



DAYTIME SLEEPINESS IN THE DAILY WORK OF THE AIR FORCE: A SURVEY OF GERMAN SOLDIERS

Dr. Reinhard Stark, Lieutenant Colonel, assistant medical director of the
Department of the Bundeswehr Hospital Hamburg / Germany.



“It is one of the largest and acoustically most advanced concert halls in the world”.

From Wikipedia











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Introduction



NTSB: Both Pilots Asleep on Hawaii Flight

AUGUST 3, 2009 / 9:41 PM / AP



The National Transportation Safety Board has confirmed an initial finding that the captain and first officer of a flight that overflowed its destination in Hawaii inadvertently fell asleep while the plane was on autopilot.

The NTSB on Monday issued its final report in the case of a 2008 go! airlines flight from Honolulu that overflowed Hilo International Airport by 30 miles.

A contributing factor in the incident was the captain's previously undiagnosed severe obstructive sleep apnea, a condition that likely caused him to experience chronic daytime fatigue and contributed to his falling asleep during the Feb. 13, 2008, flight, the NTSB said.

Pilot asleep, co-pilot on tablet, airliner drops 5000 feet

BY GERMAN PRESS AGENCY - DPA | FRANKFURT | AUG 14, 2014 - 12:00 AM GMT+3 |

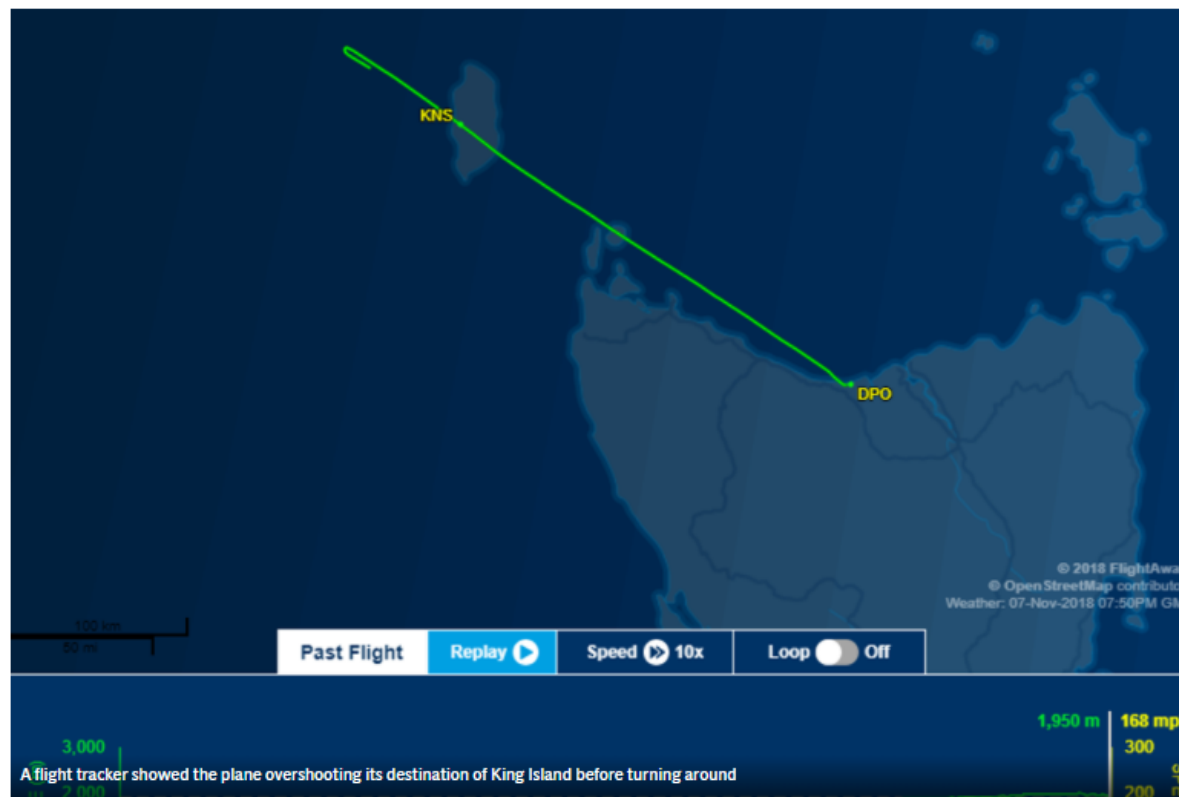


A Jet Airways plane with 280 passengers on board plunged 5,000 feet while the captain was allegedly asleep and the first officer was checking a tablet computer, officials and news reports said Thursday.

NEWS › [WORLD](#)

Australian charter flight missed destination by almost 50km after pilot fell asleep in the cockpit

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By [Megan White](#) | 26 November 2018

NEWS

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A pilot in Australia was reported to have fallen asleep midflight "likely due to a combination of fatigue and mild hypoxia [lack of sufficient oxygen]," according to the latest report Wednesday by the Australian Transport Safety Bureau (ATSB).

A new ATSB probe into the incident, which took place in July 2020, found the pilot who "was unresponsive to air traffic control calls for 40 minutes had fallen asleep due to fatigue likely exacerbated by mild hypoxia from the intermittent use of supplemental oxygen," the report said.

The pilot woke up and contact was reestablished when the plane was "about 111 km [around 70 miles]" from the intended destination of Redcliffe. The plane instead landed safely at Australia's Gold Coast Airport, around 56 miles south of Brisbane, the bureau said.



