

***Translation, construct validity and inter-rater reliability of the Dutch AM-PAC '6-clicks' Basic Mobility short form to assess the mobility of hospitalized patients***

## Master thesis

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Name student:	S.J.G. (Sven) Geelen
Student number:	4290402
Date:	June 30th, 2017
Internship supervisor(s):	Dr. K. Valkenet, prof. Dr. C. Veenhof
Internship institute:	Department of Rehabilitation, Physiotherapy Science and Sport, Brain Center Rudolf Magnus, University Medical Center Utrecht, Utrecht, The Netherlands
Lecturer/supervisor Utrecht University:	Dr. J. van der Net

“ONDERGETEKENDE

Sven Jacobus Gertruda Geelen,

bevestigt hierbij dat de onderhavige verhandeling mag worden geraadpleegd en vrij mag worden gefotokopieerd. Bij het citeren moet steeds de titel en de auteur van de verhandeling worden vermeld.”

**Examiner**

Dr. M.F. Pisters

**Assessors:**

Dr. K. Valkenet

Dr. J. van der Net

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## ABSTRACT

**Aim:** A high proportion of hospitalized patients experience limitations in mobility. To identify a loss in mobility, it is important to use an objective, standardized and valid measurement tool. The Activity Measure for Post-Acute Care '6-clicks' Basic Mobility (AM-PAC BM) is an easy-to-use, quick English measuring tool and has been found valid and reliable in a hospital population. Therefore, the study aims were: (1) to translate the AM-PAC BM to Dutch, and (2) to determine the construct validity and (3) inter-rater reliability in patients hospitalized in a Dutch medical center.

**Methods:** First, the AM-PAC BM was translated from English to Dutch by using a backward-forward translation protocol. Secondly, to determine the validity physiotherapists assessed patients admitted to the internal medicine wards to test six hypotheses regarding the construct 'mobility'. Thirdly, to determine the inter-rater reliability, pairs of physiotherapists independently scored hospitalized patients using the Dutch AM-PAC BM.

**Results:** Five of the six hypotheses (83.33%) were confirmed. Better mobility scores as measured with the AM-PAC BM relate to less restrictive pre-admission living situations ( $p=0.011$ ), less restrictive discharge locations ( $p=0.001$ ), more independence in activities of daily living ( $p=0.001$ ), and less physiotherapy visits ( $p=0.000$ ). There is a correlation between a patient's AM-PAC BM score and length of stay ( $r=-0.408$ ,  $p=0.001$ ), but not between the patient's AM-PAC BM and age ( $r=-0.180$ ,  $p=0.528$ ). Three Intraclass Correlation Coefficients were found between 0.919 (95% CI: 0.862-0.953) to 0.920 (95% CI: 0.828 – 0.964). The Kappa Coefficients for the individual items ranged between 0.649 (walking stairs) to 0.841 (sit to stand).

**Conclusion:** This study provides evidence for the construct validity of the Dutch AM-PAC BM when physiotherapists use it to assess the mobility of hospitalized patients, and also demonstrates a moderate to excellent inter-rater reliability.

**Clinical Relevance** Not only does the newly translated AM-PAC BM offer the Dutch physiotherapist an easy way to measure the mobility more validly, it also offers the Dutch physiotherapists a way to improve the validity of their clinical recommendations regarding post-acute care and discharge planning.

**Keywords:** mobility; hospitalized patients; validity; AM-PAC; reliability

## INTRODUCTION

The percentage of people older than 65 years increases by the year. It is estimated that in The Netherlands the amount of elderly will increase from 13% in 2005 to 24% in 2030.<sup>1</sup> The aging of the population will be accompanied with an increase in multi-morbidity and frailty, resulting in an increase in patients at greater risk of being admitted to a hospital when they become ill.<sup>2,3</sup> When they are admitted to a hospital, a relatively high proportion of the older patients with an acute musculoskeletal, neurological, or cardiopulmonary injury or disease, experience limitations in mobility and activities of daily living (ADL).<sup>4</sup>

A loss in mobility and ADL during admission may have profound consequences, such as prolonged length of stay, increased risk of mortality, and increased risk for institutionalization after discharge.<sup>5,6</sup> When the loss in mobility and ADL persist up to three months, the probability of “complete recovery” of function decreases.<sup>7,8</sup> After six months these impairments rarely reverse.<sup>9,10</sup> Consequently, some patients experience permanent limitations in their ADL and participation in the community after hospitalization.

