

The effect of hypoxia on reaction time to visual psychomotor task.

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The primary objective of this study is to determine the effect of exposure to hypoxia on the reaction time to visual stimuli presented at a FoV of 30 and 60 degrees horizontally and vertically. The secondary objective of this study is it to determine...

Ethical review	Approved WMO
Status	Completed
Health condition type	Other condition
Study type	Interventional

Summary

ID

NL-OMON50992

Source

ToetsingOnline

Brief title

Effect of hypoxia on reaction time

Condition

- Other condition

Synonym

Decrease in partial pressure of oxygen, hypobaric hypoxia

Health condition

Oxygen shortage in body tissue

Research involving

Human

Sponsors and support

Primary sponsor: Royal Netherlands Air Force, Centre for Man in Aviation

Source(s) of monetary or material Support: Ministry of Defence

Intervention

Keyword: Hypoxia, Pilots, Reaction time

Outcome measures

Primary outcome

The primary study parameter in this study is reaction time. Reaction time (in sec) will be measured from the moment a stimulus is presented till the participants press a right or left button

Secondary outcome

The following secondary study parameters will be measured:

1. The following response parameters will be measured during each of the visual tasks: 1. hits - correct identification of targets, 2. misses * error or omissions of target, 3. false alarms * error of commission and 4. anticipation - responses less than 200 ms following the onset of the stimulus.

2. Dwell time - Total duration of fixations made in the area of interest.

Fixation is defined as the time between the end of one saccade and the beginning of the next one. Only fixations longer than 90 ms will be used in the analysis.

3. The participants' self-perceived state of alertness. The state of alertness

will be assessed at the beginning and end of each test using the 7-point scale

Sanford Sleepiness Scale (SSS).

Study description

Background summary

A recent study showed that exposure to hypoxia impaired the awareness of environment in helicopter crews. In flight helicopter pilots rely on helmet mounted display (HMD) to help them maintain awareness of environment. HMD projects flight, sensor and weapon information (symbolology) in the pilot's field of view (FoV) eliminating the need to repeatedly look down at the cockpit instruments. Any factor affecting the pilots' ability to see and perceive a displayed symbol might have a detrimental effect on their awareness of environment. For helicopter pilots, one of such factors is hypoxia. Exposure to hypoxia has been shown to degrade visual contrast and, cause visual field narrowing. Both effects can lead to increased reaction time (RT) to visual stimuli. In addition, reduced alertness as a result of exposure to hypoxia can negatively affect vigilance and attention which are essential for visual scanning.

Study objective

The primary objective of this study is to determine the effect of exposure to hypoxia on the reaction time to visual stimuli presented at a FoV of 30 and 60 degrees horizontally and vertically.

The secondary objective of this study is to determine the effect of hypoxia on visual scanning and alertness during a visual scanning task.

Study design

The study design is single blinded, counterbalanced, repeated measures

Intervention

Participants will be exposed to simulated altitudes of 300 (92 meters) and 15,000 feet (4572 meters) in a hypobaric chamber. At these altitudes RT, visual scanning will be measured for stimuli presented at 30 and 60 degrees FoV.

Study burden and risks

We expect the risks for the pilots in the present study to be very small. It is expected that during exposure to the 15.000 ft. altitude the pilots will experience hypoxia related symptoms. However, as observed in hypobaric chamber training performed at this altitude the symptoms vanish after descent is complete and the pilots start breathing ambient air. In addition, pilots of RNLAf receive hypoxia training every five years. Therefore, they are familiar with the symptoms of hypoxia. The pilots will not be exposed to extreme altitudes or additional risks compared to the normal hypoxia training they follow during their flight career.

Each pilot will spend a total of 4.5 hours, in one day, participating in this study. This includes the familiarization and test session. Four times during the test session the participants will fill in a short questionnaire containing a question regarding their alertness.

Contacts

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Trial sites

Listed location countries

Netherlands

Eligibility criteria

Age

Adults (18-64 years)

Elderly (65 years and older)

Inclusion criteria

Pilots of the Royal Netherlands Air Force

Male

Age 22-55

The pilots need to pass their mandatory medical examination and be declared "fit to fly".

Exclusion criteria

Pilots exposed to altitudes higher than 8000 feet for a period longer than one week in the three months prior to the research.

Study design

Design

Study type: Interventional

Masking: Open (masking not used)

Control: Uncontrolled

Primary purpose: Treatment

Recruitment

NL

Recruitment status: Completed

Start date (anticipated): 02-12-2021

Enrollment: 20

Type: Actual

Ethics review

Approved WMO

Date: 08-03-2021

Application type: First submission

Study registrations

Followed up by the following (possibly more current) registration

No registrations found.

Other (possibly less up-to-date) registrations in this register

No registrations found.

In other registers

Register	ID
CCMO	NL75997.018.20