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Psychosocial Job Strain and Musculoskeletal Pain in Cabin Crew – Does Gender Matter?

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ABSTRACT

Objective: To investigate possible gender differences in psychosocial job strain (PSYJS) and single and multi-site musculoskeletal pain (MSP) in cabin crew.

Background: In recent years the proportion of male cabin crew has increased, still few studies have investigated gender differences in PSYJS and MSP in this occupational group.

Methods: In this cross-sectional study, a questionnaire concerning work-related psychosocial demands, control, social support, and MSP was answered by 107 male and 329 female cabin crew members from the three major airline companies in Norway. Binary logistic regression models were used for the analysis.

Results: There were no gender differences in PSYJS, but female cabin crew reported higher levels of social support from colleagues ($p = .001$) and nearest supervisor ($p = .006$). Multi-site MSP was reported by 70%. No gender differences in prevalence of single-site or multi-site MSP were found, except from a higher prevalence of pain in feet in female cabin crew ($p = .020$). Both a high strain (33%) and a passive (17%) work situation were associated with significantly higher risks of most single and multi-site MSP.

Conclusion: Even though few gender differences were found, both male and female cabin crew reported high prevalence of MSP and high PSYJS. Attention should be given to create a healthier psychosocial work environment for this occupational group, with a special emphasis on support at work for male cabin crew.

Introduction

In the past few decades, the airline industry has been through major changes influencing the job situation of aircrew members (Pettersen & Bjørnskau, 2015). An increased competition has led to longer flights, increased passenger loads, less time between flights and increased security demands (McNeely et al., 2014; Pettersen & Bjørnskau, 2015). Due to different kind of changes in work situation, cabin crew are exposed to high levels of psychosocial work factors like time pressure, shift work, emotional display rules, and aggression and harassment from passengers (Chen & Chen, 2012; Lee et al., 2015). Furthermore, cabin crew have reported high levels of work-related stress (Omholt et al., 2017). In the recent years, there has also been a change in the demographic characteristics of flight attendants, with an increasing proportion of male cabin crew (Population Reference Bureau, n.d.).

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Cabin crew are working in a high-risk environment for developing health problems such as sleep disorders, headaches, low back pain, gastrointestinal complaints, and fatigue (McNeely et al., 2014; Omholt et al., 2017; van den Berg et al., 2019). A commonly reported health problem in earlier studies of female cabin crew is musculoskeletal pain (MSP) (Lee et al., 2006; McNeely et al., 2014). Haugli et al. (1994) reported that female cabin crew showed higher levels of pain in neck, shoulders and ankles or feet, compared with male cabin crew. This is in line with a substantial literature documenting higher prevalence of MSP in women generally (Barbosa et al., 2013; Indregard et al., 2013; Wijnhoven et al., 2006). Gender differences in MSP are suggested to be associated with differences in working conditions and job status (Barbosa et al., 2013; Wijnhoven et al., 2006). Even though male and female cabin crew have the same work tasks and conditions, they might have different experiences of their physical and psychosocial work environment, and this could lead to differences in MSP.

Several studies have documented PSYJS to be associated with MSP (Lang et al., 2012; Larsen et al., 2019). A commonly used model to explain how psychosocial factors affect MSP is the Job Demand Control Model (Karasek & Theorell, 1990; Larsen et al., 2019). The JDC model hypothesize that a high strain job, e.g., high psychological demands and low control, could lead to MSP. A passive job characterized by low demands and low control could also have a negative influence on MSP. A low strain job, experiencing low demands and high control would not influence MSP. Experiencing high psychological demands, but at the same time high control, would be described as an active job. An active job could be associated with less MSP, health promotion, learning and development according to the JDC model (Karasek & Theorell, 1990). Later social support was added to the model as a third dimension, postulating that high social support could buffer high strain work situations (Karasek & Theorell, 1990). The JDC model is supported by several studies investigating MSP in wage-earners in general (Larsen et al., 2019; Vanroelen et al., 2009), as well as in cabin crew (Lee et al., 2008; Wahlstedt et al., 2010).

