Australian metropolitan hospital. Seven of the participants were full time midwives (av. 38.6 h p.w.), the remaining 13 participants were part time (av. 29.4 h p.w.). Participants had an average of 22.6 yr experience in shift work, and 17.7 yr experience in midwifery. Table 1 shows an example of a 'typical' roster for a part-time midwife who works a shift rotation including morning shifts (start time: 6:00–9:00), evening shifts (start time: 11:00–17:00) and night shifts (start time: 20:00–22:00).

Measures

Mood Scale II

The Mood Scale II is part of the Walter Reed Performance Assessment Battery (PAB). The individual is presented with 36 mood related adjectives and asked to respond on a 3-point Likert scale (1- not at all, 2-somewhat/sometimes, 3-mostly/generally) indicating their experience of that particular mood or emotion during a specified time period. These adjectives each load on to a total of six mood dimensions including activation, happiness, depression, anger, fatigue and fear (see Table 2). The scale takes approximately two minutes to complete. The PAB was developed in order to examine changes in mental states over time, particularly in field settings or during sleep disturbance. The Mood Scale II in particular is ideal for field research due to its brevity and sensitivity to mood fluctuations[31].

NASA Task Load Index (NASA-TLX)

The NASA-TLX is a multi-dimensional measure of

Table 1. Typical roster of a midwife working a combination of morning, afternoon and night shifts

Study Day	Start Date	Scheduled Start Time	Actual Start Time	End Date	Scheduled End Time	Actual End Time	Shift Length	Shift Type
1	2-Mar	07:00	07:00	2–Mar	15:30	15:30	8 h 30 m	Morning
2	3-Mar	–	–	–	–	–	–	–
3	4-Mar	–	–	–	–	–	–	–
4	5-Mar	21:00	21:00	6–Mar	07:30	07:40	10 h 40 m	Night
5	6-Mar	21:00	21:00	7–Mar	07:30	07:30	10 h 30 m	Night
6	7-Mar	–	–	–	–	–	–	–
7	8-Mar	–	–	–	–	–	–	–
8	9-Mar	–	–	–	–	–	–	–
9	10-Mar	–	–	–	–	–	–	–
10	11-Mar	–	–	–	–	–	–	–
11	12-Mar	21:00	21:00	13–Mar	07:30	07:30	10 h 30 m	Night
12	13-Mar	21:00	21:00	14–Mar	07:30	07:30	10 h 30 m	Night
13	14-Mar	–	–	–	–	–	–	–
14	15-Mar	–	–	–	–	–	–	–
15	16-Mar	13:00	13:00	16–Mar	21:30	21:30	8 h 30 m	Afternoon
16	17-Mar	07:00	07:00	17–Mar	15:30	15:30	8 h 30 m	Morning
17	18-Mar	–	–	–	–	–	–	–
18	19-Mar	–	–	–	–	–	–	–
19	20-Mar	13:00	13:00	20–Mar	21:30	21:45	8 h 45 m	Afternoon
20	21-Mar	07:00	07:00	21–Mar	15:30	13:30	6 h 30 m	Morning
21	22-Mar	07:00	07:00	22–Mar	15:30	14:30	7 h 30 m	Morning
22	23-Mar	–	–	–	–	–	–	–
23	24-Mar	–	–	–	–	–	–	–
24	25-Mar	–	–	–	–	–	–	–
25	26-Mar	13:00	13:00	26–Mar	21:30	21:45	8 h 45 m	Afternoon
26	27-Mar	–	–	–	–	–	–	–
27	28-Mar	–	–	–	–	–	–	–
28	29-Mar	13:00	13:00	29–Mar	21:30	21:30	8 h 30 m	Afternoon

Table 2. Mood adjectives, dimensions and response scale of the Mood Scale II

Activation	Happiness	Depression	Anger	Fatigue	Fear
Energetic	Good	Miserable	Grouchy	Inactive	Uneasy
Lively	Contented	Blue	Mean	Weary	Alarmed
Alert	Satisfied	Depressed	Annoyed	Lazy	Insecure
Cheerful	Calm	Sad	Angry	Drowsy	Afraid
Vigorous	Pleased	Downcast	Burned Up	Sluggish	Jittery
Active	Happy	Low	Irritated		Hopeless
	Steady				