Background



1500 pilots from Portuguese airlines were surveyed

- **Fatigue!** → 90.6% Fatigue Severity Scale ≥ 4 means increased fatigue
- **Insomnia!** → 34.9% reported sleeping problems
- **Sleepiness!** → 46.2% Epworth Sleepiness Scale ≥ 10
(ESS > 10 indicates increased daytime sleepiness)

328 pilots of passenger aircraft in the Arab Emirates were interviewed

- 67.4% reported drowsiness-related errors in the cockpit
 - 45.1% fell asleep without consulting the copilot
- **Fatigue!** → 68.3% FSS \geq 4 (90.6%)
- **Sleepiness!** → 34.1% ESS \geq 10 (46.2%)



214 US Army pilots were asked in an anonymous questionnaire study (2018). 42.3% stated that fatigue was a widespread problem in US Army aviation



Daytime sleepiness in pilots carries an increased risk of accidents.

There are numerous studies on the potential dangers associated with sleepiness-related mistakes.

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There are currently no official data available on the situation in the Bundeswehr.

In order to objectify the problem, an anonymous questionnaire survey was carried out to analyze

- **fatigue-related errors** and
- uncontrollable tendencies to **fall asleep** in pilots.



Methodologie



- Military medical special research
- We assessed daytime sleepiness and fatigue of members of the German Air force
- Anonymous questionnaire survey
- 1112 soldiers of the Air Force (AF) and 200 soldiers (control group (CG)) with regular daily duty were contacted
- Depending on the area of operation, 22 (CG) or 26 (AF) points were asked about the professional situation and tiredness in everyday work



- Gender?
- Rank?
- Age?
- Specification? (front seater, back seater, flight control personnel, helicopter pilots, cargo pilots)
- Flights with time zone changes?
- Total number of flight hours?



The questionnaire also included:

- Epworth Sleepiness Scale (ESS)
- Fatigue Severity Scale (FSS)
- Depression Questionnaire (PHQ-9)



Short questionnaire (nine questions)

Screening instrument for the diagnosis of depression for routine use in the somatic medical field

total scale value	Depression severity
1–4	Minimal depressive symptoms
5–9	Mild depressive symptoms
10–14	Moderate depressive symptoms
15–27	Severe depressive symptoms



Findings

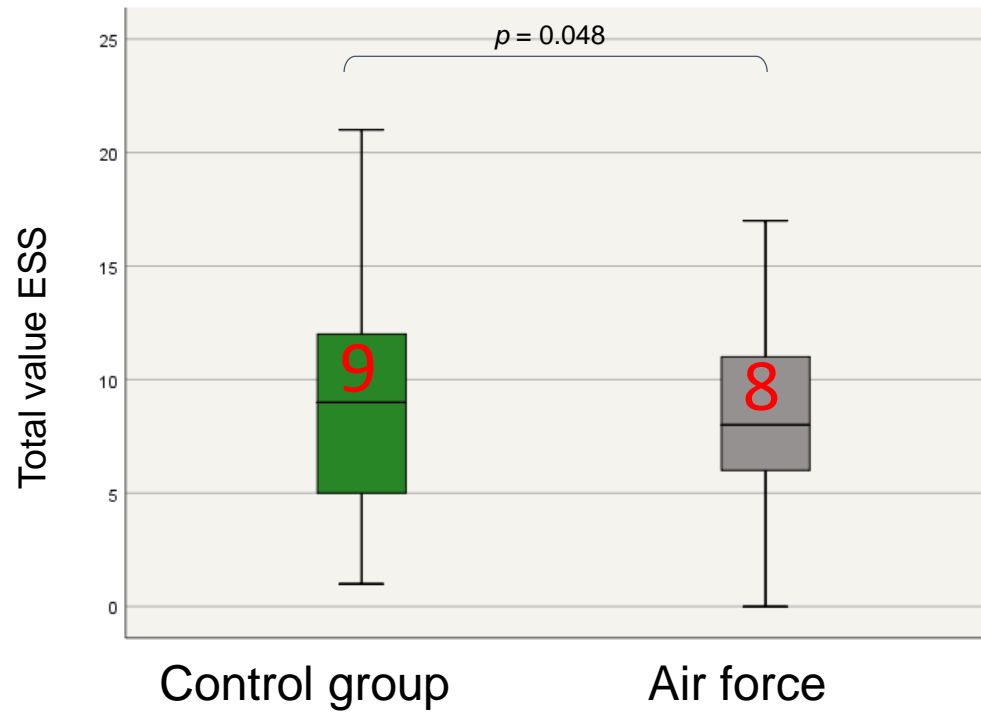


The **return rate (25,6%)** varied depending on the group membership:

