Insomnia, Work-Related Burnout, and Eating Habits Affecting the Work Ability of Flight Attendants

Chia-Jung Hu; Rei-Mei Hong; Gwo-Liang Yeh; I-Chun Hsieh

BACKGROUND: Work ability is an important component of occupational health assessments and reflects how a persons' physical and mental health affect their ability to perform their job. However, little is known about factors relating to the work ability status of flight attendants. The aim of this study was to investigate the physical, mental, and work-related factors that affect flight attendants' work ability.

- **METHODS:** A questionnaire-based cross-sectional study and simple random sampling was conducted with participants employed at a Taiwan-based airline for longer than 1 yr. Analysis of variance and Pearson correlation tests were carried out to analyze work ability according to the flight attendants' social demographics, physical and mental health, and work-related factors. Multiple regression analysis was used to predict the flight attendants' work abilities.
- **RESULTS:** A total of 472 flight attendants were recruited and the response rate was 78.67%. The work ability of the flight attendants ranged from 'moderate' to 'excellent' (WAI score, 34.1 ± 1.8 to 45.1 ± 1.5). In a regression analysis, work ability was positively associated with gender, age, and good eating habits; in contrast, insomnia and work-related burnout were negatively associated with work ability (R² = 32.4%).
- **DISCUSSION:** Insomnia, work-related burnout, and eating habits had a significant impact on flight attendants' work abilities. Hence, it is important to address insomnia and high workloads and maintain a healthy lifestyle in the workplace.
- **KEYWORDS:** insomnia, burnout, eating habits, work ability index.

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he role of flight attendants is crucial for ensuring the safety of passengers, providing excellent service, and handling incidents onboard aircraft. Flight attendants need to have adequate physical and mental health to execute their role properly.⁴ However, long work hours, jet lag, alterations in day-night work patterns, the effects of work environment variables (such as radiation, vibration, dryness, low temperature, and noise), and handling of events onboard aircraft can adversely affect flight attendants' physical and mental health. These adverse physical and mental health effects include mental illness, fatigue, musculoskeletal problems, cancer, headache, and insomnia.^{4,13,15} Several studies have investigated the health, stress, fatigue, quality of life, and job satisfaction of flight attendants, and reported that they suffer from more health problems than the general population.^{6,14} However, there have been no studies on their work ability.

The Work Ability Index (WAI) is considered important for indexing employability; it reflects a person's ability to cope with the demands of working life and is a core resource for companies.^{5,22} Work ability has been defined conceptually as follows: "How good is the worker at present, in the near future, and how able is he or she to do his or her work with respect to work demands, health and mental resources?"^{3,5} A systematic review of the work-related and personal factors associated with the WAI found that key correlates of work ability include lack of physical exertion, poor musculoskeletal capacity, age, obesity, high job demands, lack of autonomy, poor physical labor

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environment, and high physical workload.²² Despite there being many studies on the predictors of work ability, the results may not be generalizable to flight attendants due to their unique work environments.

Flight attendant's work ability plays a very important role in flight safety. Hence, this is an important area to study to ensure that crewmembers are able to meet the demands of their roles. Thus, the purpose of this study was to explore the current status and factors affecting the work ability of flight attendants.

METHODS

This study used a cross-sectional design and simple random sampling to elucidate the current work ability of flight attendants, and the social demographic, physical and mental health, and work-related factors associated with flight attendants' work ability (see Fig. 1).

Subjects

In this study, a survey of flight attendants from a Taiwanese airline was conducted. To be eligible, the flight attendants had to have worked at the airline for more than 1 yr and be able to speak and understand Chinese. The target population of this study included 2843 flight attendants. According to a sample calculation formula,⁸ when the target population contains 2800–3000 people, 338–341 participants are required for a study to be representative. In this study, 600 flight attendants were sampled and 472 valid questionnaires were returned.

Equipment

We investigated the relationship between flight attendants' work ability and personal-, health-, and work-related factors. The survey was divided into two parts, capturing socio-demographic data and physical, mental health, and work-related data. For the first part, we collected socio-demographic information from the flight attendants, including gender (men vs. women), age, marital status (single vs. married), education level (undergraduate degree vs. master's degree or higher), job title (cabin



Fig. 1. An illustration of the research framework showing potential factors associated with work ability.

crew vs. purser vs. cabin manager), and opinion regarding whether workplace fairness and justice were present (yes vs. no).