In a hospital, physiotherapists assess the level of mobility to recommend appropriate clinical care regarding physical rehabilitation, use of (walking) aids, functional activities and determining the discharge location.<sup>11</sup> Physiotherapists examine and treat these patients in order to achieve best possible mobility and ADL levels prior to discharge. In more than 75% of their physiotherapy visits they also focus on educating the patient, family and staff regarding optimal clinical care as regards to mobility and safety.<sup>11</sup>

To improve the validity of these clinical recommendations, it is important that a measurement tool is used to assess the independent mobility of a patient.<sup>12,13</sup> So far, various measurement tools have been developed to assess the independent mobility of hospitalized patients<sup>14-20</sup>, but it appears that the majority of physiotherapists working in a hospital currently do not use one of these tools as a standard part of their care.<sup>12</sup> Underlying reasons for not adopting the available instruments are for example: too time consuming to complete during usual care, too time consuming to analyse or not specifically designed for hospitalized patients.<sup>12</sup> For instance, the de Morton Mobility Index (DEMMI) has been validated in elderly patients and the Physical Function ICU Test (P-FIT) in patients with a critical illness.<sup>15,16</sup> The Modified Iowa Level of Assistance Scale (MILOA) and the Activity Measure for Post-Acute Care ‘6-clicks’ Basic Mobility (AM-PAC BM) are the only two tools that meet all three criteria.<sup>19,20</sup>

The biggest difference between the AM-PAC BM and the MILOA is that the AM-PAC BM does not take the walking distance and walking aid into the scoring.<sup>19,20</sup> Since the goal is to assess the patient's independent mobility in a standardized way, the AM-PAC BM is preferred because it can be assumed that a patient can be independent despite having a short walking distance or using a walking aid. Another difference is that physiotherapists are able to score the AM-PAC BM not only by using the observations made during an assessment, but also by using their clinical judgement as a physiotherapist about patient's probable capabilities.<sup>20</sup>

The AM-PAC BM assesses the basic mobility functions, which represent the functional activities of most interest to post-acute rehabilitation providers.<sup>20</sup> It contains six items: rolling in bed, transfers in bed, transfers out of bed, standing, walking and climbing stairs, and has been validated and found reliable within a diverse population of hospitalized patients.<sup>20,21</sup> Up to now, a Dutch version of the AM-PAC BM

is not yet available.

To enable the use of the AM-PAC '6-clicks' BM in research and clinical practice in the Netherlands, we aimed to translate this instrument to the Dutch language and investigate the construct validity and inter-rater reliability of the Dutch AM-PAC BM in patients admitted to a university hospital setting.

## METHODS

### Phase 1 – Translation:

The first step was to translate the AM-PAC BM from English to Dutch. The AM-PAC BM version 2.0 has been used (appendix A).<sup>22</sup> A backward-forward translation method was used as described in Figure 1.<sup>23,24</sup>