Recently, several studies have shown the importance of considering multi-site pain when investigating the association between PSYJS and MSP, as pain seldom occurs in just one anatomical site (Christensen et al., 2018; Kamaleri et al., 2008). An earlier study of MSP in female flight attendants showed that pain was often widespread and tended to involve more than one body region (Lee et al., 2006). As there is limited knowledge about PSYJS and MSP in male cabin crew, the aim of this study was to investigate possible gender differences in these factors.

Materials and Methods

In this cross-sectional study, 2512 unionized cabin crew members employed in the three major airlines operating from Norway were invited to answer an electronically distributed questionnaire in 2013. The respondents answered anonymously and 427 cabin crew (17%) completed the questionnaire. The sample consisted of 320 female (75%) and 107 male (25%) cabin crew.

The questionnaire contained questions about gender, age, and work-related factors such as employment status, work experience, and types of airlines.

MSP was measured with the subjective health complaint inventory (SHC) (Eriksen et al., 1999). This inventory lists 29 common health complaints to be rated on a four-point scale as

experienced last 30 days (0 = not at all, 1 = a little, 2 = some, 3 = severe). For the purpose of this study, only pain in 6 body sites (neck, shoulders, arms, upper and low back, and feet) were included. The items were dichotomized into "no complaints" (not at all) and "pain" (a little, some, severe). A variable measuring multi-site pain was also constructed by counting pain sites reported (0–6) and dichotomized into no multi-site pain (<2 pain sites) and multi-site pain (≥ 2 pain sites) (Christensen et al., 2018).

PSYJS and support at work were measured by seven questions from the General Nordic questionnaire for psychological and social factors at work (QPSnordic 34+) (Dallner et al., 2000). Quantitative demands were measured through two questions: *Is your workload irregular so that the work pile up?* and *Do you have too much to do?* Control was measured by two questions: *Can you influence the amount of work assigned to you?* and *Can you set your own work pace?* Further, support by nearest supervisor was measured through two questions: *If needed, can you get support and help with your work from your immediate superior?* and *Are your achievements appreciated by your immediate superior?* Support from colleagues was measured through a single question: *If needed, can you get support and help with your work from your co-workers?* The responses were all rated on a five-point scale (1 = never/very rarely, 2 = quite rarely, 3 = sometimes, 4 = quite often, 5 = very often/always). Mean scores for quantitative demands (2 items) and control (2 items) were constructed, and the scores were then dichotomized into low/high by using the population median (quantitative demands = 2.5, control = 2.0) (Wahlstedt et al., 2010). A variable for PSYJS was constructed with four categories: Low strain (low demands/high control), active (high demands/high control), passive (low demands/low control), and high strain (low control, high demands). A mean score for support by nearest supervisor (2 items) was calculated, and the two support variables were dichotomized into low/high by using median (support from nearest supervisor = 2.5, support from colleagues = 4.0).

Statistical Analyses

All statistics were processed using JMP Pro 13.0.0 version and SPSS version 25.0. The prevalence of single-site (no pain/pain) and multi-site MSP (<2 sites/≥2 sites) for men and women were calculated. Group differences between men and women were tested with chi-squared tests. Binary logistic regression models between variables and the different MSP were conducted, and odds ratios (OR) and 95% confidence intervals (CI) were calculated. Nagelkerke R Square was used to estimate the explained variance of the models (Pallant, 2010). Due to the relatively small sample size of male cabin crew and because there were very few significant gender differences in MSP and PSYJS found, the analyses were not stratified by gender, but tested on the total population. Gender was instead included in the models as a predictor variable. Age and airline company were also included in the models as potential confounders.

Ethical Considerations

Informed consent was obtained electronically from each respondent. The project was approved by the Regional Committees for Medical and Health Research Ethics in Norway [2013/404].

Results

Most of the cabin crew were between 31 to 50 years old, and there were significantly more female cabin crew in the youngest and the oldest age groups (Table 1). Nearly all the respondents were permanently employed, and most had work experience in aviation of more than five years. The larger part of the cabin crew operated on European flights (Table 1).

There were no significant gender differences in the reported levels of PSYJS (Table 2). Of the respondents, 24% experienced a low strain, 26% an active, 17% a passive, and 33% a high strain job situation. Significantly higher percentages of female cabin crew reported high support at work from colleagues (83%) and nearest supervisor (63%), compared to male cabin crew (69 and 48% respectively) (Table 2).