For the second part, we collected data on the physical and mental health of the participants, including whether they exercised several times a week (yes vs. no), eating habits (very good/ good vs. ordinary vs. poor/very poor), height and weight (for body mass index-based categorization; underweight vs. normal weight vs. overweight), insomnia status [Athens Insomnia Scale (AIS-8) score], mental health status [Brief Symptom Rating Scale (BSRS-5) score], and work-related burnout status [Copenhagen Burnout Inventory (CBI) score]. The AIS-8 is a brief selfassessment instrument used to evaluate insomnia.²⁰ It consists of eight items, including sleep induction, awakening during the night, final awakening, total sleep duration, sleep quality, wellbeing, functioning capacity, and sleepiness during the day.²⁰ The assessment is based on five dimensions: anxiety, depression, hostility, interpersonal sensitivity, and additional symptoms. The score for each item ranges from 0 to 4 (0, not at all; 1, a little bit; 2, moderately; 3, quite a bit; and 4, extremely).²⁰ The WAI questionnaire is used by occupational health workers and the internal consistency of the Chinese version (Cronbach's α) is 0.81.²⁴ This questionnaire included seven items: current work ability compared with lifetime best; work ability in relation to current job; number of current diseases, as diagnosed by a physician; estimated work impairment due to diseases; sick leave during the past year; prognosis of work ability over the next 2 yr; and mental resources. The total scores for the WAI range from 7 to 49; higher scores indicate better work ability. Furthermore, we classified the workers into four groups based on their work ability, as follows: poor (score range: 7-27), moderate (score range: 28-36), good (score range: 37-43), and excellent (score range: 44–49).²²

Procedures

We obtained ethical approval for this study from the research ethics committee of our university. An email was sent to the participants informing them that agreeing to complete the survey implied their consent to participate. After the participants agreed to participate, we sent them a link to an online questionnaire. This questionnaire was anonymous to protect the participants' privacy. After all of the participants had completed the questionnaire, we analyzed the collected data. The study period was between November 2017 and October 2018.

Statistical Analysis

We used the SPSS statistical software package (ver. 22.0; SPSS Inc., Chicago, IL, USA) for the data analysis and generated descriptive statistics. We used Pearson correlation analysis to explore the relationship between WAI score and numerous variables. A single-factor analysis of variance test was carried out to investigate WAI scores according to the variables of interest. We also carried out a multiple regression analysis to identify factors predicting work ability. A *P*-value of less than 0.05 was considered statistically significant.

RESULTS

A total of 472 flight attendants were recruited and the response rate was 78.67%. The demographic characteristics of the study population are summarized in Table I. Of the flight attendants, 87.3% (*N* = 412) were women, 64.8% (*N* = 306) were less than 45 yr of age, more than half were married, and the majority had a college education. Furthermore, 13.4% (N =63) reported having moderate or heavy work-related burnout, and 19.5% (N = 92) believed that there was a problem in terms of fairness and justice within their workplace. Regarding physical and mental health, 72% of the respondents (N =340) had a BMI in the 'normal weight' range, 60.4% (*N* = 285) had a regular exercise habit, 14.6% (N = 69) had good eating habits, 43.6% (N = 206) had insomnia, and 4% (N = 19) experienced moderate to severe emotional distress.

The average work ability score was 39.9 ± 3.8 points (range 34.1 ± 1.8 to 45.1 ± 1.5 points), and 82.4% (N = 389) of the participants achieved a 'good' work ability score. When assessing socio-demographic variables, factors associated with greater work ability scores were male, age above 45 yr, overweight, being a cabin manager (compared to a crewmember), **Table I.** Single-Factor Analysis of Variance: Comparison of Flight Attendants' WAI Scores According to Socio-Demographic, Work-Related, and Physical and Mental Health Status Variables (N = 472).

