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Work ability index in Slovenian hospital nurses aged over fifty years

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Nurses with reduced work ability are highly susceptible to the deleterious effects of their working environments, and their rates of sick leave, disability, and early retirement are higher than average. The aim of this study was to evaluate work ability in 433 Slovenian hospital nurses aged over fifty years providing secondary care in thirteen hospitals across Slovenia. To do that we used a standardised instrument known as work ability index (WAI). Mean WAI was 36.98±6.46 and median 38. WAI was not associated with age (Spearman's ρ=-0.034, p=0.475). Total WAI score strongly correlated with the 1st item of the WAI questionnaire "current work ability" (ρ=0.726, p<0.001). Higher WAI scores were also associated with academic education, full-time employment, and working in a single (morning) or three shifts. Our WAI findings in nurses over fifty call for systemic changes in the nursing environment to maintain good work ability among nurses until the retirement age and beyond.

KEY WORDS: nursing; demographic factors; WAI; workplace

The work of healthcare professionals is psychologically and physically demanding. Nursing staff are involved in stressful situations on a daily basis, and this can have long-term health implications. It should be noted that congestion in the health sector is a consequence of a lack of staff; in the context of increasing demands of work, nurses are required to operate under the pressure of time, interruption of tasks, and consequent low levels of concentration (1). Nurses over 50 years of age are more likely to face health problems than their younger colleagues, and poor health may affect their productivity and, most importantly, the quality of care provided and the safety of patients (2).

The ability to work should be considered an important characteristic of human health and well-being (3). It is also related to other aspects and attributes of the individual, such as lifestyle, aptitude, and mental and physical capacity (4). By assessing working ability, we can detect employees with difficulties in meeting the demands of the job early on, and this is particularly important in older employees, especially in this era when retirement age is being prolonged (5).

The concept of work ability was developed in the 1980s by Finland's Institute of Occupational Health (6), and today it is assessed with the Work Ability Index (WAI), a subjective instrument comprising seven self-assessment measures. The WAI questionnaire, which has been translated and applied in many countries across the world, is also highly predictive. In fact, some 60 % of employees with low WAI scores aged between 45 and 57 received a disability pension within 11 years of testing (7). In Slovenia, this instrument has been translated for non-commercial use by the University Rehabilitation Institute (8) and, until now, mostly used in companies with disabled employees (9–13).

A variety of studies have looked into associations between WAI and sick leave, disease (14–16), lifestyle (14, 17–18), physical activity/exercise (19–20), quality of life (3, 21–22), age (23–26), education (27), work-related stress (27–31), musculoskeletal disorders (32–35), work-family conflicts (35), changing employer or leaving the profession (36–38), night and shift work (22, 39), fatigue (40), current work ability (41–43), menopause (44), migration (45), ethnicity (46), physical work capacity (47), psychosocial hazard (48), successful aging strategies (26, 49–51), individual factors (4, 52–54), work-related factors, working conditions and workload (4, 14, 52, 54), work injury (52), and job control (26).

The main purpose of our research was to determine WAI in hospital nurses over fifty years of age, since no such research has been conducted in Slovenia so far. The study was designed to answer whether WAI score correlates with/depends on current work ability (1st item of the WAI questionnaire), age, years of work, gender, full or part-time work hours, education level, marital status, and the type of shift.

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PARTICIPANTS AND METHODS

The study was conducted between April and December 2016 and included responses from secondary care nurses aged over 50 from 13 (of 21) general and specialised hospitals across Slovenia. Some hospitals that agreed to co-operate did not provide data as to the number of their nursing staff who met the inclusion criteria but agreed to facilitate the distribution of a limited number of survey questionnaires.

Questionnaires were distributed to 910 nurses, and 433 responded (47.6 % response rate). Of these, women nurses were in vast majority (94.0 %). Mean age was 53.75±2.40 years and mean work experience 33.62±3.29 years. Most participants (75.3 %) had a vocational or technical upper secondary education, 6.5 % a higher vocational education, and 18.2 % a 1st cycle or 2nd cycle academic education.

The participants were aware of the study aim. Their participation was voluntary and anonymous. We did not have to ask the Ethics Committee for approval, as the survey could not have a detrimental effect on the persons involved.

Questionnaire

We used the Slovenian translation (8) of the original Finnish survey method in this study. However, the German short version was considered in scoring (Table 1). The German short version lists only 14 disease groups instead of the original 51 diseases (55, 56). According to Thinschmidt and Seibt (57), this shortening yields results comparable to the original version and the differences between the two do not significantly affect the outcomes.