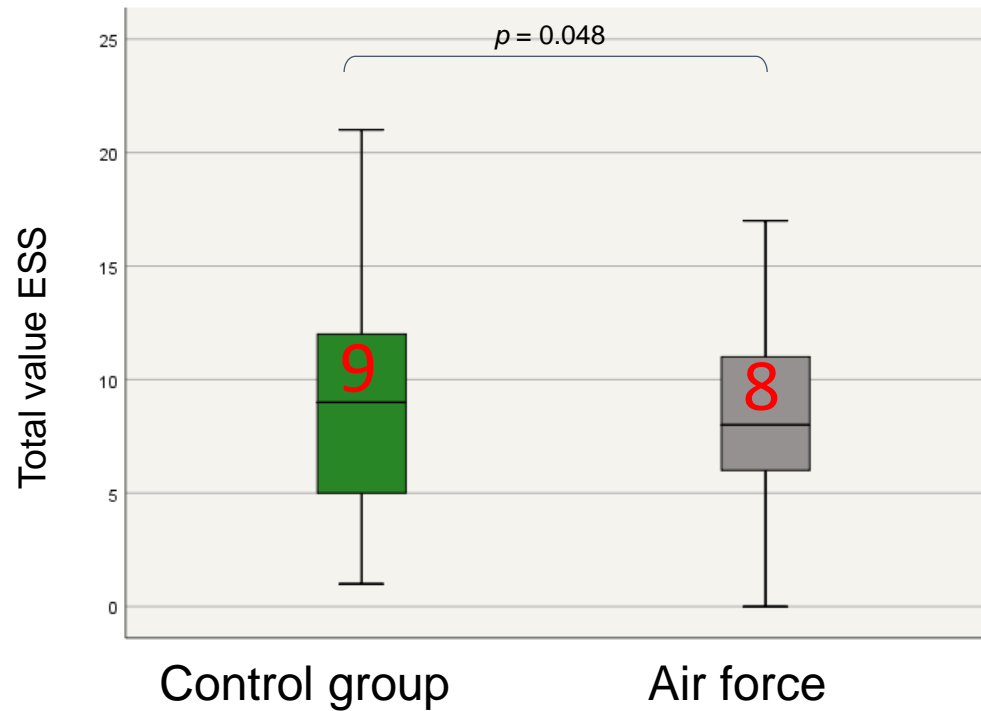
- Air Force 14.7% (n = 163)
- Control group 55% (n = 110)



EPWORTH SLEEPINESS SCALE - RESULTS

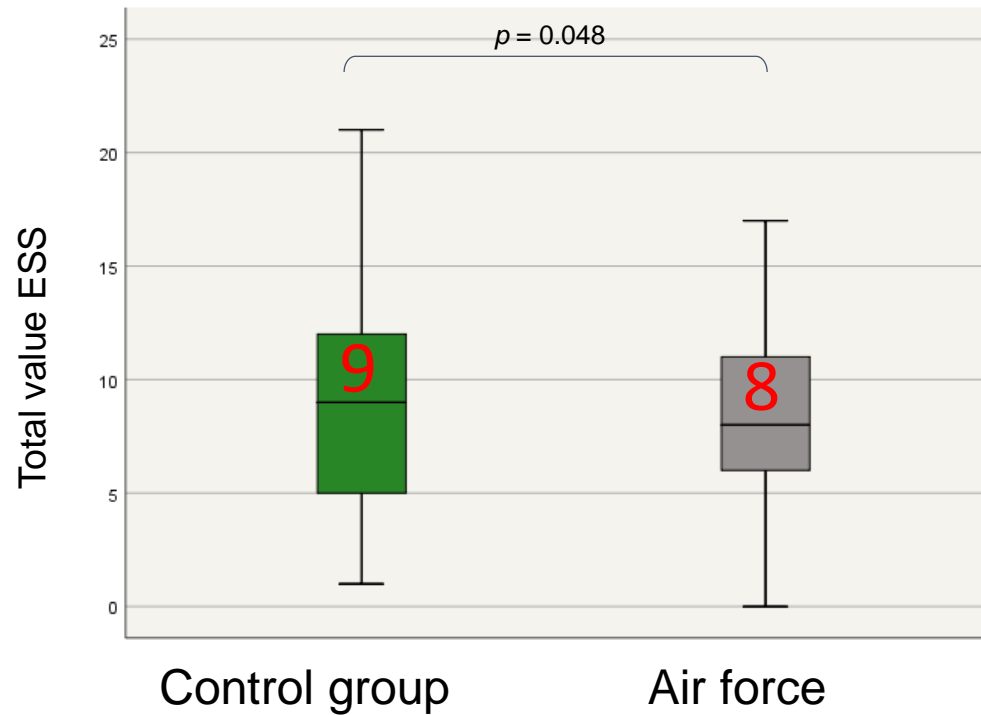


EPWORTH SLEEPINESS SCALE - RESULTS



n.s.

