

Translation and Validation of the Yale Physical Activity Survey (YPAS) Questionnaire for the Elderly in Croatia

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Abstract – This research aimed to validate the Yale Physical Activity Survey (YPAS) questionnaire in the context of population of the Republic of Croatia. The research was conducted on 135 participants who are users of four homes for the elderly and infirm in the City of Zagreb. The participants are people over 65 years old, they are Croatian speakers, and they do not have any neurological diagnosis (dementia, Parkinson's disease and they did not survive a cerebrovascular insult). People who are recovering from a cold or flu or who are unable to move independently are not included in the research. The research used the original YPAS questionnaire, i.e., a list of activities in one part and categories of activities in the other. Physical activity is shown in the average hours reported per week. Calories are calculated for each activity separately, depending on how many kcal/min each activity brings. In this research, the original YPAS questionnaire was used, to examine the levels of physical activity, and the calories for each activity were calculated using a formula. Through the research, the YPAS questionnaire was validated for the Croatian context, and the results showed that participants spend most of their time shopping, washing dishes, and walking. A certain percentage of participants do not engage in any physical activity, which confirmed the theoretical assumptions about the sedentary behaviour of elderly people.

Keywords: aging; exercise; sedentary behaviour

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Introduction

According to the data of the National Bureau of Statistics, i.e., the last population census in 2021, there are a total of 868,638 inhabitants over the age of 65 in Croatia, which is a share of 22.33 % of total population [1]. Such a demographic picture indicates a significant share of the total population that, it can be assumed, has reduced physical activity. The World Health Organization (WHO) defines

physical activity as a form of body movement produced by skeletal muscles that require energy consumption [2]. According to Melnik, Ivaniš, Maučević Gal, Čurković, and Dodig-Čurković, the aforementioned definition of the World Health Organization should not be reduced to and focused exclusively on “exercise” as an activity for maintaining fitness, given that any form of physical activity (e.g., walking) has very positive health effects [3]. On the contrary, sedentary behaviour poses a great danger to health in all age groups. Reduced or no physical activity leads precisely to sedentary behaviour and poorer energy for performing any physical activity. Even taking a break from sedentary behaviour has posi-

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tive health effects, according to Melnik and associates [3]. The World Health Organization recommends adults (18-64) between 75 and 150 minutes of moderate physical activity per week to maintain a favorable psycho-physical state [2].

During the aging process, numerous changes occur, both on the psycho-somatic level, and in the relationship of the individual with his environment. In addition, reduced level of physical activity makes aging process quite demanding and complex. Marinović Glavić and associates describe aging as one of the biggest health, economic and social challenges today [4]. As life expectancy increases with the progress of medicine and the methods used in medicine, the conclusion is that aging should be approached with more attention - especially in terms of physical activity. A very well-known concept that can be found in various literature today is the concept of active aging. One of the key components of this concept is to provide conditions for elderly people to have a quality and active lifestyle. A low level of physical activity, according to the World Health Organization, is one of the most important factors that threaten the health of the elderly population [2]. Maček and associates cite numerous reasons in favor of the concept of active aging [5]. Namely, engaging in any type of physical activity prevents various diseases of the cardiovascular and locomotor system, the onset of diabetes, has a positive effect on psychological health, and from the social aspect - intensifies the social involvement of older people in society. Contrary to the many positive effects of physical activity, a small percentage of older people engage in some type of physical activity regularly. If it is present, the activity is reduced to walking, doing household chores, gardening, etc. [6]. The author also mentions the research conducted by Andreeva and associates, which showed that among men over the age of 60, the most common physical activity is walking (11 %), followed by cycling (2.7), running or skiing (2 %), exercise on equipment (1.6 %) and swimming (1.2 %). Among women, walking is the

most common physical activity (11 %), followed by swimming (2.6 %), exercising on machines (1.4 %), and cycling (1.2 %). All the mentioned activities, involvement in social life, and others have a great impact on the quality of life of an individual. Numerous pieces of literature emphasize the decline in quality of life with the aging process due to reduced movement, greater dependence on others, reduced social interactions, and numerous other reasons. Therefore, it is considered that aging is a demographic predictor of reduced quality of life, according to Vuletić and Stapić [7].

