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Original research article

PHYSICAL ACTIVITY IN OLDER ADULTS AND THE PROBLEMS OCCURRING WITHIN THE SELF-ASSESSMENT METHOD

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Abstract. *The fact that the decline of the human functional capacity is determined by behaviors and exposures to health risks during one's entire course of life, gives physical activity (PA) and the concept of the active life style an important role. In monitoring PA in the adult population health surveillance (the quantity of PA) of the older population, there are many kinds of self-reported questionnaires such as the International Physical Activity Questionnaire (IPAQ) and General Physical Activity Questionnaire (GPAQ), which are suitable and acceptable instruments according to the World Health Organization (WHO) for those below the age of 65. Understanding the PA surveillance of older adults (> 65 years), with the exception of a few studies, was also examined by our institute within the framework of the PANGeA project. In 2013, we monitored the quantity of PA with GPAQ in three Slovenian towns on a sample of 445 participants (women N = 284 (64 %), age 66.9 ± 5.1 years, men N = 161 (36 %), age 68.4 ± 5.6 years). The comprehensive revision of the questionnaires and participants alike was carried out at the end of a day where mass measurements were taken. The results showed that only 22.6 % of the participants were able to understand and fill in data properly. Furthermore, corrections were required more often in the case of the women's data (80.1 % of the women's data compared to 72.7 % of the men's data). Almost a half (49.4 %) of the PA data required correction in more than one area. Fewer corrections were necessary in the case of participants with a higher level of education. No age-related differences were evident between the group requiring corrections and the group where no corrections were needed. The results indicate a need for caution in the assessment of PA in such surveys of the elderly population to ensure data correctness and to avoid the unreliability and incomparability of the data.*

Key words: *physical activity, older adults.*

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INTRODUCTION

The fact that the population of the whole world is getting older is no longer a simple statistical presumption. This is not only true of high-income or developed countries, but also of low- and middle-income countries, which will experience both rapid and dramatic demographic changes. In the future, the world will have more people who live to see their 80s or 90s than ever before. It is no longer a rarity for the majority of middle-aged and older adults to have living parents, especially women, as they live six to eight years longer than men. Better health care and nutrition have prolonged our life spans, but physical inactivity is a major health risk and one of the main causes of death and disability which is not restricted to the developed countries of the world (WHO, 2002). Even in poor countries, the majority of older people die of noncommunicable diseases such as heart disease, cancer and diabetes, rather than from infectious and parasitic diseases. In addition, older people can often suffer from several health problems at the same time, such as diabetes and heart disease (WHO, 2014).

The functional capacity of an individual's biological system naturally declines with age. The rate of decline is determined, at least in part, by our behaviors and exposures during one's entire course of life. These include what we eat, how physically active we are and our exposure to health risks caused by smoking, harmful consumption of alcohol, or exposure to toxic substances (WHO, 2014).

Despite the health benefits of physical activity (American College of Sports Medicine, 1998), older adults as well as the majority of the world's population are not active enough to enjoy these benefits. Many PA interventions, which affect the behavioral strategy for attenuating functional decline, reducing risk of disability and enhancing the quality of life in older adults (Keysor, 2003; Miller, 2000) were carried out. As PA is positively linked to health and the general quality of life in older adults, the analysis and monitoring of the quantity of physical activity (PA) and other determinants of lifestyle in older adults are important.

PA levels are often monitored to assess the health behaviors of the population, and their association with one's health status. An accurate assessment of PA is required to identify the current levels and changes within the population and to assess the effectiveness of the interventions designed to increase one's activity level. Data collection at the population level of PA often involves self-reporting (subjective) measures collected via questionnaires, diaries, surveys and interviews.

