Flight hours in 7 consecutive days and physical exercise among the civil pilot in Indonesia

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Abstrak

Latar belakang: *Tidak tersedianya waktu merupakan salah satu hambatan melakukan latihan fisik yang sering dilaporkan di negara berkembang. Berdasarkan Peraturan Keselamatan Penerbangan Sipil bagian 121, jam terbang maksimal pilot sipil komersial dalam 7 hari terakhir adalah 30 jam. Oleh karena itu perlu dilakukan penelitian mengenai hubungan jam terbang 7 hari terakhir terhadap kebiasaan latihan fisik pada pilot sipil di Indonesia.*

Metode: *Penelitian potong lintang terhadap 600 orang pilot sipil yang melakukan pengujian kesehatan personil penerbangan di Balai Kesehatan Penerbangan pada bulan April 2016 dan memenuhi kriteria inklusi/ekslusi. Data yang dikumpulkan yaitu karakteristik demografi, pekerjaan, kebiasaan olahraga, tinggi dan berat badan. Pengambilan data dilakukan dengan wawancara dan pemeriksaan fisik. Pilot dikategorikan memiliki kebiasaan latihan fisik sesuai rekomendasi ACSM apabila melakukan latihan fisik dengan intensitas sedang selama 150 menit per minggu atau latihan fisik dengan intensitas berat selama 75 menit per minggu.*

Hasil: *Jam terbang 7 hari terakhir merupakan faktor dominan terhadap kebiasaan latihan fisik. Jika dibandingkan dengan pilot dengan jam terbang 7 hari terakhir < 3,5 jam, maka pilot dengan jam terbang 7 hari terakhir 3,5-14 jam berisiko 24% lebih rendah memiliki kebiasaan latihan fisik sesuai [RRa= 0,76; p=0,032].*

Kesimpulan: *Faktor risiko yang berpengaruh terhadap kebiasaan latihan fisik adalah jam terbang 7 hari terakhir.* ***(Health Science Journal of Indonesia 2016;8(1):49-52)***

Kata kunci: *Jam terbang 7 hari terakhir, kebiasaan latihan fisik, pilot sipil Indonesia*

Abstract

Background: The most frequently reported barrier of doing physical exercise in developing countries is lack of time. Based on the Civil Aviation Safety Regulation part 121, the maximum working hour for commercial pilot in 7 consecutive days is 30 hours. The study objective is to identify the relation between flight hours in 7 consecutive days and the physical exercise habit among the civil pilots in Indonesia.

Methods: A cross sectional study towards 600 civil pilots, who did their medical examination at the Aviation Medical Center, Jakarta and met the inclusion/exclusion criteria. The collected data were demographic and job characteristics, physical exercise habits, body weight, heights. The data was obtained through interview and physical examinations. Pilot was categorized as having an appropriate physical exercise habit if he/she spent 150 minutes of moderate intensity exercise per week or 75 minutes of vigorous intensity exercise per week.

Results: Flight hour in 7 consecutive days was a dominant factor to the physical exercise habit. Compared to the pilot who had flight hours in 7 consecutive days less than 3.5 hours, pilot who had flight hours in 7 consecutive days 3.5-14 were having less 24% risk of appropriate physical exercise [RRa= 0,76; p=0,032].

Conclusion: Risk factor to the physical exercise habit among the civil pilot is flight hour in 7 consecutive days. ***(Health Science Journal of Indonesia 2016;8(1):49-52)***

Keywords: Flight hours in 7 consecutive days, physical exercise, civil pilot in Indonesia.

Physical exercise is important for health.[1] Some of the benefit of physical exercise is to manage coronary heart disease risk factors such as blood pressure, waist circumference, blood sugar level, and blood cholesterol level.[2] International Civil Aviation Organization (ICAO) stated that cardiovascular disease is one of the most dangerous causes of pilot incapacitation and it could danger the aviation safety.[3] Sebastian in 2015 found that in Indonesia 27.8% of civil pilot had light physical activity.[4] Sitting in a workplace (aircraft cockpit) is a sedentary behavior and might be related to having less physical exercise.

Based on Civil Aviation Safety Regulation Part 121, an air carrier may not schedule a flight crewmember and a flight crewmember may not accept an assignment for flight time in air transportation or in other commercial flying if that crewmember's total flight time in all commercial flying will exceed 30 hours in any 7 consecutive days.[5]

American Collage of Sports Medicine (ACSM) recommends that most adults engage in moderate-intensity cardiorespiratory exercise training for ≥30 min/day on ≥5 days/week for a total of ≥150 min/week, vigorous-intensity cardiorespiratory exercise training for ≥20 min/day on ≥3 days/week for a total ≥75 min/week.[6]

A study by Swanson found that each hour/week of driving was associated with a 1.6% reduction in the odds of achieving sufficient PA.[7] But there is no data yet about the association between flight hours in 7 consecutive days to the physical exercise habit among the civil pilot. The objective of this study is to identify the association of flight hours in 7 consecutive days to the physical exercise habit among the civil pilot in Indonesia.