As can be seen, numerous authors and sources mention the lack of physical activity in elderly people and potentially reduce (or underemphasize) the positive effects of any activity. Namely, the source of this interpretation lies in physical activity measurements, which not only distort the picture of the amount of activity of the elderly but also misinterpret the health consequences of physical activity, i.e., inactivity. The assumption that physical activity decreases with the aging process is common sense and logical, however, Dipietro and associates attribute this conclusion to imprecise measurement, given that most instruments for measuring physical activity have been developed based on the extent, amount and type of activity in a younger population [8]. It is for this reason that this group of scientists at Yale University between 1987 and 1989 developed an instrument that will measure physical activity in older people. They named this questionnaire YPAS. The YPAS questionnaire has been validated in several countries. With the same purpose, scientists examined the level of physical activity in elderly people. Machado and associates validated the YPAS questionnaire, considering that the variables in the test and re-test showed almost equal values [9]. In addition to the questionnaire itself, the Portuguese version of the validation also used accelerometry, the results of which were very similar to the measured correlations in previous research. De Abajo and associates validated the Spanish version of the questionnaire including all variables except for the "standing"

activity [10]. Furthermore, Pennathur and associates researched elderly people from Mexico and America, while Kolbe-Aleksander and associates validated the questionnaire in South Africa [11,12]. YPAS was also used in this paper based on the standardized variables of the original questionnaire, which will be described in more detail later [9].

The original YPAS questionnaire, which is used in this questionnaire, was designed in a different context and time. Also, physical, social, and economic practices are completely different in the United States than in Croatia. For this reason, it was necessary to validate the questionnaire and adapt it to the Croatian context so that the Croatian version of the YPAS questionnaire would be valid and applicable, which is also the aim of this paper.

Subjects and Methods

Users of homes for the elderly and infirm in the City of Zagreb over the age of 65 participated in the research. Using the method of simple random sampling, four homes for the elderly and infirm were selected and contacted to consent to participate in the research. As with the selection of homes, a simple random sampling method was used to select the participants in the research, which selected 135 users of homes for the elderly and infirm, with the emphasis that only people over 65 years of age, Croatian speakers, who do not have any neurological diagnosis participate in the research (dementia, Parkinson's disease and did not survive cerebrovascular insult). People who are recovering from a cold or flu or are unable to move independently are not included in the research. Before participating in the research, the users signed a written consent to participate in the research and thereby gave their consent for their results to be used for this work. Also, the Committee for Scientific Work and Ethics of the Faculty of Kinesiology in Zagreb approved the study. The influence of physical activity and sleep hygiene on the quality of sleep in the elderly.

The research lasted for two months, during which the first and second measurement were carried out. The team that conducted the research consisted of five researchers who were controlled by the author during the entire process. For precision and quality of data collection through the questionnaire and measurements, the researchers underwent ten hours of training before the research itself.

The YPAS questionnaire is divided into two parts, which enable the assessment of physical activity during a typical week of an individual participant [8]. The first part of the questionnaire consists of a list of activities and detailed information on the type of activity, duration (expressed in hours per week), and intensity (expressed in the number of calories consumed). The activities that are evaluated are defined by the YPAS questionnaire based on previous research, and the same variables are used for the users of the homes. Activities are divided into several categories: household chores, chores around the house, caregiving, exercise, and recreational activities. The participants reported to the examiner the time spent performing each activity during the observed week. Physical activity is shown in the average hours reported per week. Calories are calculated for each activity separately, depending on how many kcal/min each activity brings. The formula for calculating calories was $\text{activity} \times 60 \times \text{kcal/min}$. The frequencies of individual responses on the dimensions of the YPAS were calculated, and at the end, the average values of the comparison of engagement were presented.

To process the data as efficiently as possible, the frequencies of individual responses on the dimensions of the YPAS were calculated and at the end, the average values of the comparison of physical activity by season were presented. The results of the first and second measurements are shown separately, and then the comparison of the first measurement and the retest. Means and standard deviations were calculated to display average values. To compare the first measurement and to retest the validity of the criteria in the research, Pearson's and Spearman's correlation coefficients were calculated. The reliabilities of the subscales are expressed by Cronbach's α coefficient. The risk level for statistical significance is 5%. The SPSS 25 program was used for data processing.

Results

The validation process of the YPAS Croatian version of the questionnaire included a total of 135 participants. Having set the mobility of the participants as one of the main research criteria, their physical activity and calorie consumption were successfully measured through two measurements. Both measurements were made on an identical sample one month apart. Using the dimensions of the original YPAS questionnaire, Spearman's correlation coefficient was calculated to demonstrate criterion validity in both measurements.