Many kinds of PA assessments, the especially IPAQ, GPAQ, etc., are used as suitable and acceptable instruments by WHO for monitoring PA within the population health surveillance, and also for monitoring the quantity of PA (these having mostly been developed for adults under the age of 65). The understanding of PA surveillance questionnaires by older adults (> 65 years old) has been examined in a few studies. Heesch et al., (2010) examine how the elderly (65-89 years) understand the IPAQ through "face to face" semi-structured interviews, the usage of the "think aloud" method and through coding with a three-stage mode: understanding the intent of the question, performing the primary task and the formation of a response according the pre-specified respond question. The study showed that difficulties occurred during the stages of understanding and performing the primary task (recalling PA in an average week and not in the previous 7 days, reporting the same PA twice or thrice, reporting the same PA with different intensity, unclear understanding of what activities fitted with in a question's scope). More difficulties were found in defining the moderate – intensity and walking question.

Being aware of the possible difficulties and shortcomings that a self-report questionnaire brings in the objective assessment of PA in older adults led us to the research question dealt with in our research project:

1. How do older adults understand the GPAQ questions?
2. How many and what kinds of mistakes occurred the most?
3. How can we diminish the mistakes?

THE METHOD

Within the framework of the international project PANGeA ─ "Physical Activity and Nutrition for Quality Ageing", CBC Slovenia – Italy, 2007-2013, our task was also to perform the PA surveillance of healthy elderly adults in order to establish the factor of healthy ageing, one of the main project goals.

Beside the mass measurements (MM) carried out on the older healthy adults (60 to 80 years of age), the PANGeA questionnaire was also used to asses PA. Questionnaires in paper form were sent a month before the mass measurements were carried out to the older adults who had expressed an interest to participate in the mass measurement and had signed the consent. The criteria to enter the mass measurements were: the age limit (60 to 80 years old) and health status in a way that a participant is able to walk 2 km without support. Completion and submittance of the PANGeA Questionnaire was also the requirement to be invited into the MM.

The PANGeA questionnaire was divided into several parts to cover the general health status, well-being and lifestyle (PA, nutrition and habits) of the older adult population. For PA surveillance we used the GPAQ as a separate part, with detailed instructions. The GPAQ was developed by the WHO for PA surveillance for the purpose of collecting information on PA participation in the three domains, as well as their sedentary behavior, activity at work/domestic activity, travel to and from places (active transport) and recreational sports activities.

Among all the applications and the submitted questionnaires, 445 participants [women N = 284 (64 %), age 66.9 ± 5.1 years, BMI = 27.0 ± 4.6 kg/m2), men N = 161 (36 %), age 68.4 ± 5.6 years, BMI = 27.7 ± 3.3 kg/m2], were measured from three Slovenian towns: Koper, Ljubljana and Kranj, from April 2013 till September 2013.

Being aware of the obstacles and limits of understanding the questionnaire by the older adults (especially the segment of physical activity – the GPAQ part), the revision of understanding the questionnaires was carried out with a "face to face interview" at the end of the MM day. On the MM day the participants passed a blood test, blood pressure test, anthropometry, dynamometry, endurance test (VO2max, 2km walk test), gait measurement, grip and balance nutrition survey and a MoCA test. We checked their answers in the questionnaire we had received, once again together with the participants, and together we corrected or filled in the missing data, to avoid any misunderstandings and irrelevant answers. The researchers checked the questionnaire with the participants, using a three-stage model: the understanding of the question intention, the correctness of the data they filled in, the correction of the previously incorrect data and misunderstandings, as well as addition of the missing data. Special attention was given to the GPAQ part, since we were aware of the difficulties in understanding and the possibility of double reports. Because of some subjective obstacles (the participants were late for their obligations or forgot to stop to check the questionnaire …) we were able to check over 90 % of questionnaires.

For the purpose of analyzing the PANGeA Questionnaire GPAQ part revision we classified the corrections in 6 domains: 1 - no corrections, 2 - correction in the activity at work/domestic activity domain, 3 - correction in travel to and from places (active transport); 4 - correction in defining vigorous recreational sports activity; 5 - correction in defining moderate recreational sports activity; 6 - more than one correction.

