# Risk Factors and Aftermath of Stress on Female Commercial Flight Attendants in Indonesia

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## Abstract

Stress on the flight attendants can interfere their performance during flight. The objective of this study was to know the risk factors of stress on the female flight attendants in Indonesia. The study used a cross sectional design and consecutive sampling method with a total sample of 178 female flight attendants who underwent medical checkup at the Aviation Medical Center, the Ministry of Transportation of the Republic of Indonesia. The study was carried out from 1st of November until 1st of December 2016 using Depression Anxiety Stress Scale 21. Stress Analysis was performed with Epi Info version 7 and EPISTAT version 3.3. The results of this study showed that 31.46% of female flight attendants experienced stress. Female flight attendants with working period of 6-10 years had a risk of stress 8 times higher than those with shorter working period (adjusted odds ratio (ORa) = 8.11; 95% confidence interval (CI) = 1.93 to 5.11; p=0.032).Having hypertension increased the risk of stress by 2.8-fold (ORa = 2.79; 95% CI=1.33 to 23.02; p=0.040).

**Keywords:** risk factors, stress, female commercial flight attendant

## Faktor Risiko dan Akibat Stres pada Pramugari Pesawat Komersial di Indonesia

### Abstrak

Stres pada pramugari dapat mengganggu kinerja dan membahayakan pada saat terbang. Tujuan penelitian ini adalah diketahuinya faktor risiko stress pada pramugari komersial di Indonesia. Desain studi ini adalah potong lintang dan menggunakan metode *consecutive sampling* dengan jumlah sampel sebanyak 178 pramugari yang melakukan pemeriksaan kesehatan berkala di Balai Kesehatan Penerbangan, Kementerian Perhubungan Republik Indonesia. Penelitian berlangsung dari tanggal 1 November sampai tanggal 1 Desember 2016 menggunakan *Depression Anxiety Stress Scale* 21. Analisis stres dilakukan menggunakan Epi Info versi 7 dan EPISTAT versi 3.3. Hasil penelitian ini memperlihatkan bahwa 31,46% pramugari mengalami stres. Pramugari dengan lama masa kerja 6-10 tahun memiliki risiko mengalami stress 8 kali lebih tinggi dibandingkan dengan yang masa kerjanya lebih singkat (ORa=8,11; 95% CI=1,93-5,11; p=0,032). Hipertensi meningkatkan risiko mengalami stres 2,8 kali lipat (ORa =2,79; 95% CI=1.33-23,02; p=0,040).

*Kata kunci: faktor risiko, stres, pramugari komersial*

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## Introduction

Stress represents a state of psychological and physiological imbalance resulting from the disparity between situational demand and the individual's ability and motivation to meet that need.[1] Stressor comprises internal factors i.e. physical, psychological and external factors i.e. environmental and social.[2]

Social factors are extrinsic factors caused by individual interaction with the community environment. This condition is experienced by female flight attendants in carrying out their work. The female flight attendant profession has potentially considerable stress due to work related environment, such as narrow space in aircraft, uncooperative passenger response, passengers with disability and aviation emergency.[3]

Other social factors are the balance between the function in the family (especially for those who are married) and the function as a female flight attendant. McDonald *et al.,*[4] study using the National Institute for Occupational Safety and Health Generic Job Stress Questionnaire (NGJSQ) showed that 29% of female flight attendants in the United States experienced difficulty in balancing between work demands and off-the-job obligations such as family responsibilities.

A study by Kelleher and McGilloway,[5] using the revised Occupational Stress Inventory (OSI-R) instrument among Irish male and female flight attendants with an average work period of 6 years showed that 21% of them have high stress and 29% of them state that work as the main source of stress. Sharma's,[6] research on stewards and stewardesses in India who have been working for 10-30 years indicated that 88.85% of them have experienced stress.

Stress consists of eustress (positive stress) and distress (negative stress). Eustress is perceived as a 'beneficial stress' or 'adaptive stress,' which motivates to continue working through the task at hand. Eustress is an important component of everyday life as a good stress that motivates and encourages our productivity. On the other hand, distress otherwise known as 'bad stress' occurs when something becomes difficult for an individual to cope with. In extreme cases, distress can result in anxiety and/or depression. Distress causes tension in the body and mind, when the task at hand suddenly seems daunting. In this study by stress means distress.[7,8] The objective of this study was to determine the risk factors and aftermath of stress on commercial female flight attendants in Indonesia.