Table 1. Comparison of the first and second measurements - dimensions of the YPAS

	Rho	p
How many times a month did you engage in vigorous physical activity during the last month?	0.97	0.00**
How long have you been doing such intense physical activity?	0.98	0.00**
How many times during the last month did you walk for at least 10 minutes?	0.97	0.00**
How long did these walks last?	0.94	0.00**
How many hours during the day do you move around doing different activities?	0.96	0.00**
How much time have you spent standing during the last month?	0.99	0.00**
How many hours of an average day did you spend sitting during the last month?	0.99	0.00**

* $p < 0,05$; ** $p < 0,01$; Rho – Spearman's correlation coefficient; p - correlation significance

From the table 1, it is evident that Spearman's correlation coefficient in all dimensions is close to the absolute value - 1, which indicates a strong connection between the variables. Also, $p < 0.05$ indicates that the obtained correlation is statistically significant.

In addition to determining the validity of the dimensions of the questionnaire, the internal reliability of the questionnaire itself was also determined, i.e., the degree to which all examined dimensions correlate with each other. For this questionnaire, the test-retest method was used, and a correlation coefficient was calculated between the two measurements to determine the reliability of the instrument.

Authors interpret the coefficient differently but results greater than 0.7 can be considered reliable. Thus, from the table 2, we see that the coefficients between the two measurements are lower, while the reliability between the

Table 2. Reliability: test-retest

	α
First measurement – PA	0.71
PA retest	0.70
Dimensions of YPAS – first measurement	0.81
Dimensions of the YPAS – retest	0.81
Dimension (seasons) – first	0.92
Dimension (seasons) – retest	0.92

dimensions of the YPAS and the seasons is acceptable.

In both measurements, the participants declared how many hours per week they spend engaged in a certain physical activity, and calories were calculated for each physical activity using the formula $\text{activity} \times 60 \times \text{kcal}/\text{min}$.

Table 3 shows that participants spent the most hours per week shopping ($M = 4.16$), washing dishes ($M = 3.04$), brisk walking ($M = 3.09$), and walking ($M = 3.94$). The same variables were used in the second measurement, but the time spent on certain activities during the second measurement differed somewhat from the first. We can attribute this to the personal assessment of the participants, which does not exclude the possibility of error. Thus, in the second measurement (Table 3), participants spent the most time shopping ($M = 4.68$), doing light household chores ($M = 4.67$), preparing meals ($M = 5.90$), and walking ($M = 4.57$). Despite the differences in the results of the first and second measurements, we observe a significant, positive correlation between all variables.

Regarding the consumption of calories for the activities mentioned in Table 3, the most consumed calories calculated according to the formula were in activities such as shopping, climbing, housework, food preparation, brisk walking, and walking (Table 4).

In addition to the mentioned activities and the corresponding results, the questionnaire checked the amount of activity in five cate-

Table 3. Comparison of the first and second measurement – approximated time per week

	First measurement			Second measurement			r	p
	N	M	SD	M	SD			
Purchase	135	4.17	3.49	4.68	3.54	0.99	0.00**	
Climbing	135	1.76	2.50	1.81	2.45	0.97	0.00**	
Washing	135	1.96	2.13	2.37	3.39	0.61	0.00**	
Light housework	135	4.70	4.08	4.67	4.07	0.98	0.00**	
Heavy household chores	135	2.54	2.66	2.43	2.53	0.98	0.00**	
Meal preparation	135	6.02	5.37	5.91	5.10	0.96	0.00**	
Serving meals	135	2.17	2.00	2.22	1.79	0.91	0.00**	
Dishes	135	3.04	2.94	3.02	2.85	0.92	0.00**	
Repair	135	0.59	1.22	0.51	1.17	0.93	0.00**	
Rehabilitation	135	0.25	0.69	0.21	0.60	0.95	0.00**	
Garden work	135	0.96	3.33	0.69	1.37	0.53	0.00**	
Mowing	135	0.20	0.62	0.18	0.50	0.82	0.00**	
Street cleaning	135	0.49	1.08	0.44	0.95	0.91	0.00**	
Elderly care	135	0.48	2.26	1.07	5.33	0.70	0.00**	
Care for children	135	0.73	2.60	1.15	3.77	0.084	0.00**	
Fast walking	135	3.09	4.57	3.34	4.61	0.98	0.00**	
Swimming pool	135	0.44	1.24	0.57	1.51	0.82	0.00**	
Gym	135	0.20	0.67	0.20	0.67	0.99	0.00**	
Stationary bike	135	0.63	1.86	0.59	1.80	0.93	0.00**	
Swimming	135	0.07	0.35	0.07	0.39	0.95	0.00**	
Walk	135	3.94	4.36	4.56	4.92	0.81	0.00**	
Knitting	135	0.44	1.65	0.49	1.72	0.99	0.00**	
Dance	135	0.12	0.50	0.13	0.52	0.99	0.00**	
Bowling	135	0.01	0.08	0.01	0.08	-		
Golf	135	0.00	0.00	0.00	0.00	-		
Tennis	135	0.05	0.44	0.05	0.44	-		
Billiards	135	0.00	0.00	0.00	0.00	-		
In total	135							