			WAI SCO	RE	POST HOC
VARIABLE AND CATEGORY	N (%)	MEAN	SD	P-VALUE	COMPARISON
Gender					
Men	60 (12.7)	42.5	4.0	0.00**	a > b
Women	412 (87.3)	39.5	3.7		
Age (yr)					
< 45	306 (64.8)	39.1	3.7	0.00**	b > a
≥ 45	166 (35.2)	41.3	3.8		
Marital status					
Single	218 (46.2)	40.0	4.0	0.50	
Married	254 (53.8)	39.8	3.7		
Education					
College	440 (93.3)	39.8	3.9	0.44	
Postgraduate	32 (6.8)	40.4	3.8		
BMI					
Underweight	90 (19.1)	39.4	3.5	0.01*	c > b; c > a
Normal	340 (72)	39.8	3.9		
Overweight	42 (8.9)	41.5	4.0		
Position level					
Cabin crew	379 (80.3)	39.5	3.7	0.00**	c > a
Purser	36 (7.6)	40.7	3.7		
Cabin manager	57 (12.1)	42.0	4.2		
Perceived workplace justice					
Just/fair	380 (80.5)	40.2	3.8	0.00**	a > b
Unjust/unfair	92 (19.5)	38.5	3.5		
Work-related burnout					
Mild	409 (86.7)	40.3	3.6	0.00**	a > c
Moderate	55 (11.7)	37.8	4.0		a > b
Severe	8 (1.7)	34.7	4.9		
Exercise habits					
No	187 (39.6)	39.7	3.6	0.45	
Yes	285 (60.4)	40.0	4.0		
Eating habits					
Good/very good	69 (14.6)	42.4	3.9	0.00**	a > b > c
Ordinary	357 (75.6)	39.7	3.6		
Poor/very poor	46 (9.7)	37.4	3.7		
Insomnia					
No	266 (56.4)	41.2	3.5	0.00**	a > b
Yes	206 (43.6)	38.2	3.6		
Mental health/BSRS-5 score					
Normal	374 (79.2)	40.1	3.7	0.00**	a > c
Mild	79 (16.7)	39.1	3.9		
Moderate	19 (4.0)	37.8	5.0		

*P < 0.05 ; **P < 0.01.

WAI: Work Ability Index; BMI: body mass index; BSRS-5: Brief Symptom Rating Scale.

feeling that the workplace is fair/just, having mild work-related burnout and good/very good eating habits, and not having mood disorders and insomnia.

In addition to age, gender, BMI, job title, perceived workplace justice, work-related burnout, exercise habits, eating habits, insomnia, and mood disorders were all significantly correlated with WAI scores (**Table II**). Overall, the regression model was significant (F = 21.48, P < 0.01). The total variance in work ability predicted by gender, age, work-related burnout, eating habits and insomnia was 32.4%. Among the variables analyzed, gender ($\beta = 0.16$, 95% CI = 0.79–2.93), age ($\beta = 0.12$, 95% CI = 0.01–0.09), and good eating habits ($\beta =$ 0.12, 95% CI = 0.25–1.13) were positively associated with WAI scores. Only work-related burnout ($\beta = -0.15$, 95% CI = -0.07 to -0.01) and AIS-8 ($\beta = -0.34$, 95% CI = -0.47to -0.29) showed negative association with WAI score (**Table III**).

DISCUSSION

The WAI is a comprehensive indicator of work ability.⁵ The average WAI score in our study was 39.9 ± 3.8 and 82.4% of participants were classified as work ability of 'good or above.' This shows that the average working capacity of the flight attendants was high. Among the variables of interest, male sex, good eating habits, and the job title of cabin manager were most strongly associated with high WAI scores, while

Table II. Correlation Analysis Between Socio-Demographic, Work-Relate	9C
and Physical and Mental Health Status Variables and WAI Score.	

	TOTAL WAI SCORE	
VARIABLE	PEARSON'S COEFFICIENT	P-VALUE
Age	0.36	0.00**
Gender	-0.25	0.00**
BMI	0.16	0.00**
Education	0.03	0.28
Marriage	-0.31	0.50
Position level	0.22	0.00**
Perceived workplace justice	-0.17	0.00**
Work-related burnout	-0.36	0.00**
Exercise habits	0.03	0.45
Eating habits	0.30	0.00**
AIS-8	-0.47	0.00**
BSRS-5	-0.20	0.00**

**P < 0.01.

WAI: Work Ability Index; BMI: body mass index; AIS-8: Athens Insomnia Scale; BSRS-5: Brief Symptom Rating Scale.

severe work-related burnout and severe emotional distress were associated with low WAI scores. Overall, insomnia had the most negative impact on flight attendants' work ability.

The average WAI score in a Taiwanese worker population was 41.5 points,²⁴ the average score for workers in western China was 38.6 points,¹⁰ and 40.1–42.1 points for workers in Europe;^{9,11,18} all of these scores are within the 'good' range (37–43 points) and are thus similar to those in this study. Nevertheless, the average WAI score of the flight attendants in our study was lower than the average score of general workers in Taiwan and Europe, which may be due to the unique working conditions of flight attendants.

