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ORIGINAL RESEARCH ARTICLE

Utility of single-item questions to assess physical inactivity in patients with chronic heart failure

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Abstract

Aim The purpose of this study was to explore the utility of two single-item self-report (SR) questions to assess physical inactivity in patients with heart failure (HF).

Methods and results This is a cross-sectional study using data from 106 patients with HF equipped with accelerometers for 1 week each. Two SR items relating to physical activity were also collected. Correlations between accelerometer activity counts and the SR items were analysed. Patients were classified as physically active or inactive on the basis of accelerometer counts, and the SR items were used to try to predict that classification. Finally, patients were classified as having high self-reported physical activity or low self-reported physical activity, on the basis of the SR items, and the resulting groups were analysed for differences in actual physical activity. There were significant but weak correlations between the SR items and accelerometer counts: $\rho = 0.24$, $P = 0.016$ for SR1 and $\rho = 0.21$, $P = 0.033$ for SR2. Using SR items to predict whether a patient was physically active or inactive produced an area under the curve of 0.62 for SR1, with a specificity of 92% and a sensitivity of 30%. When dividing patients into groups on the basis of SR1, there was a significant difference of 1583 steps per day, or 49% more steps in the high self-reported physical activity group ($P < 0.001$).

Conclusions There might be utility in the single SR question for high-specificity screening of large populations to identify physically inactive patients in order to assign therapeutic interventions efficiently where resources are limited.

Keywords Physical inactivity; Heart failure; Accelerometer; Self-report

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Introduction

Physical inactivity has deleterious health consequences and has been described as being responsible for ~9% of all deaths worldwide.[1] Physical inactivity can be defined as the non-achievement of targets according to physical activity guidelines.[2] For adults (including people over 65 years), guidelines recommend at least 150 min of moderate-intensity aerobic physical activity throughout the week, or at least 75 min of vigorous-intensity aerobic physical activity throughout the week or an equivalent combination of moderate- and vigorous-intensity activities.[3] As people get older, their physical inactivity increases,[4] and this problem is even more prominent in people with heart failure (HF), as a majority of them live sedentary lives owing to fatigue, shortness of breath, and mental distress.[5] For patients with HF, physical inactivity is associated with a worse prognosis.[6] This includes a two-to-three times higher risk of mortality[7,8] and increased risk of hospital admission,[9,10] and the physical inactivity increases with increasing New York Heart Association (NYHA) class.[10] Furthermore, physical inactivity is an independent predictor of cognitive function[11] and sarcopenia[12] and has a negative impact on activities of daily living, appetite,[13] and quality of life (QoL)[14] for this population. It is therefore desirable to encourage physical activity in patients with HF and develop effective interventions to increase physical activity and motivate patients to support physical activity.[15]

To tailor interventions optimally to the individual patient, assessment of the patient's current physical activity level is needed. As physical activity is a complex behaviour, and thus challenging to measure, accurate assessment of physical activity is critical.[16] There are subjective (self-report SR) and objective (direct) methods of assessing physical activity: subjective assessment methods are collecting data with questionnaires and diaries/logs and objective methods of assessment collect data by calorimetry (e.g. doubly labelled water), physiological markers (e.g. heart rate monitoring), and monitoring equipment (e.g. accelerometers and pedometers).[16,17] Several factors need to be considered when choosing the appropriate method for measuring physical activity, depending on, for example, costs, number of individuals to be assessed and time and equipment requirements.[16–18] Objective measures are often more accurate but also more costly[19] or need post-processing of the data to be interpreted properly.[4,20,21] Common challenges with SR measures include recall and response bias, incomplete ascertainment across the spectrum of intensity, and underestimation and overestimation of physical activity. On the other hand, SR measures are frequently used in population studies, owing to their practicality, low cost, and low participant burden.[16–18] However, the correlation between self-reported physical activity and accelerometer measured physical activity is influenced by among other factors sex and age, which might need consideration when interpreting results.[22]

For practical use, a single-item screening question that gives a quick overview of an individual's physical activity level is preferable, as it could be used to provide a quick classification, for example, physically active vs. physically inactive.[18] To the best of our knowledge, there is no such one-item questionnaire for patients with HF.