	Control group	Air force
ESS > 10	34.9%	31.7%

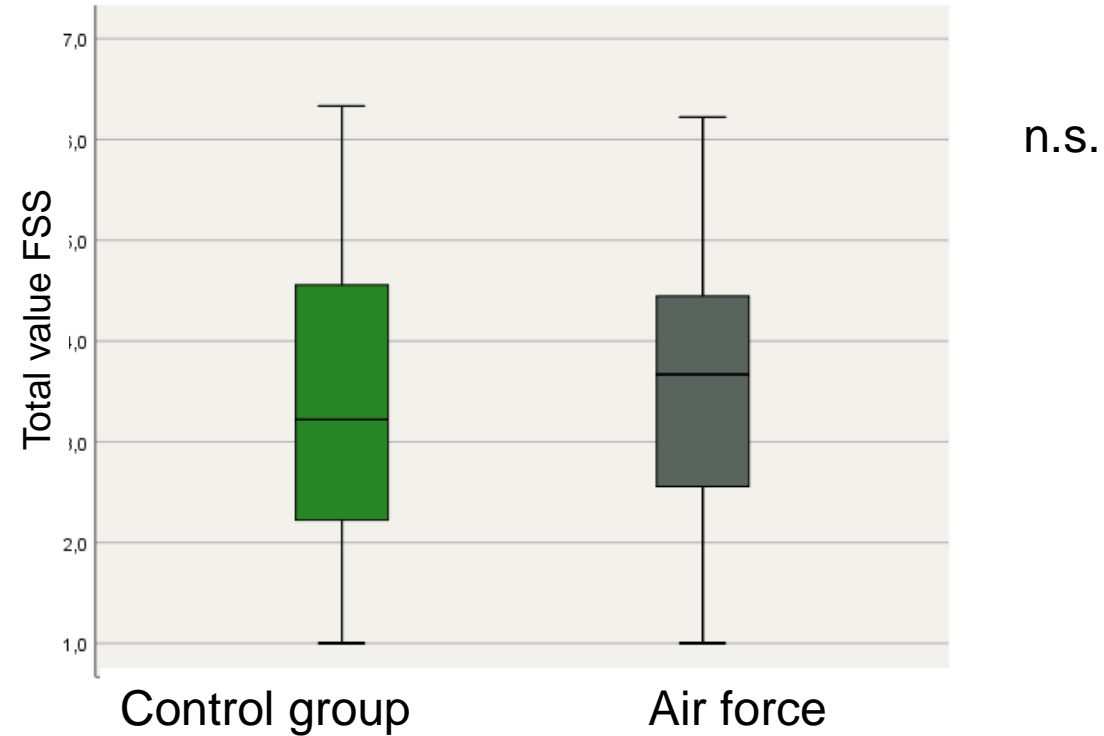


n.s.