*p < 0.05; **p < 0.01

gories: strong physical activity, light walking, general movement, standing, and sitting. The results obtained from the questionnaire in the first measurement indicated that the majority of subjects engaged in vigorous physical activity 1-3 times a week (n = 58, 21.5 %), and 26 subjects declared that they did not engage in

vigorous physical activity at all (19.3 %). Time spent performing vigorous physical activity also varied among subjects. Most participants, 48 of them (35.6 %) stated that they spend an average of 10 - 30 minutes on vigorous physical activity, while 15.6 % of participants perform such activities for more than an hour.

Table 4. Activities with the most calories consumed

	Calories	
	measurement	measurement
Purchase	875.00 kcal	983.13 kcal
Climbing	898.16 kcal	884.04 kcal
Heavy household chores	687.90 kcal	654.01 kcal
Meal preparation	902.78 kcal	886.16 kcal
Fast walking	1115.33 cal	1201.33 kcal
Walk	828.25 kcal	958.22 kcal

Furthermore, 36 participants (26.7 %) declared that they walked 3-4 times a week during the last month, from the moment the research was conducted, while 34 of them (25.2 %) walked more than 5 times a week. The most frequent walks lasted between 30 and 60 minutes ($n = 56$, 41.5 %), while in 24 participants (17.8 %) the walk lasted longer than one hour. A large number of participants ($n = 58$, 43 %) stated that they spend up to 3 hours a day standing, and as many as 38 participants (28.1 %) more than 8 hours a day sitting. This information confirms the already mentioned problem of sedentary behaviour, which is characteristic for older people, and its impact on the quality of life. However, despite the greater number of participants who move to a lesser extent, as many as 65 of them (48.1 %) move during the day to perform any type of physical activity.

Participants also compared the amount of physical activity during the seasons compared

to the amount of weekly physical activity in the past month. The results showed that the participants are most active during spring and summer, slightly less during autumn, while they exercise the least amount of physical activity during winter (Table 5).

In the second measurement, the same categories of activities were tested, and the results obtained were very similar to the first measurement, as shown by the correlation coefficients. As in the first measurement, 19.3 % of participants ($n = 23$) do not engage in vigorous physical activity at all, while 1-2 times a week vigorous physical activity is practiced by 23.0 % of participants ($n = 31$). On average, participants mostly stated that they spend 10-30 minutes performing vigorous physical activities ($n = 48$, 35.65), while 14.1 % of participants ($n = 19$) engaged in vigorous physical activity, over 60 minutes a day, slightly less than in the first measurement. As for walking as an activity, 7.4 % of participants ($n = 10$) did not walk at all last month, while most participants declared that they practiced walking 3-4 or 5 or more times a week ($n = 34$, 25.2 %). On average, walks usually lasted between 31 and 60 minutes ($n = 56$, 41.5 %). Sedentary behaviour in the second measurement also did not change significantly. As many as 43.7 % of participants ($n = 59$) declared that they spent standing from one to three hours, while 31.9 % of participants ($n = 43$) spent three to six hours sitting. A slightly smaller number of participants, compared to the first measurement, spent more than eight hours sitting (27.4 %, $n = 34$).

Table 5. First measurement - the amount of physical activity by season

	N	Min	Maks	M	SD
Spring	135	0.85	1.30	1.20	0.12
Summer	135	0.00	1.30	1.20	0.16
Autumn	135	0.00	1.30	1.01	0.20
Winter	135	0.00	1.30	0.89	0.17
In total	135				

Table 6. Second measurement – the amount of physical activity by season

	N	Min	Maks	M	SD
Spring	135	0.85	1.30	1.20	0.12
Summer	135	0.00	1.30	1.21	0.16
Autumn	135	0.00	1.30	1.03	0.21
Winter	135	0.00	1.30	0.89	0.17
In total	135				

As in the first measurement, the amount of physical activity was examined according to the seasons, and the participants answered the same as before - they are most active in spring, summer, and autumn, while the amount of physical activity decreases in winter (Table 6).