The purpose of this study was to explore the utility of two single-item SR questions to assess physical inactivity in patients with HF. We set out to investigate whether there is applicability of a single-item SR question in identifying physically inactive HF patients and to discuss whether there might be benefits to this approach in clinical practice.

Methods

This is a cross-sectional study using data collected in the HF-Wii study (ClinicalTrial.gov identifier: NCT01785121), a multi-centre, randomized controlled trial, where 605 patients with HF were recruited and randomized into attention control or structured access to a Wii game computer. The details and primary outcomes of that study have been published elsewhere.[23,24] The exclusion criteria were 'Unable to use the Nintendo Wii due to visual impairment (see a TV screen at a distance of 3 m), hearing impairment (the patient is not able to communicate by telephone), cognitive impairment (assessed by a HF nurse or cardiologist), or motor impairment (the patient should be able to swing his arm at least 10 times in a row)', 'Unable to fill in data collection material', and 'life expectancy shorter than 6 months'. This study used data collected from patients in the HF-Wii study who had provided accelerometer data measurements (n = 106).

Accelerometer

Patients used the accelerometer (ActiGraph GT9X, Pensacola, FL, USA) for seven consecutive days, and the accelerometer was worn by the patients around the hip with an elastic belt. The ActiGraph GT9X has been found to be reliable and valid.[25] The accelerometer measures intensity, frequency, and duration of physical activity as well as sedentary time. All data were sampled and downloaded as raw data (30 Hz), converted to 60 s epochs (time interval), and then counts per minute (activity counts) using the ActiLife software. The criteria for inclusion in the analyses were the use of the accelerometer for at least 4 days/week, with a minimum wear time of 540 min/day controlled by daily recordings stored in the equipment.[26] Periods with consecutive zeros for 60 min or more (with 2 min of tolerance) were interpreted as time of non-use and excluded from the analysis.[20,27]

In addition to the accelerometer data, two SR items relating to physical activity were collected, each with five possible values:

- Self-report on activity 1 (SR1): Item 9 from the nine-item European Heart Failure Self-care Behaviour Scale[28] is the statement 'I exercise regularly'. Answers range from 1 to 5 with 1 = 'I completely agree' and 5 = 'I completely disagree'. For the purpose of comprehensibility, the score was adjusted directionally, with higher scores representing a greater agreement of exercising regularly.
- Self-report on activity 2 (SR2): 'Over the past week (even if it's not a typical week), how much time did you exercise or were you physically active (e.g. strength training, walking, swimming, gardening or other type of training)?', with five possible answers[1–5]: 'No time', 'Less than 30 min/week', '30–60 min/week', '1–3 h/week', and 'More than 3 h/week'.

The collection of baseline data and questionnaires took place at the recruiting centres, after the study participants had provided informed consent. Demographic data, Minnesota Living with Heart Failure Questionnaire (MLWHFQ),[29] Montreal Cognitive Assessment (MoCA),[30] and the SR items were collected as questionnaires; and data regarding the participants' medical history were extracted from the medical charts.[23]

Statistical analysis

To assess how SR1 and SR2 correlated to an objective measure of physical activity, we used non-parametric correlation analysis between SR1 and SR2 and the activity counts from the ActiGraph accelerometer, reporting Spearman's rho (ρ) and P-values.

We defined a patient as being physically active or physically inactive on the basis of the activity counts from the ActiGraph. Patients in the top quartile were defined as physically active, and the remaining patients were defined as physically inactive.

Scores on the SR1 and SR2 are used separately to predict which group a patient belongs to (physically inactive or active), and the performance of SR1 and SR2 is assessed using an area under the curve (AUC), by calculating the receiver operating characteristics (ROC), considering both specificity and sensitivity of the classification.