	Control group	Air force
ESS > 10	34.9%	31.7%
ESS \geq 10		39,3%

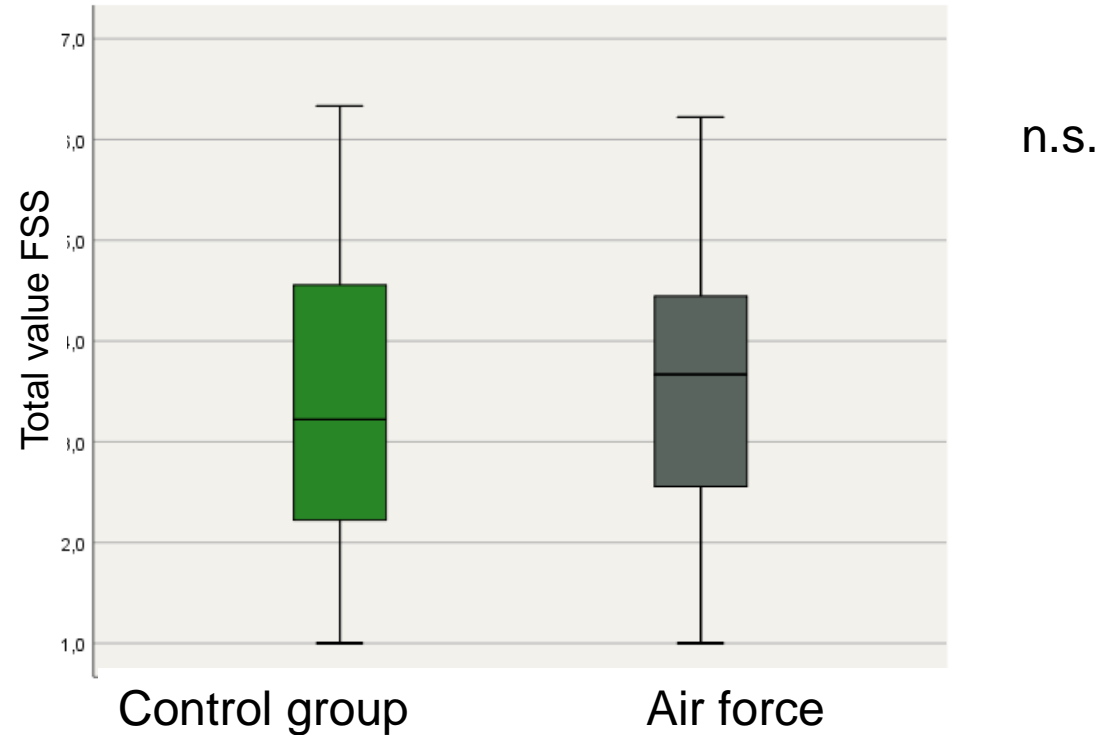
Pilots: ESS \geq 10 34,1% und 46,2%

FATIGUE SEVERITY SCALE - RESULTS



	Control group	Air force
FSS \geq 4	36.7%	40.9%

FATIGUE SEVERITY SCALE - RESULTS

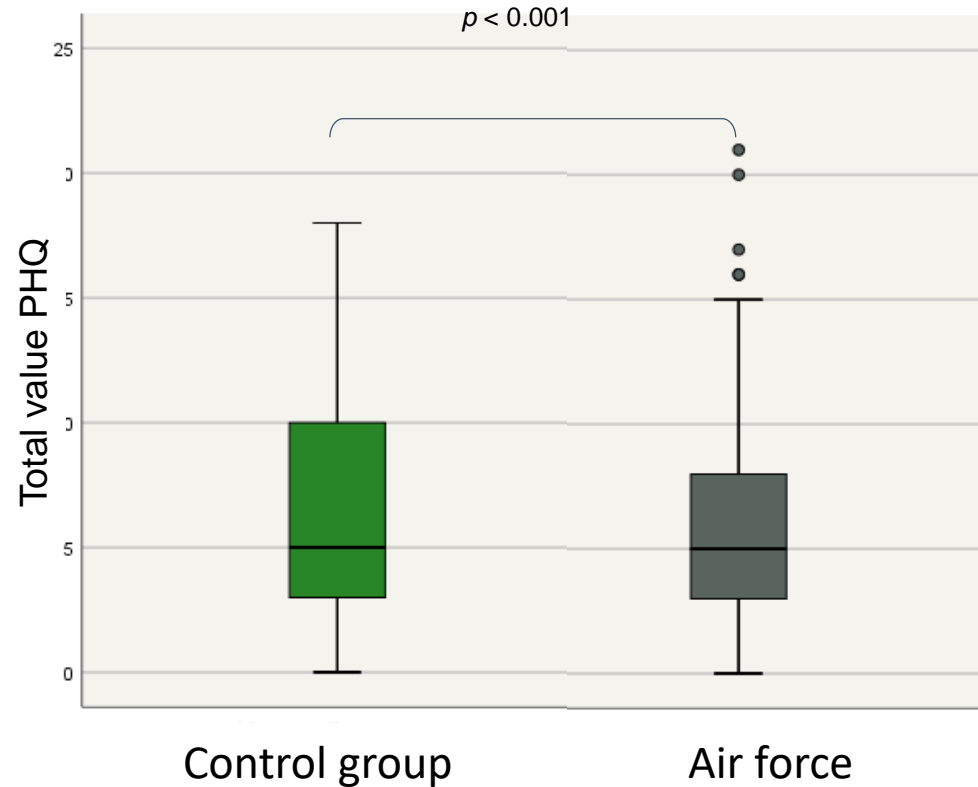


	Control group	Air force
FSS \geq 4	36.7%	40.9%

Pilots: FSS \geq 4 67.4% and 90.6%



PHQ – 9 DEPRESSION - RESULTS