## Material and Methods

The study used a cross sectional design and consecutive sampling method with total samples of 178 Indonesian commercial female flight attendants who underwent medical check up at the Office of Aviation Health-Ministry of Transportation of Indonesia between 1st of November and 1st of December 2016. The inclusion criteria were (a) Indonesian citizens who were at least 19 years of age, (b) had been working for at least 1-year in the current company, (c) and willing to be a respondent. Ethical clearance was granted from the Faculty of Medicine, Universitas Kristen Indonesia.

The outcome of this study was stress, which was measured by Depression Anxiety Stress Scale 21 (DASS 21). In DASS 21, we measure the level of stress from the total score of assessment on the statements of 2, 3, 4, 5, 7, 9, 10, 13, 15, 16, 17, 19, 20 and 21. Assessment of stress levels in this instrument consists of normal level (score=0-7), mild (score=8-9), moderate (score=10-12), heavy (score=13-16) and very heavy (score ≥17). Subjects with a score of more than 9 were considered as respondents with stress. Prior to conducting the study, we tested DASS 21

on 20 respondents to evaluate its transcultural validity (translated into Bahasa) with an α of 5%. When the correlation coefficient (r) count > r in the reference table, the question was considered valid and could be used as a testing instrument.

The independent factors measured were (a) sociodemographic characteristics, which consisted of age, marital status and body mass index; (b) the flight factors: total flight hours and length of service; (c) certain behaviors comprised of smoking, and physical exercise; and (d) certain diseases as the aftermath of stress for instance hypertension and hypercholesterolaemia. The body mass index (BMI) was categorized into 3 groups: normal when BMI 18.5 to 24.99 $kg/m^2$, overweight when BMI 25.00 to 29.99 $kg/m^2$ and obese when BMI ≥ 30 $kg/m^2$. The total flight hours were defined as the total time that commences when an aircraft moves under its own power for the purpose of flight and ends when the aircraft comes to rest after landing. The length of service measured by how long a female flight attendant had been working at the present airlines. We also studied the physical exercise factor obtained from frequency of physical exercise per week as recommended by the American College of Sport Medicine. It was classified as sufficient if physical exercise ≥ 3 times/week with intensity ≥ 30 min and insufficient if physical exercise < 3 times/week with intensity < 30 min.
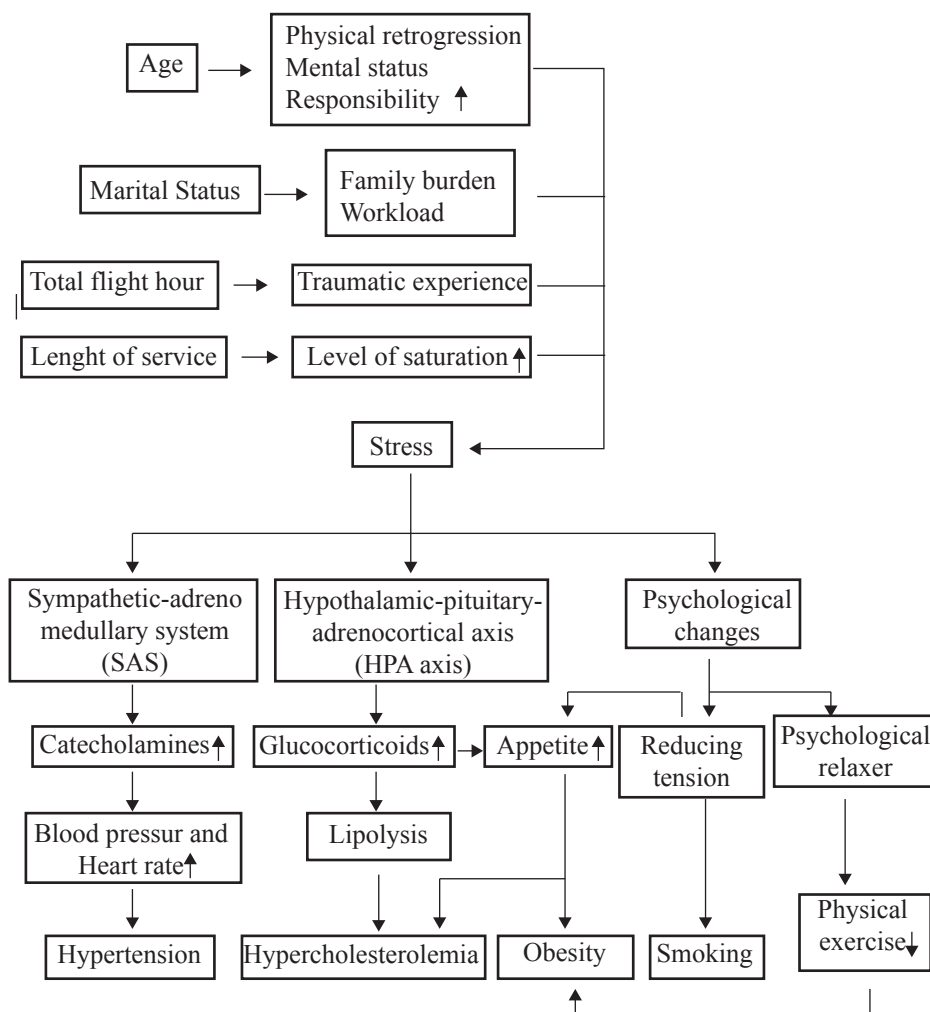