We found that that being male, older, and with better eating habits were positively associated with work ability, while

Table III. Regression Analysis of Variables Predi	icting Flight Attendant Work Ability
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exercise habits were less influential; these findings support
previously published results. ²² Our findings related to socio-
demographic factors were also aligned with previous studies, ^{2,21}
in that male workers have higher WAI scores than female. It is
possible that female flight attendants are more affected by family
and childcare commitments or workplace harassment, which in
turn affects their physical and mental health and WAI scores. ¹

Furthermore, most studies have shown that WAI score declines with age, possibly in association with early transfer or retirement due to physical and mental stress or family-related factors.² However, most of the older participants in this study were in management positions. The average age of our cabin managers was 54.8 ± 4.9 yr and their WAI scores were significantly higher than the sample average. Ilmarinen pointed out that management positions are attained by workers with significant work experience.⁵ Education and training, as well as commitment and a positive attitude toward the organization, may result in better work performance of managers vs. lower-ranked staff.

Moreover, good eating habits have a positive impact on work ability. Salem et al. found that adequate fiber intake has a positive effect on work ability;¹⁹ however, only 14.6% of the participants in our study indicated that they had good eating habits. A survey found that flight attendants' digestion, dieting behavior, and food choices are often affected by shift work and jet lag; few have good eating habits.¹⁶ Hence, we recommend that employers pay special attention to the diets of air service staff. Further surveys should be conducted to investigate the food culture and habits of flight attendants and to analyze the impact of diet on their ability to work.

We also found that perceived workplace justice was associated with the WAI score. It is important to note that Imarinen

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		MULTIPLE MODELS			
VARIABLE	β	95% CI	Р	ADJUSTED R ²	F
Gender				0.324	21.48**
Men	0				
Women	0.16	(0.79, 2.93)	0.00**		
Age	0.12	(0.01, 0.09)	0.01*		
BMI	-0.04	(-0.18, 0.07)	0.39		
Position level					
Cabin crew	0				
Purser	-0.00	(-1.24, 1.10)	0.90		
Cabin manager	-0.00	(-1.22, 1.12)	0.93		
Perceived workplace justice					
Just/fair	0				
Unjust/unfair	-0.06	(-1.43, 0.08)	0.08		
Work-related burnout	-0.15	(-0.07, -0.01)	0.00**		
Eating habits	0.12	(0.25, 1.13)	0.00**		
Exercise habits					
No	0				
Yes	-0.03	(-0,91, 0.31)	0.33		
AIS-8	-0.34	(-0.47, -0.29)	0.00**		
BSRS-5	-0.02	(-0.14, 0.09)	0.64		

Predicted value: gender, age, BMI, position level, perceived workplace justice, work-related burnout, eating habits, exercise habits, AIS-8, BSRS-5.

Number of WAI total scores.

P* < 0.05; *P* < 0.01.

CI: confidence interval; BMI: body mass index; AIS-8: Athens Insomnia Scale, BSRS-5: Brief Symptom Rating Scale.

also found that workplace justice, a supportive organizational climate, and high organizational commitment have a positive impact on work ability.8 Improving workplace justice, organizational commitment, and social support may enhance flight attendants' self-efficacy and work ability.^{7,25} The survey briefly asks the participants about workplace justice and provides several examples. Most of the participants stated that unfair includes a lack of good communication, and some indicated that work scheduling is unfair and that it could affect their performance evaluation. Hence, we recommend that employers focus on workplace communication issues to promote a culture of workplace justice. Because of the sensitivity of this issue and

because this study involved flight attendants employed by only one airline, there may be some deviations in the selection, which could be explored in the future.

As expected, emotional distress was related to a worse WAI score, especially in the case of severe emotional distress. Other studies have also reported lower WAI scores among those with greater emotional distress.¹⁷ This finding suggests a need to regularly screen for changes in the emotional states of flight attendants and provide appropriate treatment when required. Such interventions could improve work ability and overall functioning. Work-related burnout, emotional problems, and insomnia are the most common health problems among flight attendants. Indeed, in one study, female flight attendants had a 2- to 5.7-fold higher rate of sleep disorders than the average person.¹² Research has also shown that sleep and fatigue management, such as proper exposure to light, appropriate sleep times, and good exercise and dietary habits can improve insomnia and overload problems.²³ Thus, it may be important to focus health promotion interventions for flight attendants on sleep hygiene and fatigue management.

In conclusion, we found that insomnia and work-related burnout have a negative impact on WAI scores. Furthermore, good eating habits, organizational culture, and workplace justice can improve flight attendants' WAI scores and thus extend their working life. We recommend that airlines strengthen their sleep and fatigue management education programs for flight attendants or provide relevant health promotion programs. At the organizational level, it may be important to enhance benefits, reward systems, and social support, and to establish a comprehensive career development plan for flight attendants. Such measures may improve flight attendants' physical and mental health and WAI scores, and thus enhance a company's reputation and competitiveness.

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