1–Not at all,
2–Somewhat/Sometimes,
3–Mostly/Generally.

workload. Participants initially rate their experience of workload based on six workload factors (15 pairwise comparisons rated in terms of importance). The NASA-TLX rating exercise can be completed over repeated occasions with participants indicating their daily experience of each workload factor during the day (100 point scale in increments of five: low to high and good to poor). These ratings of daily workload are interpreted relative to the weight each individual previously assigned to the workload factors. Table 3 presents the workload factors and the question related to each factor (completed daily). The NASA-TLX provides an overall workload score, as well as scores for each individual workload factor. The weighting exercise takes approximately two minutes to complete and is only completed once. The rating exercise also takes approximately

Table 3. Workload factors and questions from the NASA-TLX

Workload factor	Definition
Mental Demand	How much mental and perceptual activity was required (e.g., thinking, deciding, calculating, remembering, looking, searching, etc.)? Was the task easy or demanding, simple or complex, exacting or forgiving?
Physical Demand	How much physical activity was required (e.g., pushing, pulling, turning, controlling, activating, etc.)? Was the task easy or demanding, slow or brisk, slack or strenuous, restful or laborious?
Time Demand	How much time pressure did you feel due to the rate or pace at which the tasks or task elements occurred? Was the pace slow and leisurely or rapid and frantic?
Effort	How hard did you have to work (mentally and physically) to accomplish your level of performance?
Performance	How successful do you think you were in accomplishing the goals of the task set by the experimenter (or yourself)? How satisfied were you with your performance in accomplishing these goals?
Frustration Level	How insecure, discouraged, irritated, stressed and annoyed versus secure, gratified, content, relaxed and complacent did you feel during the task?

two minutes to complete and is usually completed at the end of a work period. The NASA-TLX has been demonstrated as a valid measure of subjective workload in field studies[32, 33] and is the most commonly used measure for assessing workload[34]. Further, the NASA-TLX has been used across a wide range of occupations, including the rail industry[35], aviation[32] and nursing[26].

Procedure

Ethical clearance was granted for this study by the University of South Australia Human Research Ethics Committee, and the ethics committee of the participating hospital. Participants attended a study information session where they were given an information sheet detailing the requirements of the study. Participants were encouraged to contact the research team should they wish to take part in the study, and if they did so were given a study consent form. Once written, informed consent had been received from the participant they could begin the study. Prior to commencing the study, participants completed a demographic questionnaire which included questions about work history, living situation, cultural demographics and the NASA-TLX weighting exercise. Participants also completed a General Health Questionnaire (GHQ) to determine if they had any significant health problems, specifically sleep or mood disorders. Following this, participants completed a daily logbook for 28 consecutive days which included sleep and work diaries. Logbooks were standard A4 size (210 × 297 mm) and spiral bound with one day per opening. The first two pages of the logbook were composed of sleep and work diaries, to be completed every day. Every opening of the logbook thereafter consisted of nine questions to be completed every day (regarding subjective sleep and fatigue, caffeine consumption and use of sleep aids) and the Mood Scale II to assess mood change. On work days participants also answered a second set of 11 questions addressing work hours, errors, overtime, transportation and drowsiness or accidents whilst travelling to and from work. The NASA-TLX subjective workload measure was also completed on work days.

Statistical Analysis

Data were missing randomly throughout the final data set and thus mood analyses are based on 264 d off and 288 work days. Analyses of workload alone and workload and mood together are based on 279 work days (workload task not completed on days off). Shifts were classified as morning shifts (start time: 6:00–9:00), afternoon shifts (start time: 11:00–17:00), and night shifts (start time 20:00–22:00).

Descriptive analyses were used to indicate the proportions of the total sample that had experienced depression or anxiety, trouble falling asleep or moderate to high stress and the frequency of these experiences. Descriptive analyses were also used to compare subjective mood on work days and days off, and also to investigate perceived importance of workload factors. Descriptions of mood data are based on occasions when a participant indicated feeling a certain mood or emotion 'mostly or generally' during the preceding day. Descriptions of workload data are based on occasions when a participant indicated experiencing a high degree (>70%) of each factor.

