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MEASURING OF WORK ABILITY INDEX IN A SAMPLE OF ELDERLY IN PRIMARY HEALTH CENTERS IN BAGHDAD AL-KARKH 2023

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ABSTRACT

Background: An essential instrument in the analysis of health status is the identification and stratification of risks in specific groups exposed to conditions and factors that prioritize their need for medical care. **Objective:** To measure the Work Ability Index and its association with socio-demographics, obesity, and history of chronic disease and other work-related factors among elderly populations. **Method**: A cross-sectional study was conducted in two primary health care centers, Baghdad Health Directorate-Al-Karkh, Iraq during the period from the 1st of October 2023 to the 1st of January 2024. A convenient sample of 200 participants. Inclusion criteria included elderly people with an age of ≥60 years old. The Work Ability Index was used to assess work ability. **Results:** About 8% of the participants had an excellent Work Ability Index, 24.5% had a good, 35% had a moderate, and 32.5% had a poor Work Ability Index. There were significant associations between the Work Ability Index score and age (P-value=0.045), gender (P-value=0.004), smoking (P-value=0.043), diabetes mellitus (P-value=0.042), and rheumatological disease (P-values=0.003). Non-manual workers tend towards a significantly higher Work Ability Index compared to manual workers. **Conclusion:** About two-thirds of the participants had poor-moderate Work Ability Index scores. Age of ≥ 70 years, male gender, smoking, diabetes mellitus, rheumatological disease, and manual work were significantly associated with a lower proportion of patients with good-excellent Work Ability Index scores.

KEYWORDS: Work Ability Index, Elderly people, Iraq.

I. INTRODUCTION

In 1991, the United Nations International Conferences on Ageing and Urbanization stated that elderly people are those who are 60 years of age or older.[1,2] While 60 years of age or older is the standard for defining the elderly in many developing countries, 65 years of age is the standard in the majority of developed countries.[3]

The ageing process consists of different progressive anatomical and physiological changes in the body systems.[1] These changes may be advantageous or detrimental. While some aspects, like strategic thinking, judgment, wisdom, and expertise tend to get better with age, other functional abilities, like those related to physical activity, sight, hearing, cardiac functions, and muscle strength tend to deteriorate.[4]

It has been stated that population ageing is a worldwide phenomenon. The fastest-growing demographic segment is the elderly; by 2025, there will be more than 1.2 billion persons over the age of 60 worldwide[5, 6]. The Eastern Mediterranean Region is observing a rise in the number of people aged 60 and above. In Iraq, the number of people aged ≥ 60 years in 2012 was 1.12 million; it constituted 4% of the total population while it represented about 5% of the total population in 2016.[1]

Social and food insecurity, poverty, and health issues like as malnutrition are some of the severe difficulties encountered by elders around the world.[6] Healthy ageing appears to consist of three factors including low odds of disease and disability, elevated cognitive and physical functioning, and dynamic engagement with life[1]

In the late 1990s, the World Health Organization (WHO) created the concept of active ageing in response to changes in the demographic composition, active ageing is "the process of optimizing opportunities for health, participation and security to enhance the quality of life as people age".[7]

Work ability is the state of an employee's health both now and in the near future, as well as their capacity to carry out job demands in terms of tasks and physical and mental resources.[8] Disability is defined as long-term mental, physical, or intellectual impairments that interact with several barriers resulting in limitations of their effective participation in society. With the increase in the elderly population, there is a progressive need to assess their impairment elements, which are often ignored.[9]

Work ability assessment is an important part of occupational health management. It provides a useful and effective way to improve abilities, especially during the ageing process.[10] Self-rated work capacity is widely evaluated using the Work Capacity Index (WAI), which was created by researchers at the Finnish Institute of Occupational Health(8)

An essential instrument in the analysis of health status is the identification and stratification of risks in specific groups exposed to conditions and factors that prioritize their need for medical care.[5]

The current study aimed to measure the WAI and its association with socio-demographics, obesity, and history of chronic disease and other work-related factors among elderly populations.

II. PATIENTS AND METHOD

A cross-sectional study was conducted in AL-Zahraa Health Center and first AL-Kadhimiya Health Center at AL-Kadhimiya Sector for primary health care, Baghdad Health Directorate-Al-Karkh, Iraq during the period from the 1st of October 2023 to the 1st of January 2024. A convenient sample of 200 participants due to the short time allocated for the study. Inclusion criteria included those elderly people with an age of ≥60 years old. Exclusion criteria included those who did not agree to participate and those who were not able to answer the questions.