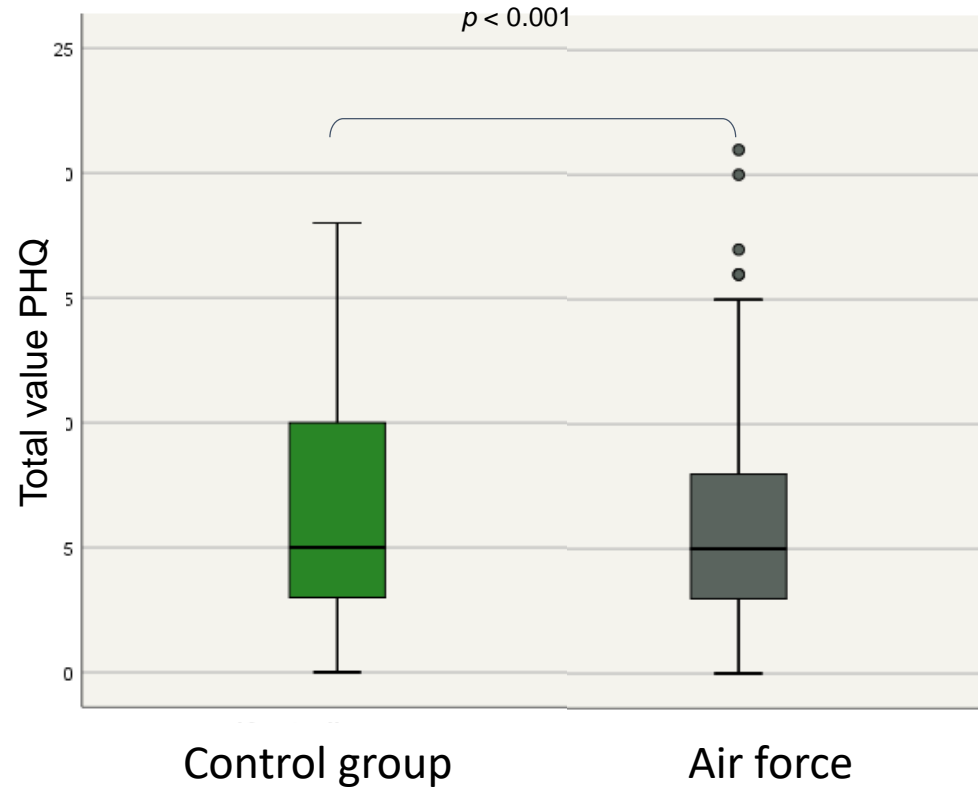


	Control group	Air force
PHQ-9 ≥ 10	27.3%	14.3%

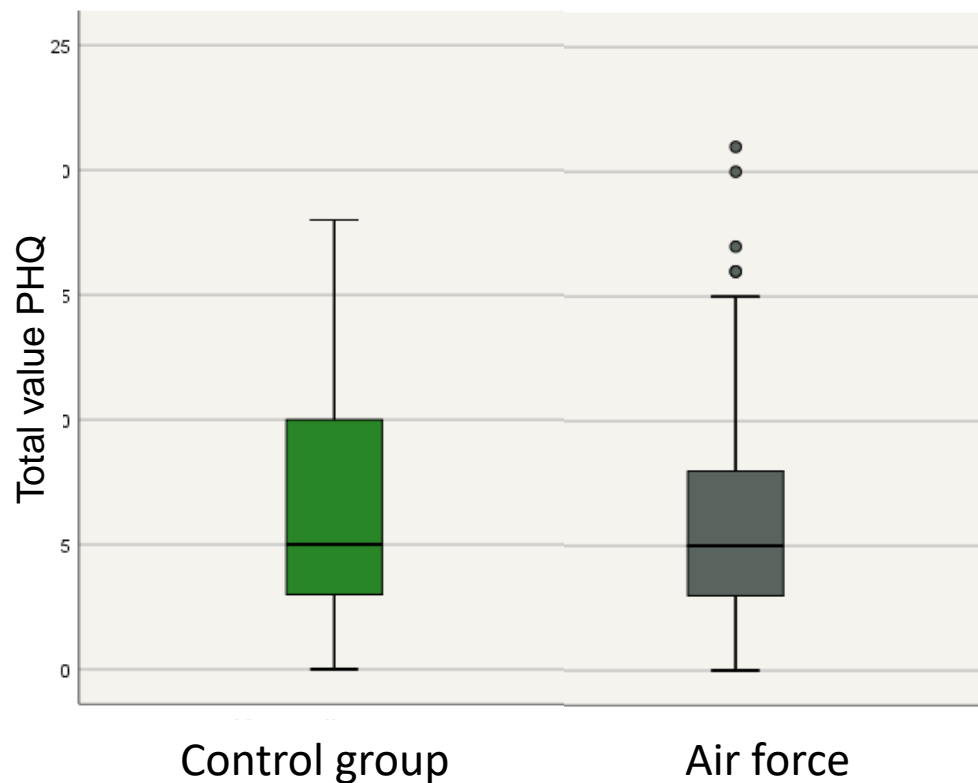
$p = 0.008$



PHQ – 9 DEPRESSION - RESULTS



	Control group	Air force
PHQ-9 ≥ 10	27.3%	14.3%
PHQ-9 ≥ 15	4.5%	3.7%

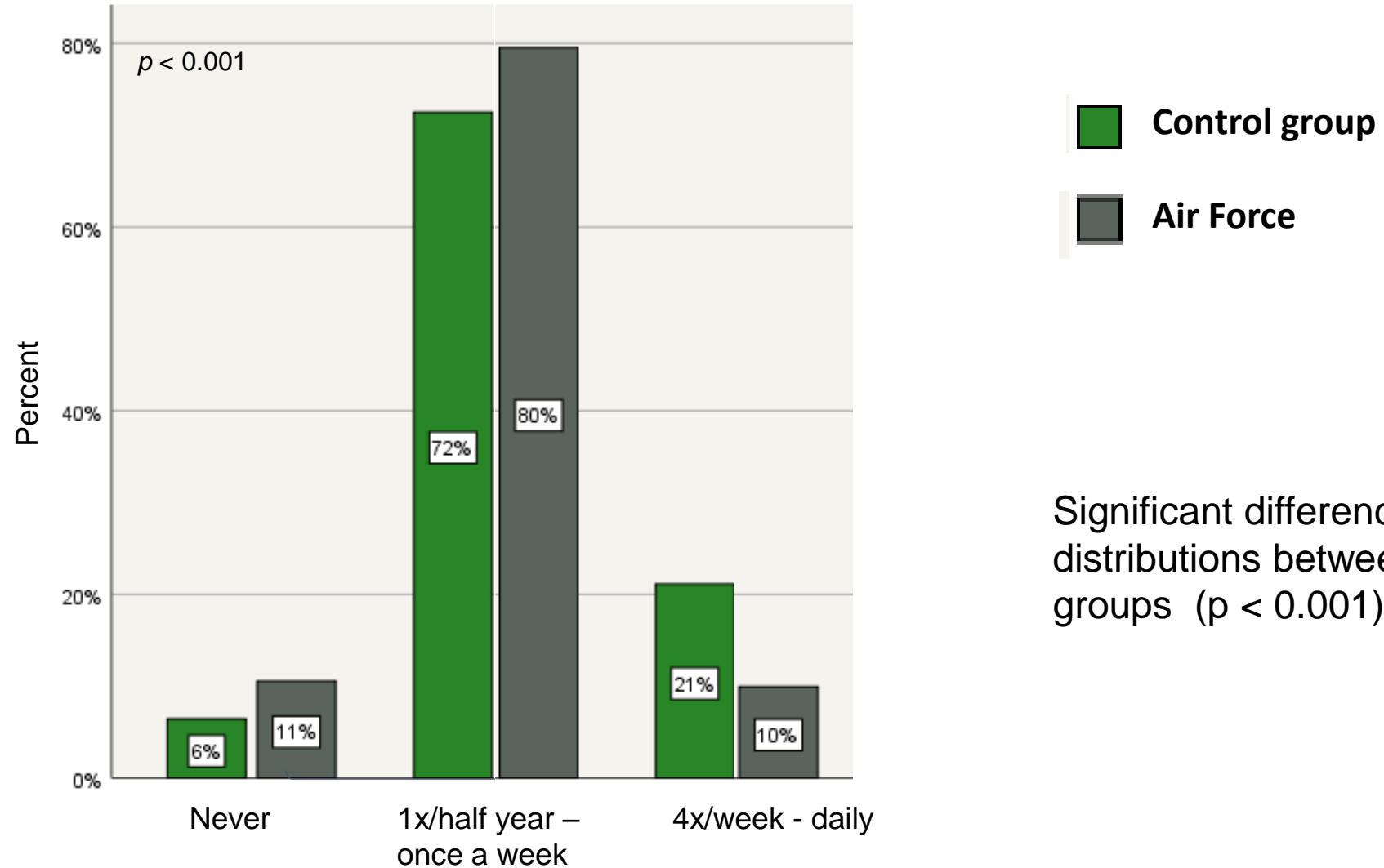


Survey of 1848 civil pilots from over 50 countries:
 12.6% of the subjects had abnormal values in the PHQ-9 indicating moderate depression