Finally, patients were classified as having high self-reported physical activity or low self-reported physical activity, on the basis of dichotomized versions of SR1 or SR2. The SR1 and SR2 each has five possible values, and we used two approaches to decide at which value to place the cut-off, to create the dichotomized version. The first approach is a theoretical a priori approach based on findings in the literature, and the second approach uses the output of the ROC analysis in a post-hoc manner, as specified by Youden.[31] For SR1, the theoretical dichotomization was based on the work by Uchmanowicz *et al*.[32] and for SR2, it was based on the exercise recommendations in the guidelines for patients with HF.[33] For the recoded SR1, as well as for SR2, levels 4 and 5 are coded as high self-reported physical activity and levels 1–3 as low self-reported physical activity. We tested the null hypothesis that there is no difference in accelerometer-based activity counts between the two groups. Because cognition might be related to the quality of SR, correlations between the SR items and the accelerometer-based activity were done separately for patients with or without cognitive impairment (MOCA score above or below 27 points).

Potential differences between defined groups with respect to relevant demographic and clinical characteristics were assessed using the Mann–Whitney U test for ordinal variables or non-normally distributed variables, Student's t-test for normally distributed, continuous variables, and χ^2-test for categorical variables.

All significance testing used two-tailed tests with α = 0.05. All calculations were performed using IBM SPSS Statistics 25.

The investigation conforms with the principles outlined in the Declaration of Helsinki and is approved by the local ethics review board. Informed consent has been obtained from the all study participants.

Results

Demographics

The demographics of the 106 patients are shown in *Table 1*. Mean age of patients was 68 years, and patients were predominately male (70%). A majority of the patients were in NYHA class II (61%). Ninety per cent of the patients were prescribed an angiotensin-converting enzyme inhibitor, angiotensin receptor blocker, or angiotensin receptor–neprilysin inhibitor; and 93% of the patients were prescribed a beta-blocker. Out of the 106 patients who completed the MoCA, 43 (41%) had no-to-light cognitive impairment, 58 (55%) had mild cognitive impairment, and two (2%) had moderate cognitive impairment. Three patients (3%) did not complete the questionnaire.

Relationship between self-report items and an objective measure of physical activity

Of the 106 patients, 104 (98%) had answered the SR1 and 106 (100%) had answered SR2. Significant weak correlations between SR items and activity counts (ActiGraph) were found, with ρ = 0.24, P = 0.016 for SR1 and ρ = 0.21, P = 0.033 for SR2 (*Figure 1*). These were similar for patients with or without cognitive dysfunction. The correlation between SR1 and SR2 was ρ = 0.44, $P < 0.001$.

Identifying physically inactive patients by self-report items

Based on the accelerometer counts, patients were grouped as physically inactive (n = 80) and physically active (n = 26). A comparison between the groups can be found in *Table 1*.

Patients in the physically active group were significantly younger, and they had less severe symptoms, indicated by a significantly lower NYHA class.

Patients in the physically active group scored significantly higher self-reported physical activity as measured by SR1 than patients in the physically inactive group. There was a higher self-reported physical activity as measured by SR2 in the physically active group; however, this was not statistically significant (P = 0.067). No difference in the physical score component of the MLWHFQ was found between physically active and physically inactive patients. The physically active group took on average 3984 steps more than the physically inactive group ($P < 0.001$).

To evaluate the performance of SR1 and SR2 in classifying patients as being physically inactive, we created a ROC curve, where true positives (sensitivity) were plotted against false positives (1 − specificity) and calculated the AUC for the ROC curve. This resulted in an AUC of 0.62 and 0.61 for SR1 and SR2, respectively, with performance at different cut-offs, as described in *Table 2*.

Table 1 Demographic and clinical characteristics of the sample ($n = 106$)

