SHORT COMMUNICATION

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THE INFLUENCE OF MORBID OBESITY ON DRIVING SKILLS. PRELIMINARY RESULTS

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Abstract: The goal of the study was to assess psychomotor skills of morbidly obese drivers. The study group included 9 morbidly obese patients and the control group consisted of selected representatives of Polish drivers. The Vienna Test System was used for the purpose of this study. Differences in cognitive skills observed between both groups were significant. Studies on larger populations are necessary.

Keywords: driving, morbid obesity, psychomotor skill

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INTRODUCTION

Since human error is the principal cause of a significant part of traffic accidents [3], the subject of the influence of obesity on the ability to drive is extremely important, especially considering an increasing number of obese and morbidly obese people around the world. According to WHO, in 2011 the population of the obese reached 400 million and it is estimated that 700 million people will be obese in 2015. Obesity, and morbid obesity in particular, in many ways exerts negative influence on the quality of life. Even the ordinary, simple everyday tasks may become very difficult or even impossible to deal with. Loss of physical dexterity is accompanied by psychological deficits. According to recent studies, obese people are at higher risk of death due to motor vehicle accidents compared to non-overweight individuals [7,14]. Morbidly obese people usually suffer from a variety of diseases, many of which are secondary to obesity, such as: hypertension, sleep apnea, fatigue and many more. Sleep apnea may cause drowsiness during the day. Previous research demonstrates that attention lapses are correlated with cognitive failure [9], which may be associated with fatigue.

Psychologically, research reveals deficits of cognitive skills among the obese people. Studies report statistically significant deficits in cognition. Operational and prospective memory [5], fluency [4], reaction time [1] and executive functions [2] are reduced in obese patients. Moreover, their decision-making skills and ability to learn on mistakes are impaired [8]. According to the observations, cognitive deficits are connected with changes in pre-frontal lobe activity [6].

Driving a car is a complex task requiring the driver to use most of the above mentioned skills. There is no research documenting the differences between a group of regular drivers and drivers diagnosed with morbid obesity and it is necessary to gather information regarding difficulties encountered by the morbidly obese drivers while driving a car, particularly in the context of constantly growing obese population around the world. Conducted studies will be of great significance for the future. Due to research conducted on morbidly obese people, car manufacturers and designers of in-car devices will be able to adapt their products to the needs of obese drivers, resulting in increased security during everyday road travel.

The goal of the study was to assess psychomotor skills crucial to driving safety among morbidly obese drivers.

METHODS

A group of 9 morbidly obese patients underwent testing. A group of regular drivers was tested for comparison. The control group provided by the Motor Transport Institute in Warsaw was selected to represent a population of Polish drivers. Study group comprised patients treated at the Department of Surgery of the Military Institute of Aviation Medicine in Warsaw. Testing lasted approximately a little over one hour each day for two days. Testing procedure did not violate the bodily integrity or privacy of the subjects. Personal data was anonymized to maintain the privacy of the participants. Information concerning medication or stimulants used by the patients was taken into account during formation of the study group. Both the study group and the control group were tested under similar, suitable conditions. Subjects from both groups were tested using the same methodology.

The following inclusion criteria were applied to the study group: subjects had to be active drivers with a valid driver's license, with obesity unrelated to endocrine disorders, over 18 years old, who had signed permission to be tested, and with BMI > 40, or > 35 with coexisting pathologies due to obesity. Control group consisted of subjects with BMI > 18.5 but < 30.

During the study both groups participated in a series of tests from the Vienna Test System measuring executive function, cognitive function, attention, memory, reaction time, motor coordination, visual and sound perception, and decision-making process. During trials the following tests from the Vienna Test System were used: Reaction Time Test (RT) Form s.1 and s.3 – tests assessing reaction time and motor response to simple and complex visual or acoustic signals [12], Memory Span Test (CORSI) measuring short-term visual memory capacity (nine blocks were shown on the screen and the subjects were asked to tap on the same blocks in the same order as the pointer. After three items the number of blocks increased by one. The test was stopped when the respondent made an error on three successive items) [10], Peripheral Perception Test (PP) for measuring perception and processing of peripherally displayed visual stimuli [13], Determination Test (DT) Form s.5 measuring stress tolerance, attention and reaction speed in situations requiring constant response to rapidly changing visual and acoustic stimuli [11]. U Mann-Whitney test was used to analyze the acquired data.

RESULTS

Determination test (DT) results, measuring attention and reaction speed in an environment containing multiple distractors showed significant differences between groups with regard to: reaction time (0.001 $p<0.05$), correctness of responses (0.034 $p<0.05$), response within a given time (0.002 $p<0.05$), delayed reaction (0.001 $p<0.05$), and omitted stimuli (0.025 $p<0.05$).

DISCUSSION

These preliminary results demonstrated that there were significant differences between groups in terms of cognitive skills, and that we may suspect differences with regard to driving capabilities between morbidly obese and non-obese drivers. These differences were observed with respect to some of the skills crucial for driving, such as: reaction adequacy and reaction time. The fact that such differences were observed in such a small study group only encouraged us to continue research on a more representative group.

AUTHORS' DECLARATION:

Study Design: Michał Janewicz, Stefan Gaździński, Ewa Trejnowska, Adam Tarnowski, Paulina Baran, Mariusz Wyleżoł; **Data Collection:** Michał Janewicz, Stefan Gaździński, Ewa Trejnowska, Adam Tarnowski, Paulina Baran, Mariusz Wyleżoł; **Statistical Analysis**: Michał Janewicz, Stefan Gaździński, Ewa Trejnowska, Adam Tarnowski, Paulina Baran, Mariusz Wyleżoł; **Manuscript Preparation:** Michał Janewicz, Stefan Gaździński, Ewa Trejnowska, Adam Tarnowski, Paulina Baran, Mariusz Wyleżoł; **Funds Collection:** Michał Janewicz, Stefan Gaździński, Ewa Trejnowska, Adam Tarnowski, Paulina Baran, Mariusz Wyleżoł. The Authors declare that there is no conflict of interest.

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