After the revision of all data from the GPAQ, the general as well as the specific domains were transferred to METs (Metabolic Equivalent), according to the GPAQ manual. The method is commonly used in the analysis of physical activity and represents the ratio of the work metabolic rate to the resting metabolic rate. One MET is defined as 1 kcal/kg/hour and is equivalent to the energy cost of sitting quietly. A MET is also defined as oxygen uptake in ml/kg/min with one MET being equal to the oxygen cost of sitting quietly, around 3.5 ml/kg/min (WHO, GPAQ).

IBM SPSS Statistics 20.0 software (SPSS, Inc., Chicago, Ill, USA) was used for descriptive statistics, and statistical significance was set at the level of $p < .05$.

RESULTS

Using such a revision of the participant's answers as a tool gave us rather unexpected findings. A high rate of corrections and gender differences were shown: fewer than one quarter (22.6 %) of the participants understood and filled the data out in the proper way. Furthermore, corrections were made more often in women's data (80.1 % of all the women's data compared to 72.7 % of the men's data).

Table 1 Descriptive statistics of the corrections made in the GPAQ part of the PANGeA questionnaire

	No correction needed			Correction			Total
	no.	%	% of popul.	no.	%	% of popul.	no.
Male	44	44	27.3	117	34.1	72.7	161
Female	56	56	19.9	226	65.9	80.1	282
Sum	100	100	22.6	343	100.0	77.4	443

Additionally, we analyzed what type of correction occurred more often, where differences in understanding were shown regarding gender and age, as well as a lot of missing data were obtained additionally.

Table 2 Descriptive statistics of the corrections made in the GPAQ part of the PANGeA questionnaire

Type of correction	Frequency	Percentage
2 – Daily tasks	73	21.3
3 – Active transport	24	7.0
4 – Recreational activities - HI	14	4.1
5 – Recreational activities - MOD	63	18.4
6 – More than one error	169	49.3
Total	343	100.0

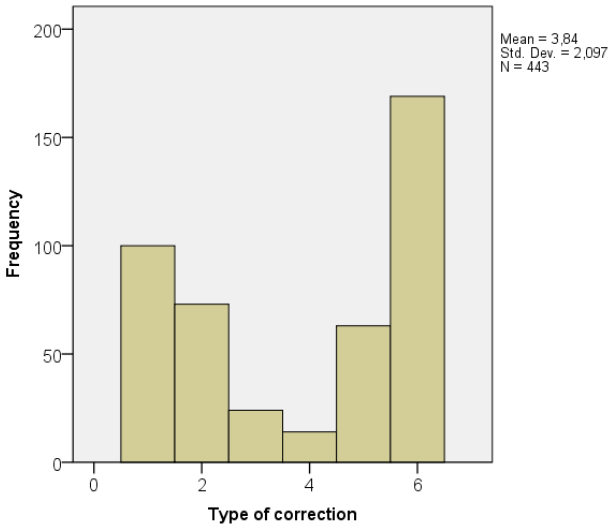

Fig 1 Type of correction.

Almost a half of the participants' data needed to be corrected in more than one domain (49.4 %). The score of the correction was also high in the domain of daily tasks (21.3 %) and in defining moderate recreational sports activity. The reported data on active transport (7.0 %) and vigorous intensity recreational sports activity (4.1 %) needed the fewest corrections.

Furthermore, we analyzed the impact of the education level on the amount of data corrections in the questionnaires, using an independent sample T-test. No corrections were needed in 98 cases (N = 98), while in 342 cases we found an error in understanding (6.45 ± 1.82 vs. 5.53 ± 2.0 respectively).

Table 3 Level of education and correction of data.