Statistical analysis

For statistical analysis we used the IBM SPSS version 22.0 (IBM Inc., Armonk, NY, USA). The WAI results are presented as arithmetic mean and standard deviation (mean±SD) or as median as a measure of the central tendency of the entire sample (6) and range (min–max).

Correlations between WAI and current work ability, age, and years of work were analysed with Spearman's correlation. Mann-Whitney U test was used to test differences in WAI for the independent variables of gender and work hours.

Differences in WAI for the other variables were analysed with the Kruskal-Wallis test. For post-hoc tests we used the Mann-Whitney test of differences between pairs of categories. The level of significance was set to $p<0.05$. The level of significance for post-hoc tests was set to 0.05 divided by the number of comparisons performed (Bonferroni correction).

RESULTS

Table 2 shows that the mean WAI in our nurses was 36.98±6.46. According to categorisation (Table 3), it was "good" for most of them (41.57 %).

Table 1 Dimensions covered by the WAI, the number of questions used to evaluate each, and the scoring of the responses (WAI short version)

Item		Number of questions	Scoring of the responses
1	Current work ability compared to the best work ability	1	0–10 points (value circled in the questionnaire)
2	Work ability in relation to demands of work	2	score weighted according to the nature of the work*
3	Diagnosed diseases (only diseases diagnosed by a physician are counted)	1 (list of 14 disease groups)	7 points=no disease 5 points=1 disease 3 points=2 diseases 3 points=3 diseases 1 point=4 diseases 1 point=5 and more diseases
4	Estimated work impairment due do diseases	1	1–6 points (value circled in the questionnaire; the worst value should be chosen)
5	Sick leave during the past 12 months	1	1–5 points (value circled in the questionnaire)
6	Own prognosis of work ability two years from now	1	1, 4, or 7 points (value circled in the questionnaire)
7	Mental capacity (item 7 refers to the respondent's life in general - at home and at work	3	The total number of points from the question series are added together, and the sum is modified as follows: sum 0 to 3=1 point sum 4 to 6=2 points sum 7 to 9=3 points sum 10 to 12=4 points

*weighting in accordance with instructions (6, 56)

Table 2 Scores of seven dimensions in the assessment of WAI

Items		Mean	SD	Median	Min	Max
1	Current work ability, compared with lifetime best	7.85	1.59	8	0	10
2	Work ability in relation to the demands of the job	7.40	1.41	8	2	10
3	Number of current diseases diagnosed by a physician (short version)	4.12	2.07	5	1	7
4	Estimated work impairment due to diseases	4.49	1.06	5	2	6
5	Sick leave during the past 12 months	4.16	1.13	5	1	5
6	Own prognosis of work ability 2 years from now	5.96	1.62	7	1	7
7	Mental capacity	2.99	0.77	3	1	4
	Work Ability Index (WAI)	**36.98**	**6.46**	**38**	**10**	**49**

SD – standard deviation; min – minimum; max – maximum

Table 3 Categorical analysis of the WAI of nurses over fifty years of age

Work Ability Index	f	f %
Poor (7–27)	36	8.31
Moderate (28–36)	146	33.72
Good (37–43)	180	41.57
Excellent (44–49)	71	16.40
Total	433	100.0

Spearman's correlation established a strong positive correlation between the WAI score and the self-assessment of current work ability (ρ=0.726; p<0.001) (Figure 1). However, WAI did not correlate with age (ρ=-0.034; p=0.475) (Figure 2) or years of work (ρ=-0.090; p=0.061).

Table 4 shows the WAI analysis regarding individual demographic variables. Even though male nurses scored higher, gender differences in WAI scores were not significant (U=4296.5; p=0.108). Similarly, marital status did not significantly affect WAI scores (χ^2=7.707; df=3; p=0.052). However, education level did (χ^2=15.370; df=2; p<0.001). Table 5 shows statistically significant differences between vocational or technical upper secondary education and the 1st or 2nd cycle academic education (U=9368; p < 0.001) and between the 1st cycle professional education and the 1st or 2nd cycle academic education (U=725; p = 0.007).

As for work hours, part-time nurses had significantly lower WAI scores than the full-timers. WAI scores also significantly differed between types of shift work (χ^2=10.690; df=2; p=0.005) (see also Table 6). Nurses who worked in two-shift rotations had significantly lower WAI score than those working in the morning shift (U=3959; p=0.012) or three-shift rotations (U=7642; p=0.001).

DISCUSSION AND CONCLUSION

The mean WAI of our nurses over fifty (36.98 points, average age 53.75 years) is lower than in similar surveys (5, 21–22, 25, 31–32, 36, 39, 40, 44, 47, 52–54) but still bordering on "good". It should be noted that the average age of the participants in these studies was lower. However, even though many studies (1, 5, 27, 28, 34, 47, 48, 53) have observed that WAI decreases with age, we did not establish that association (Figure 2). Our study also showed no correlation between WAI score and years of work or gender.