**Figure 1:** Conceptual Framework of the Study

Data were analyzed with Epi Info version 7 and EPISTAT version 3.3. Univariate analysis was conducted on the description of sociodemographic characteristics, aviation factors, certain behaviors and certain diseases related to stress. There were two steps to determine the risk factors. First, we stipulated the lowest proportion of stress in each sub-variable as a reference category. Second, we calculated odds ratio by comparing each group in sub-variable with the reference category. To obtain the final model, the significant sub-variables were tested by adjusted odds ratio (ORa).

**Results**

Overall, the value of r counted for each DASS 21 component was greater than the reference value (Table 1). It indicated that DASS 21 can be used to measure the stress in Bahasa Indonesia. From all components in DASS 21, the r value of item #2, 4 and 19 were slightly higher than the reference value, while item #9, 10, 13,15,16,17 showed strong validity.

**Tabel 1. Transcultural Validation Test of the DASS- 21 in Bahasa Indonesia**

| No of statement | r calculated | r table |
|---|---|---|
| 2 | 0.489 | 0.444 |
| 3 | 0.594 | 0.444 |
| 4 | 0.484 | 0.444 |
| 5 | 0.505 | 0.444 |
| 7 | 0.598 | 0.444 |
| 9 | 0.713 | 0.444 |
| 10 | 0.665 | 0.444 |
| 13 | 0.626 | 0.444 |
| 15 | 0.656 | 0.444 |
| 16 | 0.694 | 0.444 |
| 17 | 0,644 | 0.444 |
| 19 | 0,445 | 0.444 |
| 20 | 0,509 | 0.444 |
| 21 | 0,558 | 0.444 |

This study showed that the prevalence of stress was 31.46%. Most participants were 19-28 years old (88.76%) and unmarried (75.28%). No respondent was overweight or obese. The majority of the female flight attendants had a length of service of 1-5 years (82.58%) and had less than 6000 flight hours (80.90%). Only 15.17% of the participants had smoking habits; and 69.66% did not perform physical exercise on a regular basis. Furthermore, only 3.93% of the female flight attendants had hypertension and 20.22% had hypercholesterolemia.

In the group of sociodemography, the group of age 29-37 years and the unmarried group were the reference categories (rate=0.29 and 0.28, respectively). From aviation factors, the respondents with length of service ≥11 years and total flight hours 6000-12.999 were benchmarking (rate= 0.07 vs 0.27).

The prevalence of stress in the group of age 19-28 years compared to the group of age 29-37 years and also unmarried group compared to married group were similarly distributed. Compared to reference group, subject with length of service 6-10 years have risk of stress 19 times higher (OR 18.6, 95% CI= 2.0-76.5; p=0.006). From certain behavioral variables, smoking and physical exercise were not associated with stress. In this study, the female flight attendants with hypertension had risk of stress 6 times higher significantly but we did not find the association between stress and hypercholesterolemia.

In the multivariate analysis (Table 3) two factors with significant univariate p-value (length of service and hypertension) were included. The association between hypertension and length of service towards stress after being adjusted remained significant. Respondents who have a length of service 6-10 years have a risk of experiencing stress 8 times higher compared to respondents with period of work ≥ 11 years (p=0.037). Furthermore, respondents with hypertension had a risk of stress almost three times greater than non-hypertensive respondents (p = 0.041)

