



WORK ABILITY INDEX AMONG MEDICAL STUDENTS

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ABSTRACT

Determining a person's work ability for a specific job is one of the key factors in assessing their professional capacity. The Work Ability Index (WAI) is often used by specialists in occupational medicine for its easy implementation and reliable results. **PURPOSE:** To evaluate the Work Ability Index among fourth-year medical students in order to determine their working capacity at the beginning of the school semester. **METHODS:** We used a standardized WAI questionnaire, adapted for Bulgaria by Mincheva and Vangelova, on 44 (21 male and 23 female) students. **RESULTS:** The measured WAI ranged from 22,5 to 49 points with a mean of 39,75 (SD 6,02). 55% of the students showed poor/moderate work ability based on the scale given by Kujala et al. Males reported better physical capacity and overall health. The subjects had medical conditions typical for their work environment and way of life. **CONCLUSIONS:** The results of the study indicate the need for improving the students' work ability.

Key words: work ability index, medical students

INTRODUCTION

Leading Bulgarian professors in occupational medicine define work ability as one's ability to perform specific work for a period of time while maintaining optimal capacity and quality and without showing signs of fatigue or exhaustion (1). It is a complex characteristic of every working man and woman, which in recent years appears to be a serious problem in view of Europe's aging population. Work ability depends not only on personal qualities and health, but also on a plethora of external factors (**Figure 1**).

Comprehensive evaluation of work ability is often considered difficult to perform as it involves the services of many medical specialists and the use of significant resources. Work ability assessment is a complex undertaking involving much labor and money and includes the evaluation of cardiovascular functions, musculoskeletal functions, cognitive functions, sensory functions (vision, hearing), mental resources and more. Therefore, the

development and introduction of the Work Ability Index (WAI) by a group of Finnish occupational health specialists (2) was seen as a breakthrough in measuring this important aspect of workers' potential and a valuable tool in predicting and preventing disabilities (3). The index is determined on the basis of the answers to a series of questions which take into consideration the demands of work, the worker's health status and resources (4). Several studies have proved the reliability of WAI as well as the similarity of its results to the results of more objective measurements (5, 6). WAI was initially used in a follow-up study of ageing employees aged 45-58 in Finland (7) but its effectiveness has led to its rapid adaptation and distribution in many European countries, and even China (8, 9). Currently, the assessment scale for WAI by K. Tuomi et al. is being applied in surveys of different age groups, which could produce misleading results, since studies have shown that WAI is strongly affected by the age of the respondents (10). Therefore, another team of Finnish researchers, V. Kujala et al., attempted to revise the original scale and make it suitable for assessing younger employees (11). We used their suggested scale in this study of work ability.

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working capacity at the beginning of the school semester.



Figure 1. Subjective and objective factors affecting work ability.

MATERIALS AND METHODS

Standardized WAI questionnaires, official Bulgarian adaptation by Mincheva and Vangelova (1), presented in brief on **Table 1**, were distributed among fourth-year medical students in the first week of the second school

semester. The returned fully completed questionnaires were n=44; 21 from male and 23 from female students aged 22-27 years (average age 23 years, SD=1,18). The data received were processed and analyzed using Microsoft Excel and StatSoft Statistica 7.

Table 1. Items used to determine the Work Ability Index

Item	Questions	Range
1. Current work ability compared with the lifetime best	1	0 - 10
2. Work ability in relation to the demands of the job	2	2 - 10
3. Number of current diseases diagnosed by a physician	1	1 - 7
4. Estimated work impairment due to diseases	1	1 - 6
5. Sick leave during the past year (12 months)	1	1 - 5
6. Own prognosis of work ability 2 years from now	1	1 - 7
7. Mental resources (for life in general)	3	1 - 4

RESULTS

For the interpretation of WAI we compared the scales developed by Tuomi et al. and Kujala et al. (**Table 2**). The mean WAI of the survey group was 39,75 (SD 6,02): 39,5 for male and 40 for female students with no significant difference based on gender. These results

could be interpreted as good (Tuomi) or moderate (Kujala) work ability. It was also evident that, depending on the scale used, the results could be interpreted as largely satisfactory (68% good/excellent WAI, Tuomi scale) or largely unsatisfactory (57% poor/moderate WAI, Kujala scale).