We also established a strong correlation between the dimension of current work ability and the entire WAI. This correlation was also reported by studies on much larger samples investigating if current work ability could replace the WAI questionnaire (26, 41–43). In contrast, some researchers have come to the conclusion that current work ability is an insufficient measure in itself, as it poorly identifies the risk of disability retirement, and have therefore recommended that researchers should stick to the complete WAI instrument. Even so, current work ability could serve as a screening tool, before a complete WAI questionnaire is used in employees singled out by low current work ability scores (41).

Unlike some earlier studies (27, 47) reporting significantly higher WAI in singles than the married persons or those having a relationship, and unlike a study supporting that being married is associated with higher work ability score (58), we found no significant correlation between marital status and WAI, which is in accordance with the report by Carel et al. (5).

Some studies indicate that the WAI of nurses depends on their position and duties, which is also related to their level of education (5). According to several reports, lower education is a predictor of lower WAI (5, 22, 40). The same has been confirmed by our finding that nurses with academic degree scored significantly better than the rest.

Better WAI scores of full-time nurses can be interpreted in the light of the fact that part-time jobs are usually taken by nurses who cannot work full time for objective reasons, including poorer work ability.

Figure 1 Relationship of the WAI and the current work ability of nurses over fifty

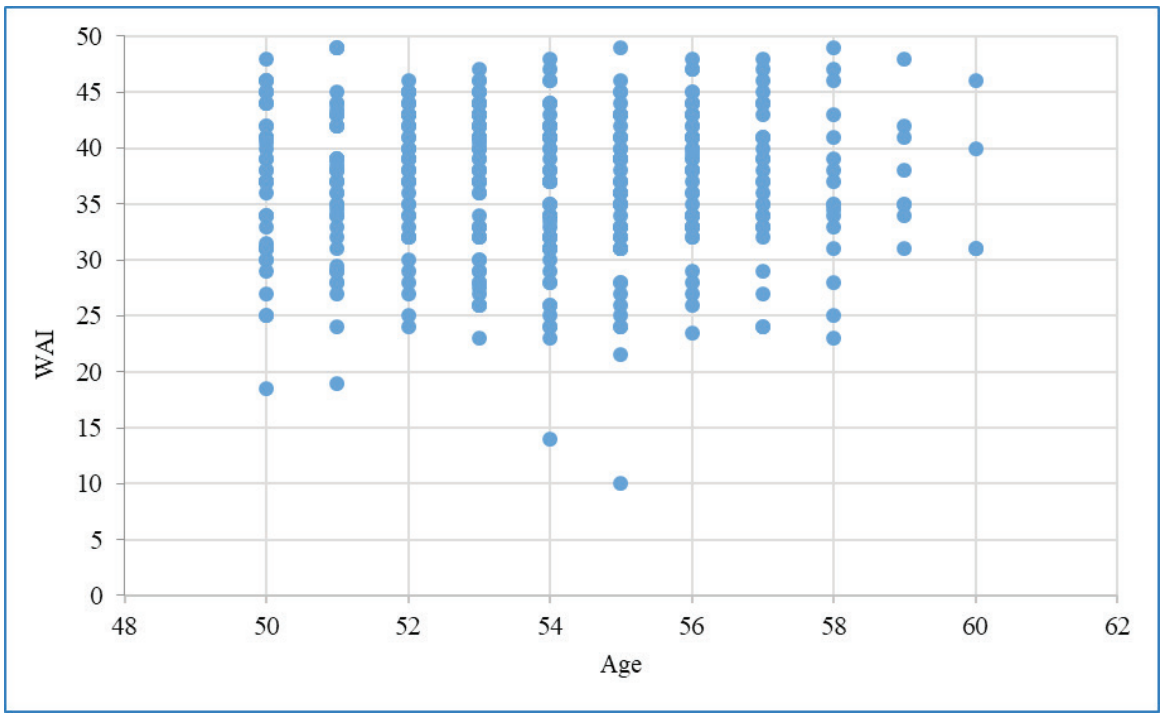

Figure 2 WAI in relation to the age (in years) of nurses over fifty

As for significantly higher WAI scores in the morning shift and three-shift nurses than in those working two shifts, our study confirms the association between shift work and work ability reported earlier (22), but it also points to a specific difference from a study reporting lowest WAI in people working all three shifts on a rotating basis (47). Namely, Slovenian nurses over 50 years of age who experience a decline in work ability can take advantage of the collective agreement for nursing employees in Slovenia (59, article 46) and exclude themselves from three-shift work.