Discussion

So far, various studies have been conducted in the Republic of Croatia in the field of physical activity among the elderly, but this study is the first for validating the YPAS questionnaire for the elderly in the Republic of Croatia. The relevance of the research is all the greater because it provides a starting point for comparing physical activity in Europe and the world. In addition, taking into account the activities of lower intensity, the results obtained from this research are particularly significant for the study of the physical activity of the elderly and their stronger integration into society. As mentioned earlier, elderly people are often less physically active, and sometimes socially distant, and the combination of this greatly affects their quality of life. Precisely because of this, this research is extremely important because it showed in which activities the participants are more present, and where there is still room for improvement.

The aim of this research was to apply and adapt the YPAS questionnaire to the context of Croatian society and the conditions in which elderly people live. For this purpose, the original YPAS questionnaire was adapted to the context of the living conditions and pos-

sibilities of the selected sample. The research was carried out by trained examiners whose objectivity significantly contributed to higher-quality research results.

The results in both measurements showed that a considerable number of participants do not engage in vigorous physical activities. Apart from the impossibility of performing heavy physical work, this can also be partly explained by the fact that the participants are in homes for the elderly and infirm where activities are planned and controlled. Despite this, a certain number of participants practice some form of stronger physical activity. The room for improvement, in terms of increasing physical activity, can be seen from the percentages that indicate a large number of participants who spent sitting or standing for more than seven hours a day. The results did not change significantly between the first and second measurements, despite the fact that after the first measurement, the subjects' awareness of the importance of movement increased to a certain extent. "Consoling" results were obtained for the question about performing any physical activity, where the participants declared that they spend at least one hour per week performing some physical activity.

In addition to the Croatian validation of the YPAS questionnaire, other authors also validated the questionnaire in the contexts of their countries and populations. Thus, in their research, Machado and associates mention the results of other authors whose research was conducted with the same purpose [9]. De Abajo and associates conducted a study

on the population of Spain using the original YPAS questionnaire. 108 participants (38 women and 70 men) took part in this research and filled out the questionnaire twice in two weeks [10]. As with other researchers, a positive test-retest correlation indicated successful validation. In addition to the existing variables of the YPAS questionnaire, the researchers in this case matched the results with the variables "Weight" and "Body fat level", thus obtaining interesting correlations between the activities and the mentioned variables. Pennathur and associates researched the Latin American population [11]. A slightly smaller sample participated in that research, considering that the research was classified as a pilot project - 49 participants (42 women and 7 men). Just as in the case of the Portuguese research, the participants filled out the questionnaire twice, and the moderate to good reliability of the questionnaire was confirmed for the context of Latin Americans. Finally, Kolbe-Alexander and associates performed the validation for the population of the Republic of South Africa [12]. In addition to using the YPAS questionnaire, they also used the IPAQ to measure heavy physical activity and caloric consumption and compared both instruments in their work. Given that $p < 0.001$, the correlation coefficient was well above the criterion value for validation. The results of all mentioned research generally give similar results, however, the authors confirmed that the YPAS variables are dominantly focused on examining activities of lower intensity. Machado and associates emphasize the importance of creating a standardized questionnaire for the elderly that will primarily measure lower-intensity activities characteristic of sedentary behaviour in the elderly [9]. It is precisely in this area that this research can be improved. A suggestion for improving this and future research is to include a list of activities that includes more specific behaviours of older people when it comes to physical activity. Taking into account the sedentary behavior and the reduced ability to move, future questionnaires and re-

search should examine which activities are appropriate for this age group, which requires a multidisciplinary approach to the entire problem and a combination of different research methods. On the other hand, the limitation of this research is potentially the sample, which could, in future research, include more homes for the elderly and infirm to make the generalization to the general population as legitimate as possible.

Given the fact that many questionnaires that measure physical activity are constructed based on measurements in younger populations, they are inapplicable to older people. By carrying out this research, the original YPAS questionnaire was validated on the population of Croatia, which made a great contribution to awareness of the amount of activity, and thus the quality of life of elderly people. The obtained results indicated a moderately reduced physical activity in the elderly, which is a characteristic of this age group. A seemingly logical conclusion, however, by using variables appropriate for this age and calculating caloric consumption during individual activities, the scale in research in this area has been moved. In conclusion, the validation of the YPAS questionnaire was carried out on a sufficiently large sample of elderly people who live in homes for the elderly and therefore have structured and adapted activities to their capabilities. With this in mind, the validation of the questionnaire outlined the real situation of elderly people and provided a relevant context for further research.

Acknowledgments

None.

Conflict of Interest

None to declare.

Funding Sources

None.

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