n (%) unless otherwise noted	All, *n* = 106	Physically inactive based on accelerometer counts, *n* = 80	Physically active based on accelerometer counts, *n* = 26	*P*
Age (mean ± SD)	68 ± 9	69 ± 9	65 ± 9	0.02
Male	74 (70)	58 (73)	16 (62)	0.29
BMI (mean ± SD)	28 ± 5	28 ± 5	27 ± 4	0.38
MLWHFQ Physical score (mean ± SD)	13 ± 9	13 ± 9	12 ± 9	0.63
MoCA (median [IQR])	25 [26–27]	26 [24.5–27]	26.5 [25–28.3]	0.10
Ischaemic aetiology	53 (50)	44 (55)	9 (35)	0.16
NYHA I	10 (9)	5 (6)	5 (19)	0.029
NYHA II	65 (61)	47 (59)	18 (69)	
NYHA III	19 (18)	18 (23)	1 (4)	
NYHA unknown	12 (11)	10 (13)	2 (8)	
HFpEF	32 (30)	26 (33)	6 (23)	0.29
HFmrEF	32 (30)	21 (26)	11 (42)	
HFrEF	42 (40)	33 (41)	9 (35)	
BP syst (mean ± SD)	128 ± 17	128 ± 18	125 ± 16	0.43
BP diast (mean ± SD)	72 ± 10	72 ± 9	74 ± 13	0.52
MI	31 (30)	25 (31)	6 (23)	0.60
COPD	15 (14)	14 (18)	1 (4)	0.11
DM	29 (27)	24 (30)	5 (19)	0.32
Implantable device	40 (38)	32 (40)	8 (31)	0.26
ACE/ARB/ARNI	95 (90)	8 (10)	3 (12)	0.82
Beta-blocker	98 (93)	73 (91)	25 (96)	0.68
MRA	50 (48)	39 (49)	11 (42)	0.70
Diuretics	79 (75)	66 (83)	13 (50)	0.004
Digitalis	13 (12)	9 (11)	4 (15)	0.73
Activity counts (mean ± SD)	163 000 ± 92 862	122 181 ± 44 779	288 597 ± 90 246	<0.001
Step count (mean ± SD)	4573 ± 2534	3595 ± 1605	7579 ± 2525	<0.001
SR1 (mean ± SD)	4.1 ± 1.1	4.0 ± 1.1	4.5 ± 1.1	0.049
SR2 (mean ± SD)	3.9 ± 1.2	3.8 ± 1.2	4.3 ± 0.88	0.067

ACE/ARB/ARNI, angiotensin-converting-enzyme inhibitor/angiotensin II receptor blocker/angiotensin receptor–neprilysin inhibitor; BMI, body mass index; BP diast, diastolic blood pressure; BP syst, systolic blood pressure; COPD, chronic obstructive pulmonary disease; DM, diabetes mellitus; HFmrEF, heart failure with mid-range ejection fraction ($40\% \leq EF \leq 50\%$); HFpEF, heart failure with preserved ejection fraction ($EF > 50\%$); HFrEF, heart failure with reduced ejection fraction ($EF < 40\%$); IQR, inter-quartile range; MI, myocardial infarction; MLWHFQ, Minnesota Living With Heart Failure Questionnaire; MoCA, Montreal Cognitive Assessment; MRA, mineralocorticoid receptor antagonist; NYHA, New York Heart Association class; SR1, self-report item 1; SR2, self-report item 2.

Assessing differences in physical activity based on self-report item classification

The next step in the analysis was to study whether it is possible to identify physically inactive patients using dichotomization of SR1 and SR2. The high self-reported physical activity and low self-reported physical activity groups, when classified based on SR1 and SR2, are described in *Tables 3* and *4*.

When using the SR1 to classify patients into a low self-reported physical activity and high self-reported physical activity groups, there was a significant difference in activity counts (43% more activity counts, $P = 0.001$) as well as average number of steps per day, corresponding to 1583 steps or 49% more steps per day ($P < 0.001$).

Using SR2 to classify the patients, there was a non-significant difference in activity counts between the groups (7.6%, $P = 0.57$), corresponding to a mean 330 more steps per day in the high physical activity group (7.6%, $P = 0.56$).

Use of the ROC-analysis output as proposed by Youden[31] resulted in using the same dichotomization for SR1 as shown in the literature, but this was different for SR2. SR1 had a sensitivity of 30% and a specificity of 92%. SR2 had a sensitivity of 29% and a specificity of 81% when based on the literature and a sensitivity of 66% and a specificity of 54% when using the Youden method.