The data was gathered using a questionnaire that was validated by Community Medicine Specialists was adopted to gather data. The questionnaire included sociodemographic information (age, gender, occupation, and marital state), and history of chronic disease (hypertension, diabetes mellitus, rheumatological diseases). Diabetes mellitus is defined by international consensus as "plasma glucose in a random sample or 2 hours after a 75 g glucose load ≥ 11.1 mmol/L (200 mg/dL) or fasting plasma glucose ≥7.0 mmol/L (126 mg/dL) or HbA1c ≥ 48 mmol/mol". These tests are repeated two times in asymptomatic patients. The British Hypertension Society classification defines mild hypertension as "blood pressure > 140/90 mmHg, moderate hypertension as blood pressure > 160/100 mmHg, and moderate hypertension as blood pressure ≥180/110 mmHg".[11,12] The rheumatological disease diagnosis is dependent on the presence of low back pain. The body mass index was calculated as weight in kilograms divided by height in meters squared.[13] In general, the body mass index is categorized into five grades "underweight (<18.5 kg/m^2), normal weight (18.5-24.9 kg/m^2), overweight (25-29.9 kg/m^2), class 1 obesity (30-34.9 kg/m^2), class 2 obesity (35-39.9 kg/m^2), and class 3 obesity (≥40 kg/m^2)".[14,15]

The work ability was assessed by the WAI questionnaire which comprises seven items. The aggregate of all single-item scores determines the final WAI score which ranges from 7 to 49 points. The work ability was categorized into four classes: poor (7-27 points); moderate (28-36 points); good (37-43 points); and excellent (44-49 points).[16]

Permission was obtained from the Arab Board of Health Specializations. Verbal consent was obtained by asking each participant if they wished to answer the questionnaire questions following a brief description of the general aim of the study and its objectives, as well as confirming the confidentiality of information.

The continuous variables were depicted as mean values along with their respective standard deviations ±SD, while categorical data were represented as numbers and percentages. Mann–Whitney U test, t-test, and Chi-Square test were used to test the statistical difference. A statistically significant result was determined by a P-value below or equal to 0.05, indicating a low probability that the observed outcome was due to chance.

III. RESULTS

A total of 200 participants were enrolled in the current study, 76% of them were aged 60-69 years old. males constituted 58% of the sample as shown in table 1.

Table 1: Sociodemographic characteristics of the participants.

Sociodemographic characteristics		N (%)
Age	60-69	152 (76.0)
	≥70	48 (24.0)
Gender	Male	116 (58.0)
	Female	84 (42.0)
Occupation	Manual	109 (54.5)
	Non-manual	91 (45.5)
Marital state	Married	139 (69.5)
	Single	6 (3.0)
	Divorced	15 (7.5)
	Widow or widower	40 (20.0)
Smoking state	Smoker	164 (82.0)
	Non-smoker	36 (18.0)

About half of the participants (51%) had hypertension and 41.5% had diabetes mellitus. About 44.5% of the participants were overweight, 23.5% were obese class 1, and 20% had normal weight as shown in Table 2.

Table 2: Medical history of the participants.

Medical history		N (%)
Hypertension	Yes	102 (51.0)
	No	98 (49.0)
Diabetes mellitus	Yes	83 (41.5)
	No	117 (58.5)
Rheumatological disease	Yes	140 (70.0)
	No	60 (30.0)
Body mass index	Normal weight	40 (20.0)
	Overweight	89 (44.5)
	Obese class 1	47 (23.5)
	Obese class 2	15 (7.5)
	Obese class 3	9 (4.5)

More than two-thirds of the patients (63%) of the participants had psychological risk, 25.5% had physical risk, 7.5% had chemical risk, and 4% had biological risk as shown in Table 3.

Table 3: Percentage of patients with occupational risk.

Occupational Risk	N (%)
Psychological risk	126 (63.0)
Physical risk	51 (25.5)
Chemical risk	15 (7.5)
Biological risk	8 (4.0)

About 8% of the participants had excellent WAI, 24.5% had good WAI, 35% had moderate WAI, and 32.5% had poor WAI as shown in Figure 1.