Level of education of the participants with corrected data	Frequency	Percentage
3 – Primary school	3	3.0
4 – Vocational school	6	6.0
5 – High school	31	31.0
6 – High school – grammar school	13	13.0
7 – College	21	21.0
9 – Bachelor degree	22	22.0
10 – Master degree, specialist studies.	1	1.0
11– Doctoral degree	1	1.0

The data showed that we made fewer corrections with the participants with a higher level of education than with other participants with lower education level, which suggests a better understanding of the meaning of PA. A further correlation analysis of the impact of educational level on the correctness of answers showed some differences in gender. The male participants with a high school level education (level 5 and more, N = 121) filled in the questionnaires more correctly (p = 0.023) than those with a lower education

(level 4 and less, N = 39). The effect of education in women showed that the higher-educated women (level 5 and more, N = 206) achieved a higher correctness level than those with lower education (N = 74). That educational effect was lost in men when we made a cut point at the educational level 7 – college degree, ($p = 0.380$), but it still remains visible in women ($p = 0.014$), which could be explained with the predominant high school education level of the observed population.

Additional analyses of age-related corrections (the amount and the type of corrections) showed that there are no age-related differences between the group with corrections and the group with no corrections (group with corr. mean age 67.2 ± 5.12; group without corr. mean age 67.7 ± 5.12, $p > 0.05$).

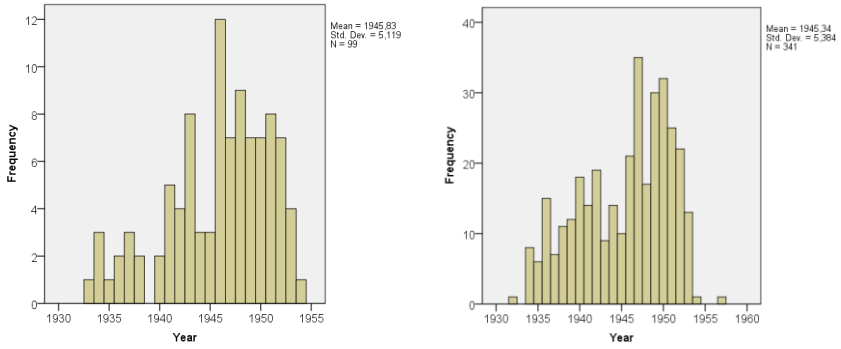

Fig. 2 Age frequency of the group with no corrections (left panel) and with corrections (the right panel)

DISCUSSION

The use of questionnaires in a large-scale survey is feasible and economic, but the use of PA questionnaires regarding the understanding of what PA includes and how to recall it (typical week, usually) needs to be conducted carefully. By administrating a PA surveillance questionnaire, the focus on the participant's own PA is highlighted with the question "How physically active am I?" That could initiate behavioral changes within the participant when we retest using the same questions and, in a positive way, the questionnaire itself could serve as an intervention. This effect of behavioral changes (Bandmann, 2008) must be taken into consideration.

According to the presented facts, the increase of PA after the revision of data 10 to 14 days later (by correcting or adding the missing data) might be the impact of a change in personal behavior and a better understanding of the PA dimensions. That also indicates low reliability within the measurement of PA in older adults.

Knowing the limitations of using PA to assess the quantity of the elderly population by means of a self-reported method (questionnaires), (Prince et al., 2008 & Heesch et al., 2010) it is important to be aware of a high level of possibility of errors and missing data when a self-report PA assessment is used.

The data we gathered from the revision of the self-reported PA data (GPAQ) showed a surprisingly high rate of corrections needed (in 77.4 % of the participants), which

represents more than 80.1 % of older women and 72 % of older men. That could apply to the insufficient understanding of all PA domains, especially among the women. In the revision interview, we noticed that the participants had difficulties in understanding that even gardening, work in a vineyard or on olive plants, cleaning and sweeping count as PA to a certain level. Women were more uncertain about defining their activity which is a part of their daily housework because that kind of activity had never before counted as PA. The generation of women (born from 1933 to 1953) was not included in the gender switch in organized sports activity participation which started in the 70's together with the rise of the feminist movement and Jane Fonda's aerobics wave. The education level of the participants also significantly determines the correctness and accuracy of PA data in the received answers, where higher-educated participants showed a better understanding of questions concerning self-reported PA.