Mixed effects Regression (random effect=participant) was used to investigate predictors of mood change on work days. Initial models included predictors of age, prior 24 h work history, prior 24 h self-reported sleep length, shift type and workload factors. Years of experience in shift work and years of experience in midwifery were not included in the models to avoid multicollinear-

ity issues as preliminary correlation analysis indicated a strong relationship between both of these variables and age (both r=≤0.8). Final models (reported in the results section) include significant predictors (p<0.05) only.

Results

The final data set included 279–288 work days and 264 non-work days (543 total d). Of the 288 work days sampled 48.6% were afternoon shifts, 26.7% were morning shifts and 19.7% were night shifts (4.8% missing data). Thirty percent of the total sample (six participants) indicated suffering from depression at some time in their life, half of these participants also reported experiencing chronic anxiety. Difficulty falling asleep was reported on approximately 27% of sleep periods, and this finding was consistent regardless of whether the preceding day was a work day or a non-work day. Moderate to high levels of stress were reported on 20% of all work days compared to only 11% of non-work days.

Mood on work days and days off

Although descriptive data suggested participants were relatively stable across work and non-work days in terms of mood (see Table 4), mixed effects ANOVA revealed a significant increase in happiness ($F(1,533.36)=4.36$, p<0.05) and decrease in fear ($F(1,532.96)=9.89$, p<0.001) on days off compared to work days. More specifically, participants reported feeling calm and contented (two components of the happiness measure) on 61–65% of non-work days, compared to 51–55% of work days (respectively). Figure 1 presents average mood ratings for each subscale on work days and days off.

Differences in mood according to shift type

Mixed effects ANOVA identified significant differences in activation ($F(2,248.5)=9.43$, p<0.001) and fatigue ($F(2,218.96)=9.2$, p<0.001) between shift types. Post-hoc analyses revealed that night shifts were associated with decreases in activation, compared to both afternoon (mean difference=–0.40) and morning shifts (mean difference=–0.47). Similarly night shifts were also associated with increases in fatigue compared to both afternoon (mean difference=0.39) and morning shifts (mean difference=0.42). Figure 2 presents average mood ratings for each subscale and shift type.

Perception and experience of workload

When participants were asked to indicate the importance of each workload factor relative to their typical daily work experience, performance (classified as success in achieving daily goals) emerged as the most important factor, with participants choosing this factor on approximately 28% of opportunities. Mental demand (e.g. thinking, deciding, calculating etc), time demand (e.g. time pressure to complete tasks) and effort (mental and physical exertion required to complete tasks) were roughly equivalent as the next most important factors (20%, 19%, 18%). Physical demand (e.g. pushing, pulling, turning etc) and frustration (i.e. feeling insecure, discouraged, stressed etc) were only selected as important to daily work experience on 8% and 5% of possible opportunities (respectively).

Log book data indicated that on approximately 46%

Table 4. Rankings and percentage of work days and days off participants reported experiencing certain mood states

Rank	Mood dimension	Work days	Days off
1	Happiness	55.27%	59.68%
2	Activation	42.41%	39.33%
3	Fatigue	8.96%	9.09%
4	Anger	2.75%	2.71%
5	Depression	1.43%	1.95%
6	Fear	1.03%	1.45%

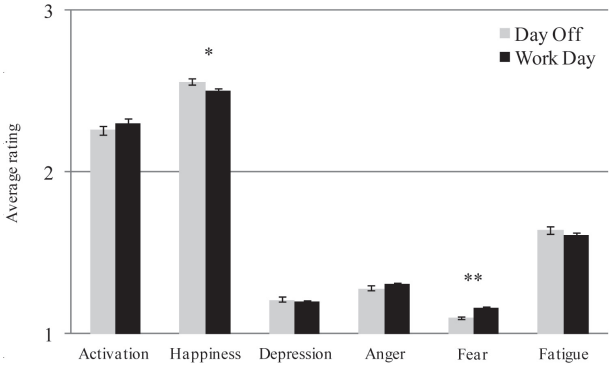

Fig. 1. Average mood ratings across workdays and days off.
*p<0.05, **p<0.005.