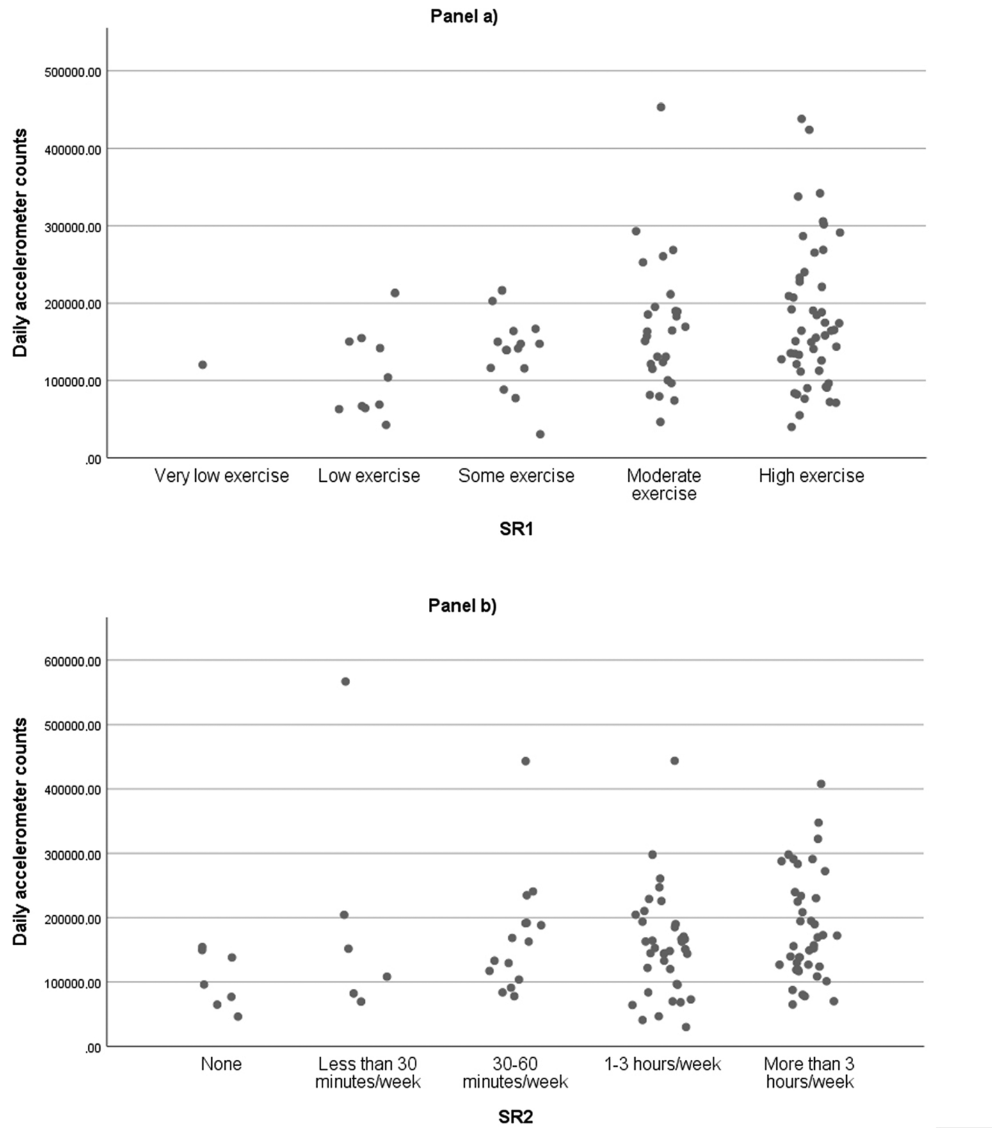
The relationship between the low and high self-reported groups and level of physical activity is illustrated in *Figure 2* (SR1) and *Figure 3* (SR2).

Discussion

The results of our study suggest that a single SR activity item may identify inactive patients with high specificity, as determined by an accelerometer. This implies that a single SR item might be promising in screening for physically inactive patients with HF.