Most errors stemmed from the misunderstanding of the type of activity or the intensity and over-reporting. A high number of more than one correction provokes a concern regarding the reliability and objectivity of PA surveillance data results, especially in older adults. Despite the generalization and international purpose of the GPAQ use a lot of open questions remained regarding the proper PA assessments of older adults, and considering the understanding point of view, also when self-assessment of PA surveillance (GPAQ) is used with younger population. A further caution in administering GPAQ and other kinds of questionnaires is needed especially when we assess the PA of lower educational level participants, both in the older adult and young population.

CONCLUSION

While most research indicates that GPAQ is a suitable and acceptable instrument for monitoring the PA in a population health surveillance for adults aged ≤ 65 years, this research showed it could have certain limitations when the PA is administered to older adults (> 65 year).

These presented facts encompassed data for the Slovenian population (healthy older adults) in general and provided additional research questions for general research into the PA of older adults in Slovenia. A need for caution in the assessment of PA has also been indicated in the case of such surveys for the elderly population, to ensure data correctness and to avoid missing data which could lead to unreliability and incomparability in the results. From the point of understanding, suitable types of PA activities and their benefits, it is imperative that a combination of education to raise awareness along with presentations of PA suitable for older people be implemented.

The population's PA within the framework of active ageing can be seen as a success story for public health policies and for socio-economic development, but it also challenges society to adapt, in order to maximize the health and functional capacity of older people, so the constant surveillance of PA is needed (WHO, 2014).

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FIZIČKA AKTIVNOST STARIJIH OSOBA I PROBLEMI SA UPOTREBOM METODE SAMOPROCENE

Činjenica da se ljudske funkcionalne sposobnosti određuju ponašanjem i izlaganjem opasnostima po zdravlje tokom čitavog ljudskog života fizičkoj aktivnosti (PA) i konceptu aktivnog života dodeljuje značajnu ulogu. U analizi PA na populaciji odraslih osoba (analiza količine PA) koriste se mnogi upitnici bazirani na samoproceni, kao što su International Physical Activity Questionnaire (IPAQ) i General Physical Activity Questionnaire (GPAQ), koje Svetska zdravstvena organizacija (WHO) prihvata kao validne instrumente merenja za ispitanike starosti do 65 godina. Ispitivanje PA na primeru odraslih osoba (> 65 godina), uz izuzetak nekoliko istraživanja, rađeno je i u našem institutu u okviru PANGeA projekta. U 2013. pratili smo količinu PA upotrebom GPAQ u tri različita grada u Sloveniji, na uzorku od ukupno 445 učesnika (žena N = 284 (64 %), starosti 66.9 ± 5.1 godina, muškaraca N = 161 (36 %), starosti 68.4 ± 5.6 godina). Detaljna analiza upitnika i učesnika izvršena je na kraju dana, nakon što su od ispitanika prikupljeni svi podaci i izvršena sva merenja. Rezultati pokazuju da je samo 22.6 % ispitanika bilo u mogućnosti da razume i pravilo popuni upitnike. Dalje, ispravke su češće bile potrebne među podacima koji su prikupljani od ženske populacije (80.1 % podataka prikupljenih od žena, u poređenju sa 72.7 % podataka prikupljenih od muškaraca). Bilo je potrebno korigovati skoro jednu polovinu (49.4 %) podatka o PA u više od jedne oblasti. Manji broj korekcija bio je potreban u slučaju ispitanika koji su imali već nivo obrazovanja. Nisu uočene razlike u pogledu godina starosti između grupa ispitanike kod kojih je bilo potrebno unositi izmene i onih kod kojih izmene nisu bile potrebne. Rezultati ukazuju na to da je potrebno pažljivo analizirati PA u ovakvim upitnicima koji su namenjeni starijim populacijama, kako bi se omogućilo prikupljanje tačnih podataka i kako bi se izbegla nevaljanost podataka, kako bi se podaci dalje mogli porediti.

Ključne reči: *fizička aktivnost, starije osobe.*