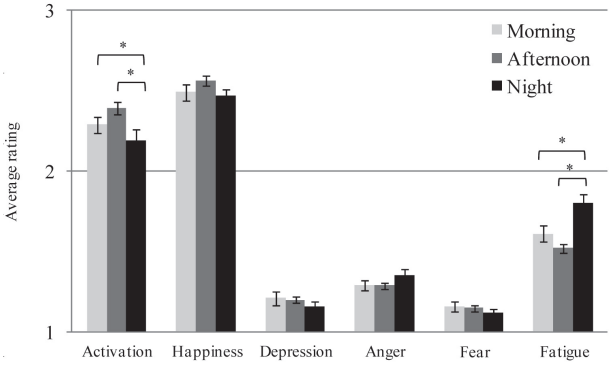

Fig. 2. Average mood ratings across shift type.
*p<0.05.

Table 5. Rankings and percentages for workload factors based on perceived importance and actual self-reported daily experience

Rank	Weighted importance factor	Percentage	Daily experience factor	Percentage
1	Performance	28.66%	Performance	70.83%
2	Mental Demand	20.66%	Mental Demand	46.18%
3	Time Demand	19.00%	Effort	45.83%
4	Effort	18.66%	Time Demand	42.70%
5	Physical Demand	8.00%	Physical Demand	32.29%
6	Frustration	5.00%	Frustration	13.54%

of work days high levels of mental demand and effort were required. High levels of time demand and physical demand were experienced on 42% and 32% of work days (respectively). High levels of frustration were experienced on 13% of all work days and high performance demand was experienced on only 3% of work days. Table 5 presents the ranked percentages of perceived importance of workload factors compared to self-reported daily experience of workload factors (based on the daily rating exercise of the NASA-TLX). Percentages for weighted importance are based on the number of times that a participant chose this workload factor over any other workload factor. Percentages for daily experience are based on the number of times that a participant reported experiencing high levels (>70%) of this workload factor. This table demonstrates that the aspects of workload that midwives perceive as important to their daily work experience (weighted importance) and relatively in line with the aspects of workload that they routinely experience (daily experience).

Differences in workload according to shift type

Mixed effects ANOVA revealed no significant differences in workload factors across shift type. Similarly, no significant differences were identified in overall workload (weighted and unweighted) across shift type. Figure 3 presents average workload factor ratings for morning, afternoon and evening shifts.

The relationship between workload and mood

There was a significant effect of shift type, performance and effort on activation ratings, such that night shifts, decreased performance demand and increases in effort were associated with decreased activation ($p<0.05$). Increased performance demand and frustration level were significant predictors of increased depression ($p<0.05$). Increased frustration was also a significant predictor of increased anger ratings ($p<0.001$) and increased fear ratings ($p<0.001$). Finally, there was a significant effect of shift type, recent sleep history (sleep in the prior 24 h), performance and time demand on

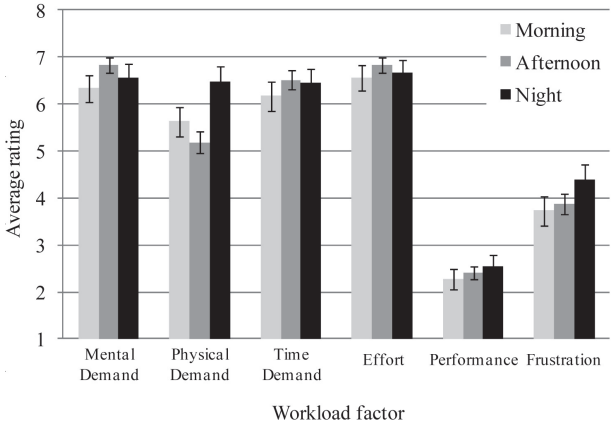

Fig. 3. Average workload ratings across shift type.

fatigue ratings. In this way, night shifts, lower levels of prior sleep, decreases in time demand and increases in performance demand were associated with increased fatigue ($p<0.05$). In the case of both fatigue and activation, night shifts were associated with the most substantial impairments in these aspects of mood, followed by morning shifts and finally, afternoon shifts ($p<0.05$). Table 6 presents the overall findings of the mixed effects regression, including df, f and p values.