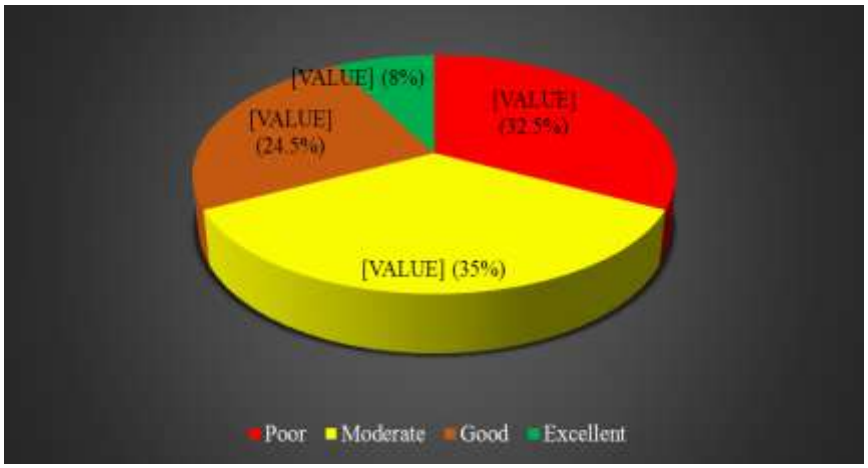

Figure 1: Distribution of the participants according to the WAI score level.

There were significant associations between the WAI score and age (P-value=0.007), gender (P-value=0.001), marital state (P-value=0.001), and smoking state (P-value=0.043), as shown in table 4.

Table 4: Association between the WAI score and sociodemographic characteristics.

Sociodemographic characteristics		Poor N (%)	Moderate N (%)	Good N (%)	Excellent N (%)	P-value
Age	60-69	40 (26.3)	57 (37.5)	40 (26.3)	15 (9.9)	**0.007**
	≥70	25 (52.1)	13 (27.1)	9 (18.8)	1 (2.1)	
Gender	Male	25 (21.6)	41 (35.3)	39 (33.6)	11 (9.5)	**0.001**
	Female	40 (47.6)	29 (34.5)	10 (11.9)	5 (6.0)	
Marital state	Married	35 (25.2)	51 (36.7)	41 (29.5)	12 (8.6)	**0.015**
	Single	2 (33.3)	2 (33.3)	1 (16.7)	1 (16.7)	
	Divorced	4 (26.7)	6 (40.0)	3 (20.0)	2 (13.3)	
	Widow or widower	24 (60.0)	11 (27.5)	4 (10.0)	1 (2.5)	
Smoking state	Smoker	8 (22.2)	20 (55.6)	6 (16.7)	2 (5.6)	**0.043**
	Non-smoker	57 (34.8)	50 (30.5)	43 (26.2)	14 (8.5)	

Significant associations were obtained between the WAI score and hypertension, diabetes mellitus, and rheumatological disease (P-values were 0.004, 0.010, and 0.001, respectively) as shown in Table 5.

Table 5: Association between the WAI score and medical history.

Medical history and examination		Poor N (%)	Moderate N (%)	Good N (%)	Excellent N (%)	P-value
Hypertension	Yes	43 (42.2)	33 (23.4)	23 (22.5)	3 (2.9)	**0.004**
	No	22 (22.4)	37 (37.8)	26 (26.8)	13 (13.3)	
Diabetes mellitus	Yes	35 (42.2)	30 (36.1)	16 (19.3)	2 (2.4)	**0.010**
	No	30 (25.6)	40 (34.2)	33 (28.2)	14 (12.0)	
Rheumatological disease	Yes	59 (42.1)	50 (35.7)	29 (20.7)	2 (1.4)	**0.001**
	No	6 (10.0)	20 (33.3)	20 (33.3)	14 (23.3)	
Body mass index	Normal weight	10 (25.0)	14 (35.0)	13 (32.5)	3 (7.5)	0.073
	Overweight	27 (30.3)	28 (31.5)	22 (24.7)	12 (13.5)	
	Class 1	15 (31.9)	20 (42.6)	11 (23.4)	1 (2.1)	
	Class 2	6 (40.0)	7 (46.7)	2 (13.3)	0 (0.0)	
	Class 3	7 (77.8)	1 (11.1)	1 (11.1)	0 (0.0)	

There was no significant association between the WAI score and the type of risk (P-value=0.063). As shown in figure 2.