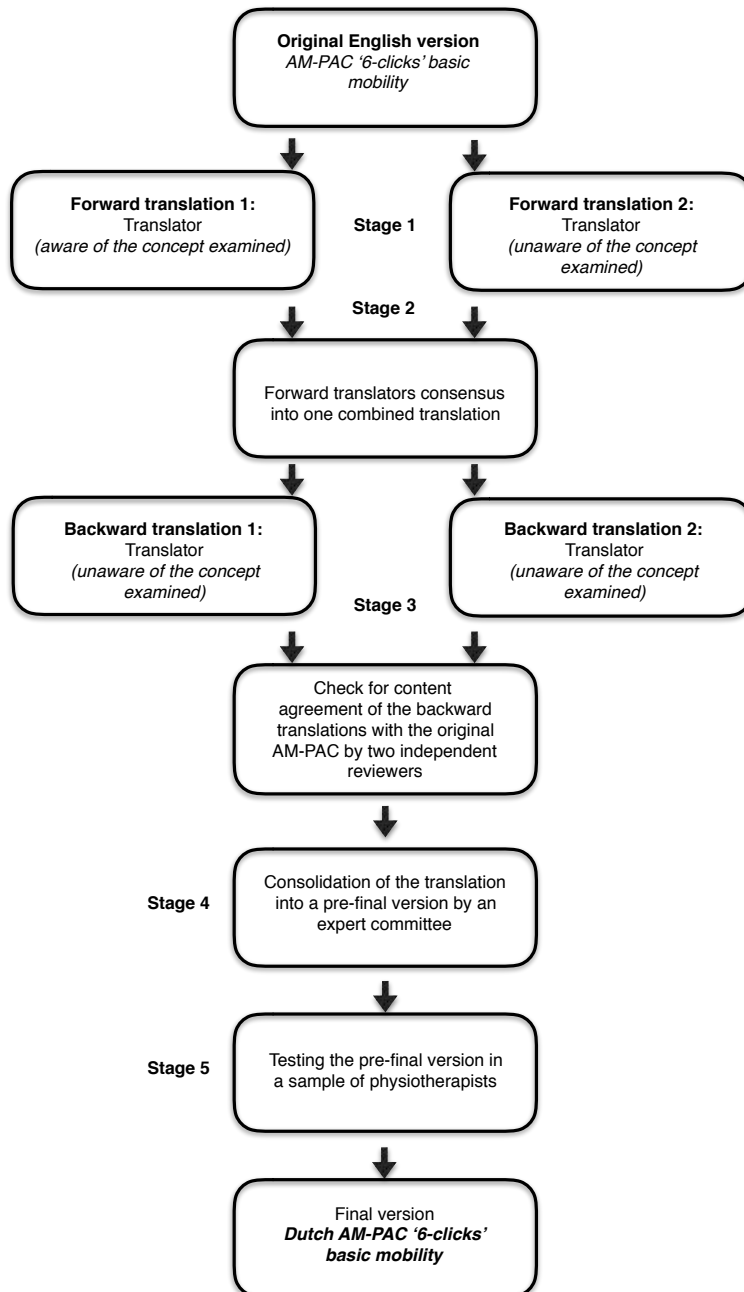


Figure 1: translation process AM-PAC '6-clicks' Basic Mobility

In stage 1 of the translation process, two independent translators translated all 6 items, introductory texts, response options and the footnote of the AM-PAC BM. Both translators were bilingual, with Dutch as their native language. One translator worked as a clinician and was aware of the purpose of

the AM-PAC BM. The second translator had no medical background and was not aware of the purpose of the AM-PAC BM.

In stage 2, both translators and an independent observer sat down to synthesize the results. During this meeting, the original AM-PAC BM, both translations and the notes were used to derive one combined translation. Any disagreements were discussed until consensus on the combined translation had been reached.

In stage 3, two different independent translators translated the preliminary Dutch version back to English. Both translators had no medical background, had English as their native language and Dutch as their second language. They were unaware of the original version of the AM-PAC BM. Both backward translations were compared with the original version by two additional independent reviewers to ensure a consistent and adequate translation. Any inconsistencies or conceptual errors in the translation process were changed.

In stage 4, an expert committee reviewed all versions of the translation process. The role of the expert committee was to consolidate all the versions into a pre-final version, ready for pre-testing as described in stage 5. A methodologist, a language professional, one forward translator, one backward translator and health professionals were part of the expert committee.