	Control group	Air force
PHQ-9 \geq 10	27.3%	14.3%
PHQ-9 \geq 15	4.5%	3.7%

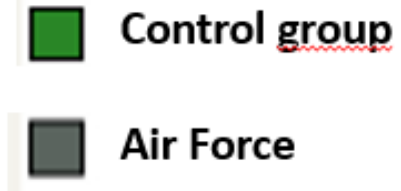
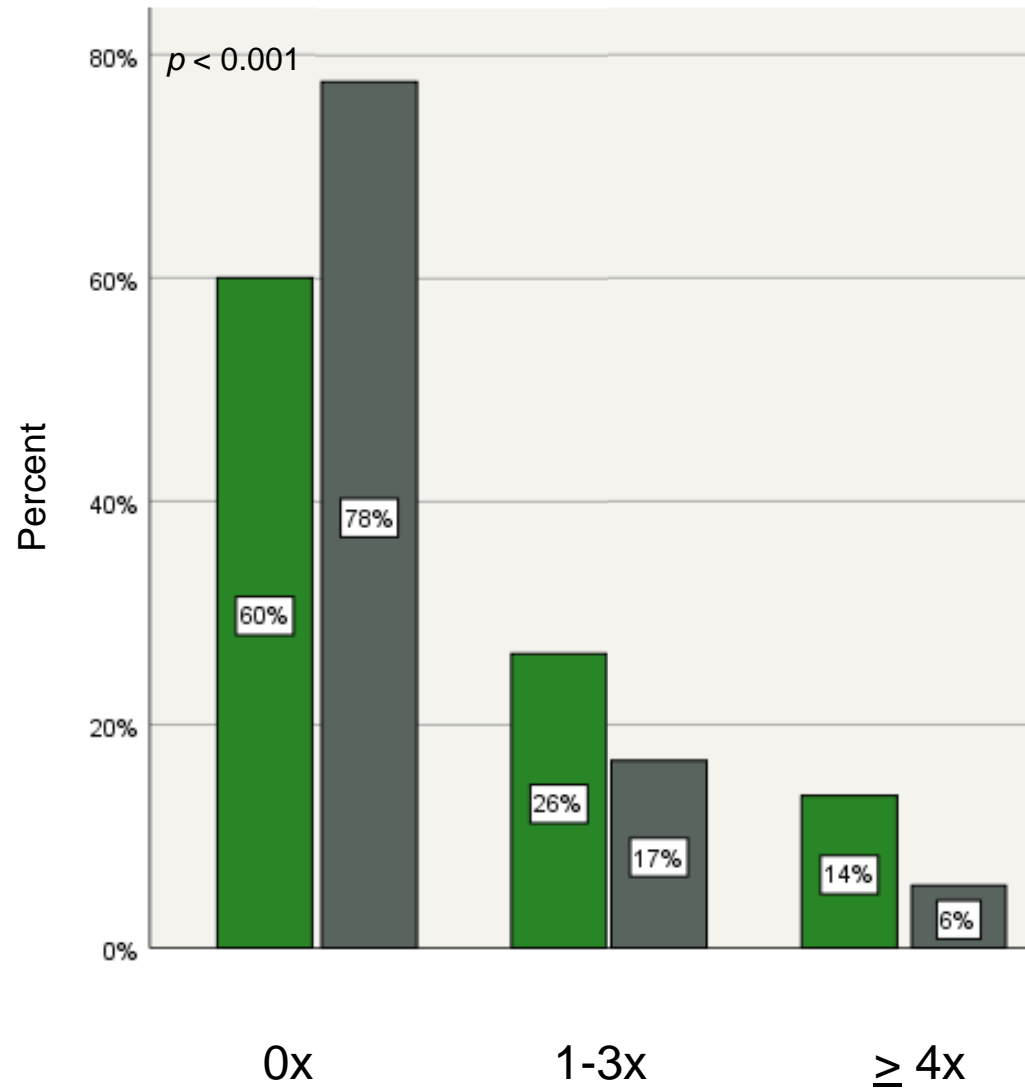
$p = 0.008$ (comparing PHQ-9 \geq 10 between groups)
 $p = 0.042$ (comparing PHQ-9 \geq 15 between groups)

ARE YOU VERY TIRED AT WORK?