The performance in terms of correlation to accelerometer data, of a single SR item as used in this study (0.24 and 0.21 for SR1 and SR2), was comparable to previously reported more elaborate questionnaires, which are usually around $R = 0.3$,[22] although higher results have also been reported.[34] A weak correlation can be explained by that physical activity

Figure 1 (A) Scatter plot of SR1 vs. activity counts (n = 104). (B) Scatter plot of SR2 vs. activity counts (n = 106).



is a broad construct, containing several dimensions. Questionnaires or SR items capture behaviour or perceived time spent in specific situations, while objective measures capture movement above a certain threshold.[22] A weak correlation does therefore not necessarily mean that one method is more valid and reliable than the other. Because the correlation of the single SR item with accelerometer readings and the more elaborate questionnaires are comparable, a single

Table 2 Results of the ROC analysis, using the self-report items to identify physically inactive patients

SR1, AUC = 0.62			SR2, AUC = 0.61		
Cut-off (physically inactive if at cut-off or above)	Sensitivity	Specificity	Cut-off (physically inactive if at cut-off or above)	Sensitivity	Specificity
Value 2	0.55	0.63	Level 2	0.66	0.54
Value 3	0.30	0.92	Level 3	0.29	0.81
Value 4	0.12	0.96	Level 4	0.15	0.96
Value 5	0.00	1.0	Level 5	0.088	1.0

Higher cut-offs correspond to a lower self-reported activity level. Each self-report item has five possible values.

Table 3 Differences between the high physical activity and the low physical activity groups, when classified based on SR1

	Low self-reported physical activity with SR1 (*n* = 26)	High self-reported physical activity with SR1 (*n* = 77)	*P*
SR1 (mean ± SD)	2.5 ± 0.58	4.6 ± 0.48	<0.001
SR2 (mean ± SD)	3.1 ± 1.3	4.3 ± 0.90	<0.001
Age (mean ± SD)	68 ± 9	69 ± 10	0.64
Male, *n* (%)	19 (73)	52 (68)	0.60
NYHA class I, *n* (%)	2 (8)	8 (10)	0.50
NYHA class II, *n* (%)	16 (62)	49 (64)	
NYHA class III, *n* (%)	7 (27)	12 (16)	
NYHA class unknown, *n* (%)	1 (4)	8 (10)	
MLWHFQ Physical score (mean ± SD)	15.5 ± 10.5	12.5 ± 8.3	0.15
MoCA (median [quartiles])	25.5 [24.5–27]	26 [25–28]	0.33
Activity counts (mean ± SD)	120 548 ± 51 849	171 980 ± 89 322	0.001
Step count (mean ± SD)	3309 ± 1617	4892 ± 2463	<0.001

MLWHFQ, Minnesota Living With Heart Failure Questionnaire; MoCA, Montreal Cognitive Assessment; NYHA, New York Heart Association class; SR1, self-report item 1; SR2, self-report item 2.

Table 4 Differences between high physical activity and low physical activity groups, when classified based on SR2

	Low self-reported physical activity with SR2 (*n* = 28)	High self-reported physical activity with SR2 (*n* = 78)	*P*
SR1 (mean ± SD)	3.4 ± 1.2	4.3 ± 0.91	<0.001
SR2 (mean ± SD)	2.3 ± 0.85	4.5 ± 0.50	<0.001
Age (mean ± SD)	69 ± 10	68 ± 9	0.85
Male, *n* (%)	20 (71)	54 (69)	0.83
NYHA class I, *n* (%)	2 (7)	8 (10)	0.56
NYHA class II, *n* (%)	17 (61)	48 (62)	
NYHA class III, *n* (%)	7 (25)	12 (15)	
NYHA class unknown, *n* (%)	2 (7)	10 (13)	
MLWHFQ physical score (mean ± SD)	12.6 ± 10.4	13.3 ± 8.4	0.74
MoCA (median [quartiles])	25 [23.3–27]	26 [28–28]	0.19
Activity counts (mean ± SD)	154 407 ± 113 691	166 085 ± 84 795	0.57
Step count (mean ± SD)	4330 ± 2853	4660 ± 2423	0.56

MLWHFQ, Minnesota Living With Heart Failure Questionnaire; MoCA, Montreal Cognitive Assessment; NYHA, New York Heart Association class; SR1, self-report item 1; SR2, self-report item 2.

Figure 2 Physical activity measured by the ActiGraph, plotted as a function of level of physical activity as defined by the SR1.