In stage 5, the pre-final version of the Dutch AM-PAC BM was field tested in a sample of physiotherapists. Three physiotherapists were asked to read the pre-final version. They were then asked about their thoughts on the meaning of each item and related answer options. These field tests were examined in order to look for any consistent misinterpretations or room for discussion. If needed, the pre-final version was adjusted accordingly. The translation process resulted in a final Dutch AM-PAC BM version that was used within this study, and has been added to this report in appendix B.

## ***Phase 2 – Validation and inter-rater reliability:***

### *Study design:*

A single-center, cross-sectional study design was used to investigate the construct validity and inter-reliability of the Dutch AM-PAC BM. The Medical Research Ethics Committee of the University Medical center Utrecht (UMC Utrecht) determined that this project does not fall under the “Medical Research Involving Human Subjects Act” (WAG/mb/16/038953 and WAG/mb/16/038954). The dataset included only anonymous data.

### *Study population:*

The AM-PAC BM was first introduced to the physiotherapists working on the acute medical wards: rheumatology, nephrology, gastroenterology, oncology (including haematology), urology, infection diseases, internal medicine and geriatrics. The physiotherapists received an explanation of the background, rationale, and use of the AM-PAC BM. They were asked to use the AM-PAC BM within the regular care to assess patient mobility. For both the validity and the reliability sample, all patients above 18 years who were admitted to one of these acute medical wards, were eligible for inclusion. The patients who were medically unstable, did have surgery during admission, or where mobilisation was contraindicated by the medical team were excluded. For the validity sample, patients were also only included when they have been assessed by the physiotherapist using the AM-PAC in the first visit.



### *The AM-PAC BM:*

The AM-PAC '6-clicks' Basic Mobility is a standardized method to identify the patients' mobility and originates from the calibrated AM-PAC item bank.<sup>20</sup> The '6-clicks' is a validated tool designed to use in hospitalized patients receiving (post-)acute rehabilitation care, and the items represent the activities most important to determine a patient's discharge location and are therefore commonly assessed by physiotherapists.<sup>20,25</sup> From the first moment the physiotherapist visits, a moderate to good estimate can be made regarding the patient's discharge destination.<sup>13</sup> All activities are scored on a scale of 1 (unable to do or total assistance required) to 4 (no assistance required). The sum of the scores ranges from 6 (indicating total assistance or cannot do at all) to 24 (indicating completely independent). The physiotherapists score the outcome by carrying out their assessment without any additions or changes. They base their answers on their observations made during the assessment or on their clinical judgement about patient's probable capabilities.

### *Assessment of validity:*

The construct that needed to be validated within the AM-PAC BM was "the patients' mobility". The patients' mobility can be defined as the state in which an individual has the ability to independently make purposeful physical movements of the body to be able to return home.<sup>26</sup> The research team decided to investigate the construct by testing hypotheses related to the construct, due to the absence of a gold standard.<sup>24</sup> To test construct validity, the following six hypotheses were defined: 1) lower age correlates moderately ( $r = 0.3$  to  $0.5$ ) with higher scores on their first physiotherapeutic visit, 2) patients' length of stay is inversely moderately correlated ( $r = 0.3$  to  $0.5$ ) with the score on the first visit, 3) patients living at home have significantly higher scores on their first physiotherapeutic visit than those living in more restrictive settings, 4) patients score significantly higher on their first physiotherapeutic visit when they were more independent in their ADL prior to admission (as measured by the Katz-ADL<sup>27</sup>), 5) patients returning home have significantly higher on their first physiotherapeutic visit than patients returning to more restrictive settings, and 6) patients score higher when they only needed a single physiotherapy visit during their hospital stay (standardized difference score of  $4.72^{20}$ ). These hypotheses have been posed using the original study<sup>20</sup>, the input of the research team and two involved physiotherapists. A positive rating of the construct validity is present when at least 75% of the results are in correspondence with these hypotheses.<sup>28</sup>

The AM-PAC BM scores, information regarding the patients' age, gender, type of diagnosis at admission, length of stay, pre-admission living situation, discharge location and the pre-admission Katz-ADL score<sup>27</sup> were collected by the physiotherapist and delivered anonymously to the research team.