**Tabel 2.** Risk Factors of Stress By Sociodemograph Characteristics and Others

| Variables | Stress | | | | Crude OR | 95% CI | p value |
|---|---|---|---|---|---|---|---|
| | Yes | | No | | | | |
| | n | % | n | % | | | |
| **A. Soriodemography** | | | | | | | |
| Age (year-old) | | | | | | | |
| 29-37 | 5 | 29.4 | 12 | 70.6 | 1 | | |
| 19-28 | 51 | 32.3 | 107 | 67.7 | 1,1 | 0,4-3.4 | 1 |
| >37 | 0 | 0 | 3 | 100 | NA | | |
| Marital status | | | | | | | |
| Unmarried | 38 | 28.4 | 96 | 71.6 | 1 | | |
| Married | 18 | 40.9 | 26 | 59.1 | 1.6 | 0.9-3.5 | 0.14 |
| BMI | | | | | | | |
| 18.5-24.9 kgtoi$^2$ | 55 | 31.5 | 122 | 69.9 | | | |
| 25-29.9 kg/in$^2$ | 1 | 100 | 0 | 0 | NA | | |
| >30 kg/tat$^2$ | 0 | 00 | 0 | 0 | NA | | |
| **B. Action factors** | | | | | | | |
| Length of service (year) | | | | | | | |
| >11 | 1 | 7.1 | 13 | 92.9 | 1 | | |
| 1-5 | 45 | 30.6 | 102 | 69.4 | 5.7 | 0.8-45.2 | 0.12 |
| 6-10 | 10 | 58.8 | 7 | 41.2 | 18.6 | 2.0-76.5 | 0.006 |
| Total flight hours | | | | | | | |
| 6000-12.999 | 10 | 27.0 | 27 | 73,0 | 1 | | |
| 59-5.999 | 32 | 29.9 | 75 | 70.1 | 1.1 | 0.5-2.7 | 0.8 |
| 13.000-29.999 | 14 | 41.2 | 20 | 58.8 | 1.9 | 0.7-5.1 | 02 |
| **C. Certain behaviour** | | | | | | | |
| Smoking | | | | | | | |
| No | 46 | 30.5 | 105 | 69.5 | 1 | | |
| Yes | 10 | 37.0 | 17 | 63.0 | 1.34 | 0.6-3.2 | 0.5 |
| Physical exercise | | | | | | | |
| Yes | 16 | 29,6 | 38 | 70.4 | 1 | | |
| No | 40 | 32,3 | 84 | 67.7 | 1.1 | 0.6-2.3 | 0.9 |
| **D. Certain diseases** | | | | | | | |
| Hypertension | | | | | | | |
| No | 51 | 29.8 | 120 | 70.2 | 1 | | |
| Yes | 5 | 71.4 | 2 | 28.6 | 5.9 | 1.1-31.3 | 0.03 |
| Hypercholesterolemia | | | | | | | |
| No | 44 | 31.9 | 98 | 69.0 | 1 | | |
| Yes | 12 | 33.3 | 24 | 66.7 | 1.11 | 0.5-2.4 | 0.8 |

OR= Odds Ratio; CI= confidence interval

**Table 3. The Relationship between Length of Service and Hypertension towards Stress**

| Variables | Stress | | | | Adjusted OR | 95% CI | p value |
|---|---|---|---|---|---|---|---|
| | Yes | | No | | | | |
| | n | % | n | % | | | |
| **A. Aviation factor** | | | | | | | |
| Length of service (y) | | | | | | | |
| ≥ 11 | 1 | 7. | 13 | 92.9 | 1 | | |
| 6– 10 | 10 | 58.8 | 7 | 41.2 | 8.1 | 1.9-5.1 | 0.032 |
| **B. Certain disease** | | | | | | | |
| Hypertension | | | | | | | |
| No | 51 | 29.8 | 120 | 70.2 | 1 | | |
| Yes | 5 | 71.4 | 2 | 28.6 | 2.79 | 1.33-23.02 | 0.040 |

## Discussion

This study found no relationship between sociodemographic factors consisting of age, marital status and BMI with stress. The results of previous studies about sociodemographic factors were varied. Daily stress studies, in particular, have produced inconsistent findings. Some studies showed reduced, another demonstrated amplified, age-related responses, and yet others found no age differences in negative emotional response to stress.[9] The different results might be caused by different characteristics of the sample.

The study by Scott et al.,[10] states that married groups are at a lower risk of stress. On the other hand, Osei et al.,[11] study suggests that unmarried groups experience only low levels of stress while the married group experiences high levels of stress. The results of these two studies are conflicting.[10,11] Major et al.,[12] reported that stress can be caused by personal factors such as family problems. This becomes dominant in married individual so that marital status could be one of the factors lead to stress. However, the results of the present study suggested that there was no association between marital status and stress. The majority (75.28%) of respondents in this study were unmarried group.