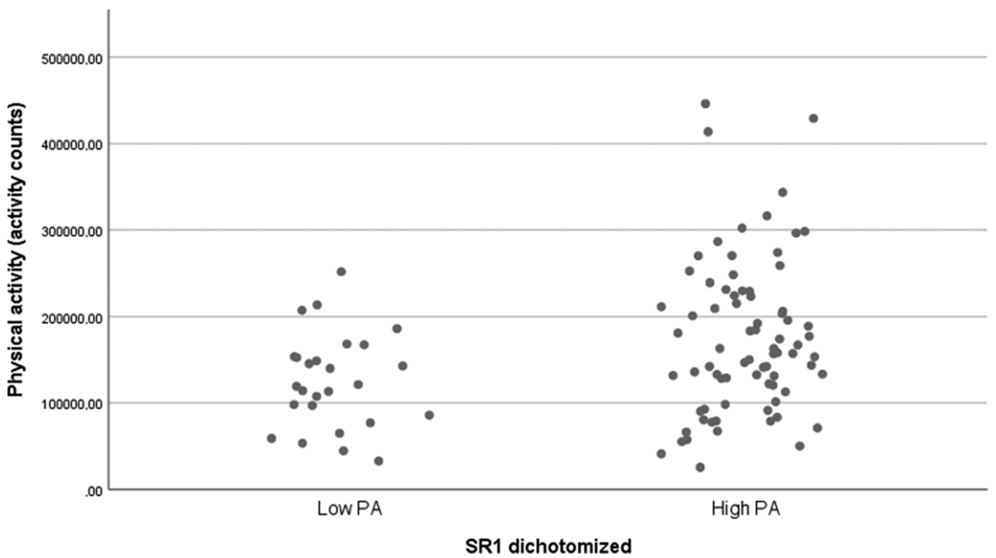
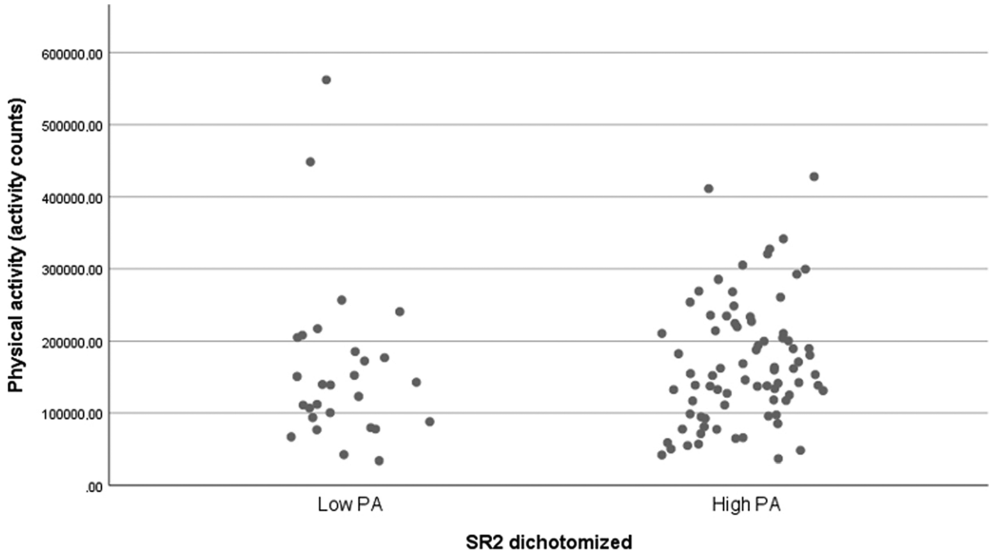


Figure 3 Physical activity measured by the ActiGraph, plotted as a function of level of physical activity as defined by the SR2.



item might be promising for a first screening for physical inactivity, keeping in mind that such an item lacks details compared with comprehensive physical activity questionnaires.

We found that a single SR item has poor predictive power in terms of successfully classifying patients with HF as physically inactive or physically active, with ROC analysis results of 0.62 and 0.61, for SR1 and SR2, respectively. However, the data indicate that correctly classifying a physically inactive patient can be done with high specificity (92%), but sensitivity remains low (30%).