There were no gender differences in the prevalence of MSP, except for a significantly higher prevalence of pain in feet reported by female cabin crew (Table 3). The most frequently reported pain sites were neck pain, shoulder pain, and low back pain, and more than half of the cabin crew had experienced such pain during the last 30 days (Table 3). Only 16% reported no pain site, 14% reported one pain site, and multi-site pain (≥2 pain sites) was reported by 70% of the participants (Table 3).

Experiencing a high strain situation was significantly associated with a higher risk for reporting pain in neck (OR = 3.38), shoulder (OR = 2.42), arm (OR = 1.99), upper back (OR = 2.85), low back (OR = 2.84), and multi-site pain (OR = 2.36) compared with a low strain situation (Table 4). A passive work situation was also significantly associated with a higher risk for reporting neck pain (OR = 2.06), upper back (OR = 2.23), low back pain (OR = 2.19), and multi-site pain (OR = 2.04)(Table 4). There were no significant associations between support at work from colleagues or nearest supervisor and MSP. In the models, gender was only found to be associated with a higher risk of pain in feet. The models explained between 7 to 10% of the variance in pain (Table 4).

Table 1. Individual characteristics of study group.

	Total N = 427 n (%)	Men N = 107 n (%)	Women N = 320 n (%)	P-value
Age				
<30 years	110 (26)	22 (21)	88 (28)	0.027
31–40	144 (34)	44 (41)	100 (31)	
41–50	118 (28)	34 (32)	84 (26)	
>50	55 (13)	7 (7)	48 (15)	
Employment status[a]				
Permanent	409 (97)	104 (98)	305 (97)	0.585
Temporary	11 (3)	2 (2)	9 (3)	
Work experience[b]				
≤ 5 years	119 (28)	30 (28)	89 (28)	0.589
6–10	90 (21)	25 (23)	65 (20)	
11–19	134 (32)	36 (34)	98 (31)	
≥ 20	82 (19)	16(15)	66 (21)	
Type of airlines[c]				
Scandinavian	31 (7)	3 (3)	28 (9)	0.074
European	328 (78)	84 (79)	244 (77)	
Intercontinental	64 (15)	20 (19)	44 (14)	

[a]Missing: N = 7, [b]Missing: N = 2, [c]Missing: N = 4

Table 2. Psychosocial job strain and support at work among cabin crew participants.

	Total N = 427 n (%)	Men N = 107 n (%)	Women N = 320 n (%)	P-value
PSYJS[1,a]				
Low strain	103 (24)	28 (26)	75 (24)	0.833
Active	113 (26)	29 (27)	84 (26)	
Passive	71 (17)	19 (18)	52 (16)	
High strain	138 (33)	31 (29)	107 (34)	
Support at work (colleagues)[b]				
Low	86 (20)	33 (31)	53 (17)	0.001
High	336 (80)	73 (69)	263 (83)	
Support at work (supervisor)[c]				
Low	172 (41)	55 (52)	117 (37)	0.006
High	252 (59)	51 (48)	201 (63)	

[1]Low strain (low demands, high control); active (high demands, high control); passive (low demands, low control); high strain (high demands, low control)
[a]Missing: N = 2, [b]Missing: N = 5, [c]Missing: N = 3

Table 3. Prevalence of musculoskeletal pain and number of pain sites.

	Total N = 427 n (%)	Men N = 107 n (%)	Women N = 320 n (%)	P-value
Pain sites				
Neck	246 (58)	62 (59)	184 (58)	0.989
Shoulders	228 (54)	58 (55)	170 (54)	0.797
Arms	137 (33)	33 (32)	104 (33)	0.824
Upper back	187 (45)	47 (45)	140 (45)	0.996
Low back	221 (53)	56 (53)	165 (53)	0.984
Feet	180 (43)	35 (33)	145 (46)	0.020
Number of pain sites				
0	68 (16)	20 (19)	48 (15)	0.867
1	61 (14)	14 (13)	47 (15)	
2	70 (16)	16 (15)	54 (17)	
3	57 (13)	14 (13)	43 (13)	
4	70 (16)	21 (20)	49 (15)	
5	59 (14)	13 (12)	46 (14)	
6	42 (10)	9 (8)	33 (10)	