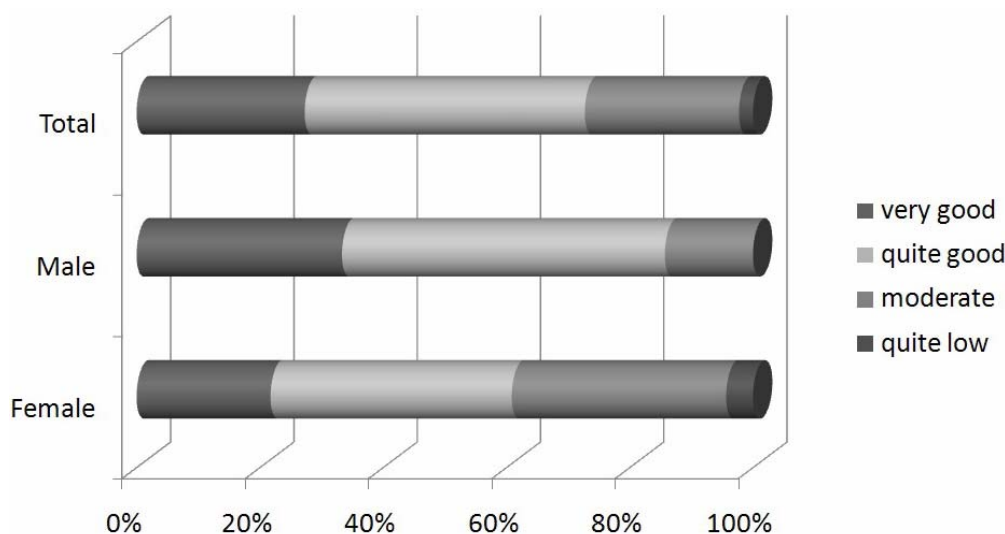
Table 2. Work Ability Index by gender

Tuomi et al. (1998)					Kujala et al. (2005)				
WAI	Score	Male n=21	Female n=23	Total n=44	WAI	Score	Male n=21	Female n=23	Total n=44
Poor	2 – 27	n=1	n=2	n=3 (7%)	Poor	7 – 36	n=7	n=7	n=14 (32%)
Moderate	28 – 36	n=6	n=5	n=11 (25%)	Moderate	37 – 40	n=4	n=7	n=11 (25%)
Good	37 – 43	n=8	n=14	n=22 (50%)	Good	41 – 44	n=6	n=7	n=13 (29%)
Excellent	44 – 49	n=6	n=2	n=8 (18%)	Excellent	45 – 49	n=4	n=2	n=6 (14%)

Item 1 in the questionnaire required the test subjects to self-assess their current work ability in the range 0 -10 compared with their lifetime best, 0 meaning worst and 10 meaning best possible work ability. In 21 of the given answers (48%), current work ability was estimated by the study participants as 6 or less, in 20% as 7, also in 20% as 8, in 7% as 9, and only two students (5%) gave themselves the maximum of 10 points. We also compared the self-assessed work ability to the measured WAI. Results were as follows: for the Tuomi scale, we found concurrence in 50% of the cases, better self-evaluation in 11%, and worse

self-evaluation in 39%; for the Kujala scale, the percentages were 36%, 48% and 16%, respectively.

The distribution of answers to Item 2 is shown on **Figure 2** (work ability in relation to the physical demands of the job) and **Figure 3** (work ability in relation to the mental demands of the job). The physical capacity for work is slightly higher than the mental capacity, and female students evaluate their physical capacity worse than their male colleagues; again, no significant difference between genders was evident.