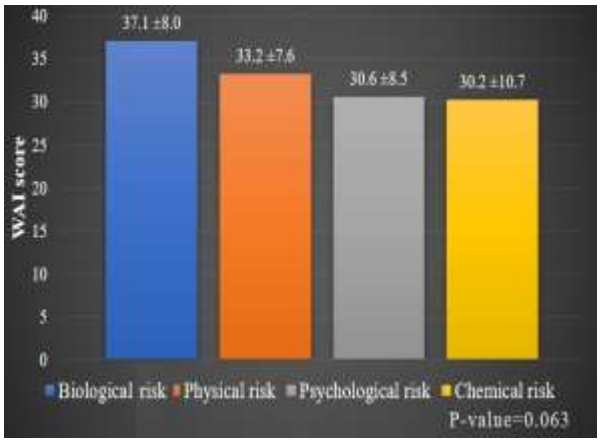

Figure 2: Distribution of the WAI score according to the type of risk.

Table 6 summarises the results of the Mann-Whitney U Test conducted on the simulated data: This table shows the U statistic and the very small p-value, indicating a statistically significant difference in the WAI score distributions between 'Manual' and 'Non-manual' workers based on the assumptions we used for simulation.

Table 6: WAI score distributions between manual and non-manual workers.

Test	U Statistic	P Value
Mann-Whitney U Test	2499.0	9.98×10−109. 98×10−10

Figure 3 shows the distributions of the simulated WAI scores for manual and non-manual workers. The distributions are overlaid with kernel density estimates (KDE) to visualize the difference in WAI scores between the two groups. In this figure, there is a difference in the central tendency of the WAI scores, with non-manual workers tending towards a significantly higher WAI compared to manual workers. This visual representation supports the statistical finding from the Mann-Whitney U Test, indicating a significant difference between the two groups based on the simulated data.

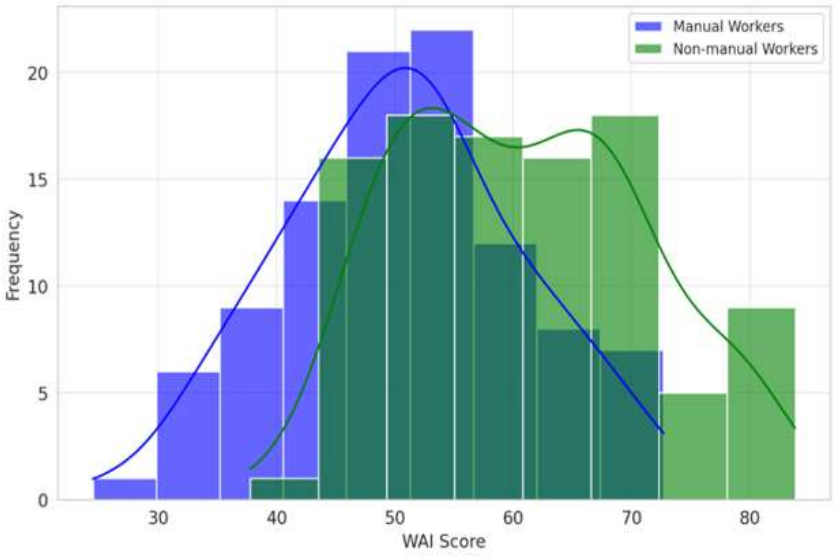

Figure 3: Distributions of the simulated WAI scores for manual and non-manual workers.

For statistical purposes, we categorized WAI scores into poor-moderate and good-excellent. According to the binary logistic regression, age, gender smoking, diabetes mellitus, and rheumatological disease significantly affect the WAI score independently from each other. As shown in table 7.

Table 7: Binary logistic regression.