Discussion

Based on earlier research, the hypothesis of this study was that female gender crew would report higher levels of MSP and PSYJS than male cabin crew. Although female cabin crew reported significantly higher prevalence of pain in feet and support at work compared to male cabin crew, no other differences in MSP and PSYJS were found. The prevalence of MSP was high in both gender groups, and multi-site pain was common. Experiencing a high strain job situation was significantly associated with pain in neck, shoulder, arm, upper back, low back, and multi-site MSP compared with a low strain situation. A passive work situation was also significantly associated with reporting pain in neck, upper back, low back, and multi-site MSP.

The air crew members reported a high prevalence of MSP, as in earlier studies (Lee et al., 2006, 2008). A high prevalence of 70% of multi-site MSP was reported, higher than earlier found in the general Norwegian working population (65%) (Christensen et al., 2018). This should be noticed, as number of pain sites is a strong predictor for future work ability, sick leave, and disability pension (Haukka et al., 2013; Neupane et al., 2011).

Table 4. Binary logistic regression models[a] between psychosocial job strain, support at work, and musculoskeletal pain in cabin crew participants (N = 427).

	Neck (r^2 = 0.086) OR (95%CI)	*Shoulder* (r^2 = 0.068) OR (95%CI)	*Arm* (r^2 = 0.095) OR (95%CI)	*Upper back* (r^2 = 0.068) OR (95%CI)
Gender				
Men	1	1	1	1
Women	1.03 (0.64–1.66)	0.98 (0.61–1.57)	1.15 (0.69–1.92)	1.06 (0.66–1.70)
PSYJS				
Low strain	1	1	1	1
Active	1.65 (0.94–2.91)	1.53 (0.87–2.69)	1.06 (0.56–2.02)	1.48 (0.83–2.66)
Passive	2.06 (1.09–3.90)*	1.67 (0.88–3.14)	0.94 (0.45–1.97)	2.23 (1.17–4.26)*
High strain	3.38 (1.86–6.17)***	2.42 (1.35–4.34)**	1.99 (1.06–3.75)*	2.85 (1.57–5.17)***
Support at work (colleagues)				
Low	1	1	1	1
High	1.20 (0.70–2.06)	1.26 (0.75–2.14)	0.74 (0.43–1.29)	1.07 (0.63–1.83)
Support at work (supervisor)				
Low	1	1	1	1
High	0.96 (0.60–1.54)	1.03 (0.65–1.64)	0.88 (0.54–1.44)	0.94 (0.59–1.51)

	Low back (r^2 = 0.088) OR (95%CI)	*Feet* (r^2 = 0.088) OR (95%CI)	*Multi-site*[b] (r^2 = 0.057) OR (95%CI)
Gender			
Men	1	1	1
Women	1.03 (0.65–1.66)	1.82 (1.11–2.97) *	1.14 (0.69–1.87)
PSYJS			
Low strain	1	1	1
Active	1.56 (0.88–2.78)	1.43 (0.80–2.57)	1.59 (0.89–2.85)
Passive	2.19 (1.16–4.16)*	1.01 (0.52–1.98)	2.04 (1.04–4.00)*
High strain	2.84 (1.57–5.15)***	1.72 (0.96–3.11)	2.36 (1.28–4.36)**
Support at work (colleagues)			
Low	1	1	1
High	0.86 (0.50–1.47)	0.78 (0.46–1.34)	1.28 (0.73–2.24)
Support at work (supervisor)			
Low	1	1	1
High	1.46 (0.91–2.35)	0.81 (0.51–1.28)	0.92 (0.56–1.51)

*p ≤ 0.05; **p ≤ 0.01; ***p ≤ 0.001; [a]All models adjusted for age and airline company; [b] < 2 pain sites/≥2 pain sites