The finding that it is possible to identify some inactive patients with high certainty (high specificity) using a single-item question but that it is not possible to find all of the inactive patients (low sensitivity) is comparable to findings of a medication adherence study where patients who reported not adhering to medication in general did not take the medication; however, patients who reported that they were adherent were not necessarily taking the medication.[35] The implications of these findings are that if the single SR item classifies a patient as physically inactive, this patient with 92% certainty is not active and could be referred to a more comprehensive physical activity testing, followed by a dedicated intervention programme to improve physical activity. If the SR item classifies the patient as physically active, more detailed assessment might be needed to determine the actual physical activity level and to then tailor therapy accordingly.

We investigated the physical activity of patients classified by the dichotomized versions of the two SR items. When the dichotomized SR1 was used to group patients, the average numbers of steps per day were 3309 and 4892, respectively, for the groups and 4573 for the entire population, matching well with the numbers expected for this elderly and chronically ill population, which are reported to be between 3500 and 5000.[36] Two studies published that a step count-based cut-off is an independent predictor of mortality for patients with HF, with the significant cut-offs in the two studies reported at 3571 or 4889 steps/day, respectively,[37,38] both of which lie between our obtained group mean step counts. Although formally incorrect,[2] there are also reports of using a step count-based cut-off to define the state of being sedentary,[11,36,39,40] and sedentary behaviour is connected to increased mortality in these patients.[8,10] Tudor-Locke *et al*. defined a sedentary lifestyle as fewer than 5000 steps per day,[40] and Alosco *et al*. classified people taking fewer than 5000 steps/day as being physically inactive or sedentary.[39] Of the patients in the current study who were classified as physically inactive on the basis of SR1, 85% had daily step counts below 5000 steps. This further confirms that the SR1-identified physically inactive patients truly are inactive and also that there might be a prognostic value in this classification. Demeyer *et al*. concluded that for patients with chronic obstructive pulmonary disease, an increase in daily steps exceeding 600 reduced the risk of hospital admissions,[41] and the difference between our groups was 1583 steps, also supporting that the SR1-based screening has clinical value. To confirm applicability of SR1-based classification to make predictions on prognosis, prospective clinical trials are needed. Regardless of what cut-off was chosen to dichotomize SR2 to classify the patients, no significant difference between the groups in terms of physical activity appeared.

To conclude, using a single SR item question to identify physically inactive HF patients is a promising means of screening for patients who are the least likely to achieve acceptable levels of physical activity and therefore are at increased risk of worse outcomes.

Methodological issues

None of these single SR items was specifically designed for screening purposes. The SR1 specifically asks about exercise, which is by definition not the same as physical activity[42]; hence, there is a risk of not eliciting the appropriate responses.[43] More research on the validity of the SR items is needed and would add to the interpretability of these results. SR might be challenging for patients with cognitive problems. While we did not find differences in the relationship between SR and accelerometer, future studies should explore the value of SR on activity level in patients with and without cognitive problems.

Participants in this study were all recruited for an exercise trial,[23] so with that associated selection bias, the findings herein might not be generalizable to the general HF population.

There are several guidelines for physical activity that might apply to HF patients, but no clear guidance on precise physical activity for chronic HF exists. It is thus difficult to classify the patients decisively in this study as physically inactive or physically active according to the strict definition by Thivel *et al*.[2] To investigate whether SR1 or SR2 could be used to identify physically inactive patients, we chose to define physical inactivity on the basis of activity counts from the ActiGraph. Patients in the top quartile were classified as 'physically active', and those in the remaining quartiles were classified as 'physically inactive'. This approach was previously used by Loprinzi.[44] Another published approach was to define a step count $>$ 5000 steps/day as physically active.[39] The 75th percentile was 6139 steps in this current data set, which is close to 5000. We therefore believe that our definition of physical inactivity is reasonable.

Conclusions

A single SR item correlates with an objective measure of physical activity. There might be utility in the single SR item for high-specificity screening of large populations to identify physically inactive patients, in order to refer them to a more detail assessment in order to assign therapeutic interventions efficiently where resources are limited.

The single SR item might be able to serve as a cut-off, instead of an accelerometer, to identify patients at increased risk for worse prognosis.

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Conflict of interest

None to report.

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