METHODS

The population of this cross sectional study was civil pilots who went to the Aviation Medical Center, Directorate General of Civil Aviation to have their medical examination to obtain the medical certificate in April 2016. Sample was obtained through a purposive sampling method. The data was secondary data from the Civil Pilot Healthy Lifestyle Survey conducted by the Aviation Medicine Study, Faculty of Medicine, University of Indonesia. The pilots were interviewed based on questionnaire and had a physical examination. The dependent variable of this study was the physical exercise habit based on the ACSM recommendation. Subject was categorized as having an appropriate exercise habit if they met the ACSM recommendation. The main independent variable was flight hour in 7 consecutive days, which was defined as a total elapsed period within 7 days, from the time a crewmember is required to report for duty, to the time that crew member has completed all official duties with respect to a flight or series of flights and is released for an official crew rest. This period is categorized in 3 categories which are < 3.5 hours, 3.5-14 hours and > 14 hours. Data analysis was Cox regression using the Stata 9 program.

RESULTS

There were 644 subjects included in the study. 636 subjects met the inclusion criteria. 36 subjects were excluded from the study because less than 18 years old or race other than Asian. In total there were 600 subjects that fulfilled the inclusion and exclusion criteria. Tabel 1 showed that 46.17% subject had appropriate physical exercise habit based on ACSM recommendation. Tabel 2 showed the results of bivariate analysis, subjects who 51-65 years old, married, and had total flight hour ≥ 10436 are more likely to have less risk of appropriate physical exercise based on ACSM recommendation, compared to their baseline.

Table 3 showed the results of multivariate analysis. Compared to the pilot who had flight hours in 7 consecutive days less than 3.5 hours, pilot who had flight hours in 7 consecutive days 3.5-14 were having less 24% risk of appropriate physical exercise [RRa= 0,76; p=0,032].

Tabel 1. Subject's demographic, job characteristic, habit and BMI

Subject	Number	%
Age		
18-39 years old	440	73,3
40-50 years old	106	17,3
51-65 years old	54	9
Marrital status		
Not married	299	49,8
Married	298	49,7
Divorced	3	0,5
Type of license		
PPL	52	8,6
CPL	355	59,2
ATPL	193	32,2
Total flight hours		
< 10436 hours	505	84,2
≥ 10436 hours	95	15,8
Flight hours in 7 consecutive days		
< 3,5 hours	244	40,7
3,5-14 hours	141	23,5
>14 hours	215	35,8
Body Mass Index		
Normal	161	26,8
Overweight	140	23,3
Obesity	299	49,8
Physical exercise		
Inappropriate	323	53,8
Appropriate	277	46,2

Tabel 2. Demographic, job characteristic and physical exercise

	Inappropriate physical exercise (n = 323)		Appropriate physical exercise (n=277)		Crude relative risk	Confidence interval 95%	P
	N	%	N	%			
Age							
18-39 years old	220	50	220	50	1,0	Reference	
40-50 years old	63	59,4	43	40,6	0,81	0,59-1,12	0,21
51-65 years old	40	74,1	14	25,9	0,52	0,30-0,89	0,017
Marital status							
Not married	137	45,8	162	54,2	1,0	Reference	
Married	184	61,7	114	38,3	0,70	0,56-0,90	0,004
Divorce	2	66,7	1	33,3	0,62	0,09-4,40	0,63
Type of license							
PPL	22	42,3	30	57,7	1,0	Reference	
CPL	183	51,5	172	48,5	0,84	0,57-1,24	0,378
ATPL	118	61,1	75	38,9	0,67	0,44-1,03	0,067
Total flight hours							
<10436	258	51,1	247	48,9	1	Reference	
≥10436	65	68,4	30	31,6	0,65	0,44-0,94	0,024
Flight hours in 7 consecutive days							
<3,5	123	48,6	130	51,4	1,0	Reference	
3,5-14	83	62,8	49	37,1	0,72	0,52-1,00	0,052
>14	117	54,4	98	45,6	0,89	0,68-1,15	0,370
BMI							
Normal	79	49,1	82	50,9	1	Reference	
Overweight	66	47,1	74	52,9	1,04	0,76-1,42	0,82
Obesity	178	59,5	121	40,5	0,79	0,60-1,05	0,10