	Variables in the Equation				
	B	**S.E.**	**df**	**P-value**	**Exp(B)**
Age	-.946-	0.473	1	**0.045**	0.388
Gender	-1.212-	0.424	1	**0.004**	0.298
Marital state	-.072-	0.181	1	0.693	0.931
Smoking	-1.331-	0.500	1	**0.008**	0.264
Hypertension	-.191-	0.377	1	0.612	0.826
Diabetes mellitus	-.762-	0.375	1	**0.042**	0.467
Rheumatological disease	-1.089-	0.363	1	**0.003**	0.336
Body mass index	-.314-	0.202	1	0.120	0.730
Constant	4.492	1.104	1	.000	89.279

IV. DISCUSSION

The functional reserve of various physiological systems declines with age, and the impact of this decline on functionality is dependent on a multitude of circumstances.[17]

According to the results of the current study, more than two-thirds of the patients had poor or moderate WAI scores. In comparison, another study that was done in Poland revealed that 44.4% of the participants had good WAI scores, 36.4% had moderate WAI scores, 13.4% had excellent WAI scores, and nearly 6% had poor WAI scores.[18]

The proportions of participants with good and excellent WAI scores were significantly higher among male participants aged 60-69 years compared to others which means that they can continue in their work if they do not have other limitations. In comparison, the same results were obtained in another study that was done by Agnieszka et al.[7] In another study that was done in Thailand, the risk of poor to moderate WAI was higher among workers with ages of ≥55 years.[19]

The current study revealed that males had a higher proportion of those who had good and excellent WAI scores compared to females. In another study that was done in Poland, there was no significant difference between males and females regarding the WAI score.[18]

In the current study, no significant association was obtained in the current study between WAI score and marital state. This agreed with the results of another study that was done by Thanapop and Chamnong Thanapop.[19]

The current study revealed that smoking was significantly associated with a higher proportion of participants with poor-moderated WAI scores compared to others. In agreement, Hüseyin Eroğlu found that non-smoking elderly subjects had higher physical fitness levels compared to smoking elderly subjects.[20]

Diabetes mellitus and rheumatological diseases significantly impacted the WAI score in the current study. In another study, Agnieszka et al. concluded that pain, depression, musculoskeletal, and cardiovascular diseases were the most important factors that impacted work ability.[7] This agreed with the results of another study that was done in Thailand which showed that workers with non-communicable diseases had a higher risk of poor to moderate WAI.[19]

The current study revealed an insignificant association between WAI score and body mass index. In agreement, the same results were obtained in another study that was done by Sasithorn Thanapop and Chamnong Thanapop.[19]

In the current study, participants with non-manual work had significantly higher scores of WAI compared to those with manual workers which means that the work environment can significantly impact the WAI score. In agreement, another study that was done in Spain revealed a significant correlation between the WAI score and the physical demands of the job.[21] In Germany, a study that was done there revealed that the WAI score was significantly higher among those who were working in education compared to those who were working in the industry or services.

According to the results of the current study, the type of risk was not significantly associated with WAI scores. In comparison, in another study that was done in Germany, psychosocial stress, emotional exhaustion, daily cognitive failures, subclinical depression, and burnout symptoms were negative predictors of work ability.[22] The results of the current study might be related to the small sample size, in addition to the participant's inability to challenge the risk to which the participants were most exposed through their work.

CONCLUSION

About two-thirds of the participants had poor-moderate WAI scores. Age of ≥ 70 years, male gender, smoking, manual work, diabetes mellitus, rheumatological disease,

and manual work were significantly associated with a lower proportion of patients with good-excellent WAI scores.

Recommendations: Decrease the time of work and offer a better work environment for manual workers to achieve better work ability. Raising the retirement year, as employees who were less than 70 years old have greater work ability than those who were older than 70 years old. Taking the necessary measures to reduce employee treason to improve work ability.

Strengths

- Relevant and timely topic: The focus on elderly work ability is crucial given the global trend of an ageing population, making the study's findings relevant for policymakers and healthcare providers.
- Comprehensive data collection: The use of a validated and structured questionnaire to collect data on a range of variables (socio-demographics, chronic disease history, etc.) allows for a nuanced analysis of factors affecting the WAI.
- Significant Findings: The identification of significant associations between WAI and factors such as age, gender, smoking status, and chronic diseases provides valuable insights for targeted interventions.

Weaknesses

- Convenience Sampling: The use of a convenient sample may limit the generalizability of the findings to the broader elderly population in Baghdad or elsewhere.
- Short Study Duration: The limited duration of the study (October 2023 to January 2024) may not fully capture the variations in work ability that could occur due to seasonal employment or health fluctuations among the elderly.
- Lack of Longitudinal Data: The cross-sectional study design provides a snapshot in time but cannot establish causality or track changes in work ability over time

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