**Figure 2.** Work ability in relation to the physical demands of the job.

There were no differences in scores for mental demands of the job between male and female students. In the final score for Item 2, priority was given to mental capacity due to the nature of the students' work as predominantly mental. The final score ranged from 4,5 to 10, averaging 7,5.

Most of the subjects (n=25) didn't suffer from any diseases (**Figure 4**), again the males appearing healthier than females (but not significantly). Five people claimed to currently

having five or more diagnosed illnesses or medical conditions. Most frequently stated diseases were gastritis, respiratory infections, ophthalmological conditions, low back or neck pain, neurological and skin diseases. It is a worrisome fact that quite a few of the students (n=8) self-diagnosed as having some kind of mental disorder, predominantly depression. Higher number of diagnosed illnesses corresponded to a low WAI (with two exceptions).

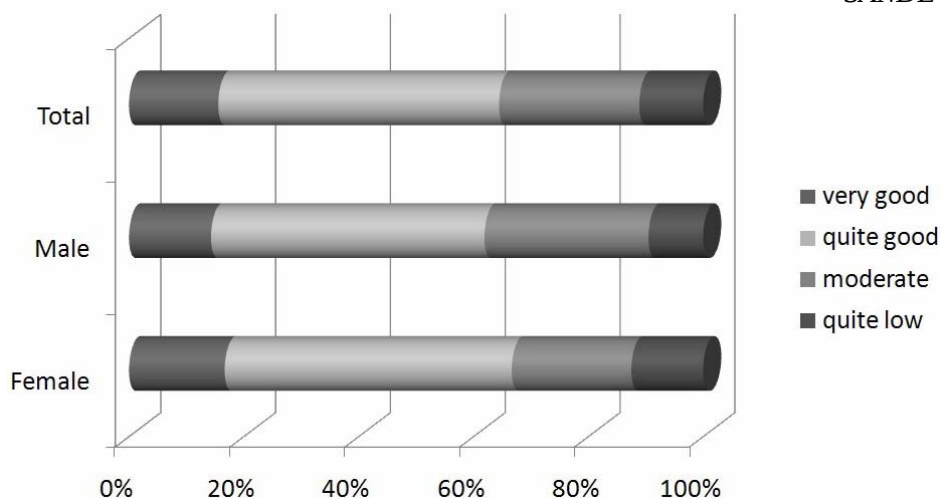


Figure 3. Work ability in relation to the mental demands of the job.

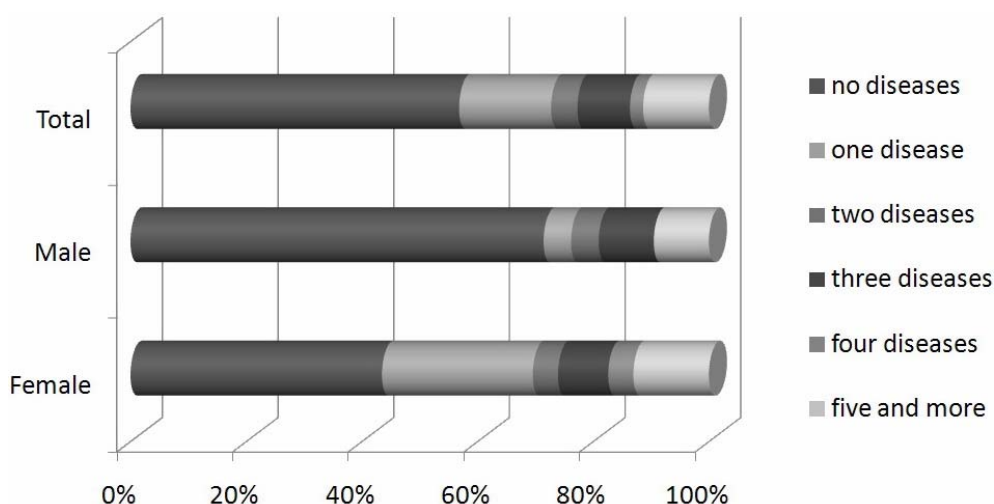


Figure 4. Number of current diseases diagnosed by a physician.