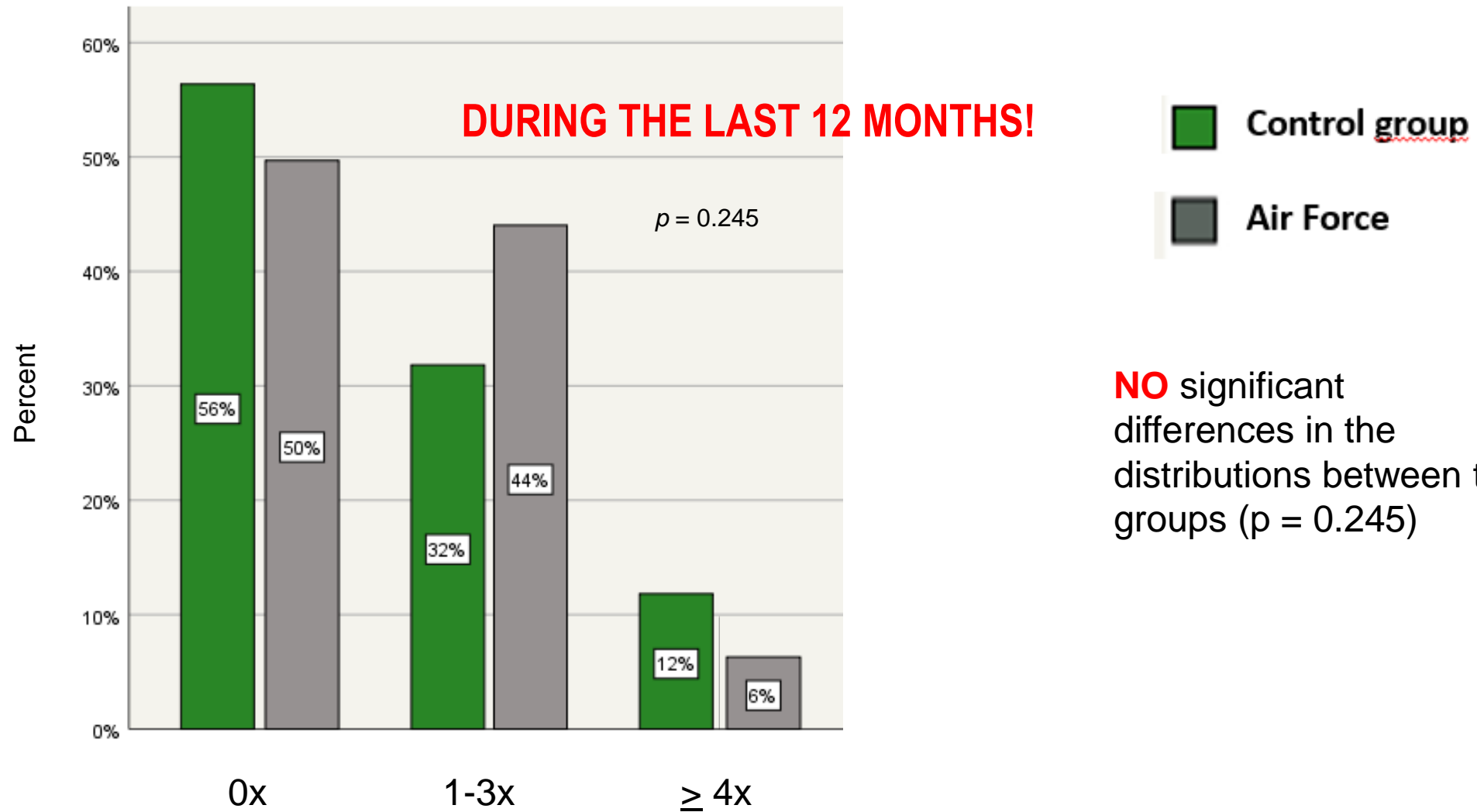


UNINTENTIONAL NODDING OFF ON DUTY DURING THE LAST 12 MONTHS?



Significant differences in the distributions between the groups ($p < 0.001$)

ERRORS CAUSED BY FATIGUE WHILE ON DUTY?





Discussion

More alert than the civil surveys (1.3) due to:

- Rarer long-haul flights > 6h? (2, 3)
- Hardly any night flight? (2.3)
- Hardly any flights across time zones? (2.3)

(1) Reis C, Mestre C, Canhão H, Gradwell D, Paiva T: Sleep complaints and fatigue of airline pilots. *Sleep Science* 9 (2016) 73–77

(2) Bourgeois-Bougrine S, Carbon P, Gounelle C, Mollard R, Coblentz A. Perceived fatigue for short- and long-haul flights: a survey of 739 airline pilots. *Aviat Space Environ Med.* 2003 Oct;74(10):1072-7. PMID: 14556570.

(3) Aljurf TM, Olaish AH, BaHammam AS: Assessment of sleepiness, fatigue, and depression among Gulf Cooperation Council commercial airline pilots. *Sleep Breath.* 2017 Sep 7. doi: 10.1007/s11325-017-1565-7



- Increased ESS total scores as a sign of sleepiness were found in 39.3%
- This is compared to the survey by Aljurf et al. (2017; 34.1%) slightly more, compared to Reis et al. (2016; 59.3%) but significantly less.

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- Reis described
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 - that the age of the pilots, the length of working hours, the number of short, medium or long-haul flights and the number of night flights have no influence on daytime sleepiness
 - while early starts and increased fatigue were statistically significantly associated with an increased total value in the ESS.
- The Bundeswehr pilots showed less fatigue
- The time of the morning take-offs was not queried in our survey

- The workload was felt to be the higher in the “Air Force” survey group (n.s.).
- The topic of “workload” was discussed significantly more often in the Air Force Group.
- Significantly more air force soldiers present themselves concentrated up to the end of duty.
- The percentage of respondents who agreed with the statement that they enjoy their professional activity was higher in the Air Force group (82.2%).



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... and all participants of the study