In our study, we found no gender differences in MSP, except for pain in feet. A higher prevalence of pain in feet in female cabin crew is reported earlier (Haugli et al., 1994), and might be a result of wearing high heels as part of the uniform. The general lack of gender differences in both single and multi-site MSP in cabin crew was an unexpected finding, as female workers usually tend to report more single and multi-site MSP compared to males (Barbosa et al., 2013; Nordander et al., 2008). This tendency might be explained by higher biological vulnerability, willingness to report symptoms, or higher double burden of work and family obligations experienced by female workers (Barbosa et al., 2013; Wijnhoven et al., 2006). Furthermore, differences in occupation, job status, or physical or psychological exposures are associated with higher prevalence of MSP in female workers (Hooftman et al., 2005; Park et al., 2017). Even within the same occupation, male and female workers might have different responses to the same exposure, and thereby different risks for developing MSP (Nordander et al., 2008). In our study, it does not seem that the psychosocial work environment of cabin crew affected the genders differently. Male cabin crew might experience higher physical strain assisting with manual handling and physically demanding tasks compared with their

female colleagues. Although we had no measurement of physical demands and workload, the lack of differences in MSP could indicate that a possible bias in physical workload did not influence MSP, as the levels of PSYJS and MSP were the same in male and female cabin crew. However, further studies should be conducted to investigate gender differences in physical demands in cabin crew.

It should be noticed that a substantial proportion of the cabin crew reported a high strain job situation. Experiencing a high strain situation was associated with two to three times higher risks of reporting pain in neck, shoulder, arm, upper back, and low back pain compared with a low strain situation. According to the JDC model, such a working situation will influence MSP negatively, and has been reported for other occupational groups (Larsen et al., 2019; Vanroelen et al., 2009). A high strain situation was also associated with a more than two times higher risk of multi-site MSP, as reported earlier for other occupational groups (Christensen et al., 2018; Sembajwe et al., 2013). A passive work situation was associated with a more than two times higher risk for reporting neck pain, upper and low back pain, and multi-site pain. This might be explained with such a job situation leading to boredom and lower job satisfaction (Christensen et al., 2018; Vanroelen et al., 2009) and a more passive lifestyle during leisure time (Gimeno et al., 2009).

The only gender differences in work-related psychosocial factors found were significantly lower levels of support at work from both colleagues and nearest supervisor for male cabin crew. Young and James (2001) reported that male flight attendants perceived themselves as different from the majority group of female flight attendants, and that they did not socially identify with their female colleagues. Although, the proportion of male cabin crew has increased, they are still outnumbered by females, and a special focus should be given to their social support needs. However, social support at work was not significantly associated with MSP in our models.

Limitations and Weaknesses

This study has several limitations and weaknesses that should be taken into consideration when interpreting the results. The response rate was low, and as we have no details about the non-respondents, possible selection bias cannot be ruled out. However, the full anonymity given might have prevented some respondence bias. Furthermore, the gender ratio in our sample was 75% women and 25% men, which is approximately the same ratio found in the largest airline company in Norway (70% and 30%) (Pedersen, 2016). Still, we cannot know if the prevalence estimates might be lower or higher than for the total population of Norwegian cabin crew. An over-representation of healthy subjects in health surveys have been reported earlier (Volken, 2013). However, for the interpretation of the gender group differences, and the associations between PSYJS and MSP, the possible selection bias might not be as important if the groups are comparable (Rothman, 2012). The low level of explained variance in the logistic regression models indicates that several other factors influence MSP. We had no information on other factors known to be associated with MSP, such as poor lifestyle and high physical workload, and this constitute a further limitation. Another weakness of the study is the cross-sectional design that limit the possibility to investigate any true causal associations between PSYJS and MSP. Also, as we tested our models on the total population of cabin crew and did not stratify the analyses on gender, we

cannot say if PSYJS or support at work affected MSP in male and female cabin crew differently. A further limitation is that the data collection was conducted in 2013, and the results do not cover recent developments in the aviation industry.

Conclusions

Except for a significantly higher prevalence of pain in feet for female cabin crew, no gender differences in neither single nor multi-site MSP were found. Neither were there any differences in PSYJS, but male cabin crew experienced lower level of support at work than female cabin crew. For both male and female cabin crew a high strain work situation was associated with both single and multi-site MSP. Attention should be given to create a healthier psychosocial work environment for this occupational group, with a special emphasis on support at work for male cabin crew.

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Disclosure statement

No potential conflict of interest was reported by the author(s).

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