The majority of students (66%, $n=29$) didn't have work impairment due to a disease, while only four subjects (9%) stated that their condition often disturbs their work. Likewise, 73% ($n=33$) never went into sick leave during the 12 months before the survey; only one person was away for more than 25 days.

Almost all students (84%, $n= 37$) shared an optimistic view of their future (two years from now) work ability, three (7%) gave a moderate, and four (9%) a pessimistic prognosis. Overall, the surveyed subjects showed good mental resources (80% receiving a final score of 3 or 4) and an even distribution of answers for the three questions comprising Item 7 (experiencing pleasure in everyday activities, taking initiative and having hopes for the future) as follows: 20% answered "all the time", $40\pm5\%$ – "quite often", $35\pm5\%$ – "sometimes" and about 5% answered "rarely."

DISCUSSION

The calculated mean WAI (39,75) could be interpreted as either good (Tuomi scale) or moderate (Kujala scale) work ability (**Table 2**). The female group had slightly higher mean WAI than the male group, although other studies report the opposite (11). Our research team decided to adhere to the scale suggested by Kujala et al. due to the closeness of the age groups used (23 years average age for our test subjects, 31 in the Kujala et al. study). Therefore, the obtained results were considered overall unsatisfactory: more than half of the students showed poor or moderate work ability on the Kujala scale and thus a need for intervention in order to restore or improve it (2). Since the survey was conducted at the beginning of the second semester, the poor results suggest that the majority of students would not perform their work at maximum capacity or might find their obligations too

excessive, which may lead to signs of stress, fatigue, or illness. Similar results are often observed in studies among medical personnel, e.g. nursing staff (13), midwives (14), and physicians (15). Our survey suggests that the problem with low work ability among medical personnel starts as early as the university bench and gradually worsens as the young men and women begin their professional careers. The major causes of concern related to low work ability are not only the demanding working conditions in hospitals and medical practices, such as shifts, long working hours and stressful dealings with patients and colleagues, which are typical for the medical profession, but also the lack of successful coping strategies and other organizational and psychosocial mechanisms for preventing stress at work and promoting a positive work environment. These preventive strategies should be taught not only at work, but also at medical school. Unfortunately, university programs in Bulgaria are considerably lacking in that aspect of education.

Most students (48%) self-assessed their current work ability as poor or moderate, which correlated positively with the final WAI score (57% poor/moderate WAI on the Kujala et al. scale) and showed that the students could evaluate their condition quite well. Males fared better on the items concerning physical capacity, but mental capacity were estimated similarly by both men and women. Usually in Bulgaria men at this age practice sports more regularly than women, which explains their higher physical capacity (16).

The cited illnesses, diagnosed by a physician (Item 3), could be attributed either to work-related stress and a sedentary lifestyle (gastritis, low back pain and neck pain) or to exposure to biological risks during the students' hospital training. These conditions are widespread among professions with low physical and considerable mental activity, one of which is the medical profession (17). A positive aspect of item 3 was that the mentioned diseases did not necessitate sick leave among the majority of students.

Another good outcome was the positive outlook on life in general, shown in Item 7. Although the students evaluated their studies as stressful and strenuous, they still found pleasure in everyday activities, felt motivated and had hope for the future. This positive view

on life is a significant factor in achieving better work ability and overall happiness.

The largely poor/moderate work ability of the students in this survey shows the strong need for optimization and preventive measures. The promotion of work ability is often extended to include work demands and the work environment, work organization and community, and employees' health, functional capacity and professional competence (18). Some measures that could be useful in achieving better work ability of medical students should be directed to: increasing physical activity and preventing of hypodynamia, especially among female students; acquiring skills for dealing with psychological stress; applying adequate work/rest regimens in order to increase productivity and delay signs of fatigue (19). Little could be done regarding workload and the work environment at universities, as medical training is one of the most rigorous. Still, school officials and administrators should consider optimizing the current medical curriculum.

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