Discussion

Overall, midwives were relatively consistent in terms of mood, and reported stable levels of positive mood (happiness and activation) and comparatively low levels of negative mood (anger, depression, fear and fatigue). Days off were characterised by significantly higher levels of happiness and lower levels of fear, compared to work days. The increased happiness noted on days off compared to work days may not represent job dissatisfaction but rather a universal preference for non-work days. Interestingly, there was a significant decrease in fear on days off and moderate to high levels of stress were reported on twice as many workdays (20%) as days off. The Mood Scale II uses adjectives such

Table 6. Results of mixed effects regression to predict mood on work days

		df	F
Activation	Shift Type	2,240.9	9.04***
	Performance	1,260.6	16.91**
	Effort	1,193.2	4.99*
Depression	Performance	1,287.9	5.98*
	Frustration	1,187.5	13.7***
Anger	Frustration	1,110.1	26.0***
Fear	Frustration	1,210.8	11.0*
Fatigue	Shift Type	1,105.0	5.56**
	Sleep24	1,224.7	5.59*
	Performance	1,234.1	7.32**
	Time Demand	1,105.0	5.56*

*p<0.05, **p<0.01, ***p<0.001.

as 'insecure', 'afraid' and 'alarmed' to quantify fear. Taken this way, increases in fear reports on workdays might reflect work-related stress associated with demand and responsibility. The findings are generally in line with previous studies in nursing demonstrating an increase in stress on workdays relative to days off[12, 15].

Analysis revealed that midwives rated successful performance as the most important workload factor of their job. Following this, mental demand, time demand and effort were the next most important factors. Physical exertion and frustration, annoyance or insecurity at work were perceived as relatively unimportant to typical experience of workload. It is apparent, based on these rankings, that midwifery is perceived as a relatively high pressure occupation, likely on account of the consequences of error or poor performance for patient safety. Indeed, existing research has acknowledged that health care workers face unique challenges given that the consequences of error in health care settings may pose a direct threat to public safety[36].

Lower amounts of sleep in the previous 24 h and night shifts were both significant predictors of increased fatigue. Night shifts and increases in effort required to achieve satisfactory performance were associated with significantly reduced activation. These findings are consistent with our current knowledge of reductions in sleep and increases in fatigue frequently associated with night shifts[15, 37]. Perceptions of workload did not differ significantly with shift type. Notably, during night shifts, decreases in the pace of the work shift (time demands) and increases in the perception of performance demand were associated with increased fatigue. This is in line with conceptions of fatigue, which is influenced by prior sleep, time spent at work, time awake[38] and workload[39]. Consistent with midwives' rating of performance as the most important workload factor, perceptions of poor performance predicted mood change in three of the six mood dimensions assessed; activation depression, and fatigue. In turn, frustration was perceived as the least important workload factor for midwives. Increased frustration was a significant predictor of increased depression, anger, and fear. Taken together, when participants felt that their work was more demanding, frustrating and required more effort, mood was negatively influenced. This supports the connection between workload and negative mood change in healthcare[23–26] in this midwife cohort.

Several study limitations should be acknowledged. As previously discussed, the 'Fear' subscale of the Mood Scale II does not directly address the conventional idea of fear. The adjectives that participants respond to (i.e. uneasy, alarmed, hopeless) share themes more related to commonly understood ideas of insecurity or uncertainty. This does not limit the validity of the findings, but rather creates confusion when discussing the changes in fear identified in the present study. Renaming the fear scale in a way that more directly reflects the items that compose it, for example 'unease', may help address this issue. Moreover, the three-point scale of this instrument possibly results in a lack of sensitivity, which should be considered in further research.

In addition, the present study only used participants from one South Australian metropolitan hospital. It is conceivable that given the subjective nature of the measures used there may be factors specific to this hospital which influenced responses. As such, this study is currently being replicated in a sample of midwives at different hospital. Conducting similar investigations in different hospitals will provide converging evidence relating to the link between shift work, workload and mood in healthcare.

Summary

Based on the findings of the present study, it is clear that there are significant negative consequences for mood associated with a) work days b) night shifts and c) workload. Midwives report feeling more stressed, fearful and less happy when at work and experience elevated fatigue and diminished activation during night shifts. This study is the first to begin to map complexity of the relationships between perception of workload and subjective mood in a sample of midwives. Given the potential for mood to influence a multitude of functions relevant to safety, performance and psychosocial wellbeing it is important to understand the factors which influence mood, particularly if we are to effectively deal with the current shortfall in the Australian midwifery

workforce.

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