WAI scores reported in our study call for action to maintain and improve the work ability of nurses. It is necessary to determine whether the characteristics of the workplace and lifestyle of an employee improve or threaten the ability to work. In addition, all risks arising from the working environment, the organisation of work, and problems with superiors should be eliminated (6).

Table 4 Descriptive statistics of WAI by socio-demographic factors and statistical differences between groups

	N	Min	Max	Mean	SD	Median	
Gender							
Female	407	10	49	36.83	6.45	37	U=4296.5; p=0.108
Male	26	27	49	38.85	6.50	41	
Education level							
Vocational or technical upper secondary education	326	10	49	36.46	6.46	37	χ^2=15.370; df=2; p<0.001
Higher vocational education, 1st cycle professional education	28	19	46	35.93	5.75	36.5	
1st or 2nd cycle academic education	79	14	49	39.31	6.26	41	
Marital status							
Single	35	31	49	39.91	4.75	41	χ^2=7.707; df=3; p=0.052
Married or cohabiting	352	10	49	36.73	6.49	37	
Widowed	16	24	47	36.88	6.21	37	
Divorced	28	24	49	35.91	7.52	33.5	
Work hours							
Full-time	409	10	49	37.39	6.21	38	U=1715; p < 0.001
Part-time	24	19	44	29.33	6.11	28.5	
Shift type							
Morning shift	106	14	48	37.28	6.89	38	χ^2=10.690; df=2; p=0.005
Two-shift rotation	94	19	48	35.31	6.14	35.5	
Three-shift rotation	211	10	49	37.69	6.19	38.0	

U – test statistic of Mann-Whitney U test; χ^2 – test statistic of Kruskal-Wallis test

Table 5 Differences in WAI by education

Level of education		Mean Difference	U	p
Vocational or technical upper secondary education	Higher vocational education, first cycle professional education	0.53	4254	0.550
	First or second cycle academic education	-2.85	9368	0.000
Higher vocational education, first cycle professional education	First or second cycle academic education	-3.38	725	0.007

U – Mann-Whitney U test; statistically significant differences were those with p-value lower than 0.017 (Bonferroni correction)

Table 6 Differences in WAI by type of shift

Shift type		Mean difference	U	p
Morning shift	Two-shift rotation	1.97	3959	0.012
	Three-shift rotation	-0.41	11092	0.905
Two-shift rotation	Three-shift rotation	-2.38	7642	0.001

U – test statistic of Mann-Whitney U test; statistically significant differences were those with p-value lower than 0.017 (Bonferroni correction)

Conflicts of interest

None to declare.

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Indeks delovne zmožnosti medicinskih sester starih 50 let in več v hospitalni dejavnosti v Sloveniji

Izvajalci zdravstvene nege z zmanjšano delovno zmožnostjo so bolj dovzetni za negativne vplive delovnega okolja ter podvrženi tveganju za bolniško odsotnost, invalidnost in predčasno upokojevanje. Namen raziskave je oceniti delovno zmožnost izvajalcev zdravstvene nege starih 50 let in več, zaposlenih v hospitalni dejavnosti v Sloveniji, s ciljem raziskati povezavo med oceno delovne zmožnosti in trenutno delovno zmožnostjo ter demografskimi dejavniki. V raziskavi, ki je potekala od aprila do decembra 2016 je sodelovalo 433 izvajalcev zdravstvene nege 50 let in več, iz 13 bolnišnic na sekundarnem nivoju v Sloveniji. Uporabljen je standardiziran merski instrument za merjenje delovne zmožnosti (WAI), kratke verzije. Izračunana aritmetična srednja vrednost WAI je znašala 36,98±6,46 ter mediana 38. Ob predpostavki p=0.05 je bilo ugotovljeno, da starost in WAI nista povezani (ρ= - 0.034, p=0.475). Izkazalo se je, da sta oceni WAI in »trenutna delovna zmožnost« močno pozitivno povezani (ρ=0,726, p<0.001). Demografske spremenljivke kot so višja izobrazba, polni delovni čas, enoizmenski ali triizmenski turnus so v naši raziskavi povezane z višjo oceno WAI. Izračunani WAI pri medicinskih sestrah, starejših od petdeset let, kaže na potrebo po sistemskih spremembah v okolju zdravstvene nege, tako da da bodo zaposleni v zdravstveni negi lahko ohranjali dobro delovno sposobnost vse do upokojitvene starosti in dlje.

KLJUČNE BESEDE: delovno mesto; demografski dejavniki; zdravstvena nega