The study conducted by Chao et al.,[13] examined the relationships between chronic stress, food cravings, and body mass index. (n=169). Chronic stress had a significant direct effect on food cravings, and food cravings had a significant direct effect on body mass index. The total effect of chronic stress on body mass index was significant.[13] In this study we could not test the significance since there we two cells with null value.

When stress starts interfering with our ability to live a normal life for an extended period, it becomes even more dangerous. The longer the stress lasts, the worse it is for both our mind and body. Someone might feel fatigue, unable to concentrate or irritable for no good reason. Chronic stress causes wear and tear on the body by over eating, smoking and other bad habits use to cope with stress.[14,15]

From aviation factors, only length of service significantly related to stress. Stanetic and Tesanovic[16] conducted study included 199 female (83.30%) and 40 male (16.70%) participants. The respondents aged over 46 years and with the length of service over 21 years had statistically significant higher level of stress and emotional exhaustion than younger participants and participants with shorter length of service. It might be said that age and length of service have important influence on the level of stress and burnout syndrome. The older and the higher the length of service, the higher the level of stress and the higher the risk of burnout syndrome.

Ahmadi and Alireza[17] conducted the cross sectional study on military pilots in Iran. The sample size was 89 pilots. The research concluded that the longer total flight hour, the lower risk of stress. Thus, there was an inverse association between total flight hour with stress. This result was inconsistent with the current research. The present study found that there was no relationship between total flight hours with the occurrence of stress. It might be related with the characteristics of passengers. In this current study, the passengers were civilians while in Ahmadi and Alireza[17] study the passengers were the military.

There were two certain behaviors examined in this study: smoking and physical activities. However, none of them was associated with stress. The result of some studies concerning the relationship between smoking with stress were varied. To address whether cigarette smoking actually has an effect of reducing stress and negative emotions, previous studies

have examined the effect of smoking by using both psychological and physiological indices. In the results of subjective ratings, participants reported that acute smoking decreased their anxiety and stress, which is in line with the expectation of smokers that cigarette smoking relieves stress. On the other hand, physiological results have indicated that smoking increases the heart rate which is a sign of increased arousal. Arousal is an important component of the stress response and an increased arousal level is a typical physiological response elicited by a stressor.[18]

The study in California by Michael *et al.*,[19] with sample size of 814 respondents found that there was no relationship between physical activities with stress. The result is in line with the current study. But another study by Stults-Kolehmainen and Sinha[20] revealed that psychological pressure would decreased physical activities.

Some diseases are considered related to stress. In this study we only examined hypertension and hypercholesterolemia. Generally, stress was significantly related to hypertension[21]. Hu B *et al.*[22] demonstrated that after being adjusted for all other risk factors, women showed a greater risk of hypertension if they had either stress at work or at home (OR = 1.285 vs 1.231; 95% CI= 1.027-1.609 vs 1.001-1.514) compared to having stress at neither work nor home. However, the increased risk for hypertension by stress was not found in men. Therefore, psychological stress was associated with an increased risk for hypertension, although this increased risk was not consistent across gender.A conflicting findings were shown by Jadhav *et al.*[21] Statistically significant association was found between mental stress and hypertension for males, but not in females.

Sympathetic activation is held responsible for the transient elevation in blood pressure observed during acute psychogenic stress such as forced mental arithmetic, when it is associated with increased heart rate, visceral vasoconstriction that exceeds muscular vasodilatation, and, more often than not, high cardiac output. Plausibility refers to the biological plausibility of a causal hypothesis. The hypothesis that stress can lead to sustained hypertension is plausible because it fits with the accepted concept that illness is a results when a susceptible host undergoes exposure to an adverse environment. Variations in individual susceptibility to hypertension and in the magnitude of sympathetically induced cardiodynamic responses to stress are well-documented observations compatible with the proposed etiologic hypothesis.[23]

Under stress, the body is preparing to protect and assumes a primitive response, called the fight-or-flight response. During such a situation, the brain produces the hormones cortisol and adrenaline. The release of these hormones send signals that increase blood flow to the brain and eventually produces more energy for the body. When cortisol and adrenaline are released, it raises cholesterol level. Specifically, the release of cortisol raises blood-sugar levels for the body's use as energy, as it locks away fat so it's not used during this state as energy. Therefore, as cortisol is released, it raises the body's blood-glucose level, which in turn creates more triglyceride production. Higher triglycerides create higher cholesterol levels.[24] In our study we found no significant enhancement of cholesterol level in the group with stress.

In conclusion, this study found that length of service of 6-10 years was a significant risk factor and hypertension was the aftermath of stress.

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