Tabel 3. Association between age, marital status, flight hours in consecutive 7 days and physical exercise

	Inappropriate physical exercise (n = 323)		Appropriate physical exercise (n=277)		Adjusted relative risk	Confidence interval 95%	P
	n	%	N	%			
Age							
18-39 years old	220	50	220	50	1,0	Reference	
40-50 years old	63	59,4	43	40,6	0,97	0,72-1,31	0,86
51-65 years old	40	74,1	14	25,9	0,63	0,39-1,04	0,069
Marital status							
Not married	137	45,8	162	54,2	1,0	Reference	
Married	184	61,7	114	38,3	0,77	0,62-0,96	0,020
Divorced	2	66,7	1	33,3	0,68	0,15-3,16	0,621
Flight hours in 7 consecutive hours							
<3,5	123	48,6	130	51,4	1,0	Reference	
3,5-14	83	62,8	49	37,1	0,76	0,59-0,98	0,036
>14	117	54,4	98	45,6	0,94	0,78-1,14	0,541

DISCUSSIONS

In this study, 46.17% subjects had an appropriate physical exercise habit based on ACSM recommendation; meanwhile 53.83% subjects did not have an appropriate physical exercise habit based on ACSM recommendation. This percentage is similar to the data reported by Haskell, from 2005 less than half (49.1%) of U.S. adults met the CDC/ACSM physical activity recommendation.[8] A higher percentage was reported by Martin, 68% of his study respondents are physically active below the CDC/ACSM criterion.[9] But a lower percentage was reported by Wallace, approximately 37% the study respondents met CDC/ACSM guideline. [10]

This study has proven that there was an association between flight hours in 7 consecutive days to the physical exercise habit among the civil pilot in Indonesia. Pilots who sit in the workplace might be susceptible to sedentary behavior.

Sedentary behaviors typically are in the energy expenditure range of 1.0 to 1.5 METs (multiples of the basal metabolic rate). Thus, sedentary behaviors are those that involve sitting and low levels of energy expenditure. In contrast, moderate-to-vigorous physical activity such as bicycling, swimming, walking, or running may be done in a variety of body positions, but require an energy expenditure of 3 to 8 METs.[11]

Data from 15 European Union member state showed that the most important barriers to increase physical activity are work or study commitments.[12] Lack of time is one of the most frequently reported barriers in developing countries. It was suggested that this barrier may actually represent a lack of motivation, but another study found an association between hours worked and leisure-time physical activity.[13]

In this study, pilot who had flight hours in 7 consecutive days 3.5-14 were having less 24% risk of appropriate physical exercise (RRa= 0,76; p=0,032) Compared to the pilot who had flight hours in 7 consecutive days less than 3.5 hours. Swanson reported that compared with respondents who drove < 210 min/week, those who spent more time driving were generally less likely to participate in sufficient PA; however; only driving for at least 1680 min/week was statistically significant (OR 0.40). Each hour of driving per week (continuous variable) was associated with a 1.6% reduction in the odds of achieving sufficient PA (OR 0.98; 95%CI 0.97–0.99, $P < .017$).[7]

Sedentary behaviors include sitting during commuting, in the workplace and the domestic environment, and during leisure time.[11] Findings from studies on work-related health suggest that occupations where the primary duties include operating a motor vehicle are associated with a higher risk of adverse health outcomes including overweight and obesity compared with occupations that involve no or limited operation of a motor vehicle.[14]

The association between obesity and physical exercise could not be determined in this study although 49,8% of the pilot is obese. Based on the bivariate analysis, obese pilot is less likely to have appropriate physical exercised compared to the pilot with normal weight (RRc=0,79; p=0,1). But it's not statistically significant in multivariate analysis with stepwise method.

In this study pilot who married had 23% risk of appropriate physical exercise, compared to the pilot who is not married [RRa=0,77; p=0,020]. Previous studies examining the association between marital status and physical activity behavior had different results. Booth et al (2000) found marital status has no association with physical exercise. Study by King et al. (1998) showed that transition from a single to a married state resulted in significant positive changes in physical activity relative to individuals remaining single.[15]

The limitations of this cross sectional study is measurement of physical exercise was done subjectively by a questionnaire without a direct measurement of MET-hour per week so the dose-response relation could not be obtained.

In conclusion, factor that associated with physical exercise is flight hours in 7 consecutive days. This could be a general description of sedentary behavior among the civil pilot in Indonesia based on the amount of time spent sit in the aircraft cockpit.

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