### *Inter-rater reliability:*

The procedure described by Van Dillen and Roach (1988) was used to assess the inter-rater reliability.<sup>21,29</sup> Participating physiotherapists visited hospitalized patients in pairs. One physiotherapist was responsible for the direct care of the patient and performed treatment as usual and additionally recorded the Dutch AM-PAC BM scores on paper. The second physiotherapist solely observed the patient and also scored the tool. Both physiotherapists were unaware of the other therapist's AM-PAC BM assessment. The pair of physiotherapists did not communicate with each other during the assessment.

### *Data analysis:*

All analyses were conducted using IBM-SPSS Statistics version 24 (IBM Corp, Armon, New York).

For the construct validity a sample size of at least 64 patients was calculated with a  $\beta$  of 80%, an  $\alpha$  of 5% and a one-tail correlation of at least 0.3 based on the original validation study of Jette et al.<sup>20</sup> For the inter-rater reliability a sample of at least 50 patients was needed to calculate an Intraclass Correlation Coefficient (ICC) between two raters of at least 0.8 with a 95% confidence interval of  $\pm 0.1$ .<sup>24,30</sup>

Descriptive statistics were derived to describe the patients who were observed during the study. Because the AM-PAC BM was drawn from the calibrated AM-PAC item bank, all scores can be transformed to a standardized score, the t-scale score, for analysis (with a mean of 50 and standard deviation (sd) of 10).<sup>22,31</sup> The transformation table has been added to appendix C.

Normality was evaluated by using histograms and Q-Q plots. Homogeneity of variances was evaluated by Levene's test. The following data analyses were used to test the six hypotheses: a one-tailed Spearman's correlation coefficient was used to determine the relationship between 1) the first visit score and age, and 2) the first visit score and length of stay. Trend analysis of variance (ANOVA) was used to examine differences in mean first visit scores across 3) six types of pre-admission living situations (home alone, home with partner, home with home-care / caregiver, rehabilitation center / assisted-living facility and a nursing facility), 4) across the different Katz-ADL scores, and 5) across seven types of discharge locations (home alone, home with partner, home with home-care / caregiver, rehabilitation center / assisted-living facility, nursing facility / different hospital / hospice and death). An independent *t* test was used to examine 6) the difference in first visit scores between the patients who were visited once by a physiotherapist or visited more than once. In case of heterogeneity of variances, Welch's test was used instead of an ANOVA. In case of non-normality, nonparametric equivalent tests were used.

To investigate the inter-rater reliability for each individual item of the AM-PAC BM, a linear weighted kappa statistic was used. To determine the inter-rater reliability of the total AM-PAC BM score, a one-way and two-way random model of absolute agreement ICC was used.

## RESULTS

### *Descriptives study samples*

The two independent samples included 64 patients to investigate the construct validity and 50 to investigate the inter-rater reliability (Table 1).

*Table 1: Characteristics*

Characteristics	Validity sample n = 64	Inter-rater Reliability sample n = 50
<b>Age (years), mean (sd, range)</b>	73.52 (13.53, 18-93)	70.94 (14.99, 31-95)
<b>Sex, n (%)</b>		
Female	35 (54.7)	26 (52)
Male	29 (45.3)	24 (48)
<b>Type of primary diagnosis at admission, n (%)</b>		
Gastroenterology	10 (15.6)	6 (12)
Nephrology	2 (3.1)	2 (4)
Internal Medicine	15 (23.4)	3 (6)
Geriatrics	27 (42.2)	18 (36)
Oncology, (including hematology)	2 (3.1)	3 (6)
Rheumatology	3 (4.7)	8 (16)
Dermatology	1 (1.6)	1 (2.0)
Infectious disease	4 (6.3)	4 (8.0)
Urology	0 (0.0)	4 (8)
<b>Length of stay (days), median (IQR)</b>	11 (7-20)	
<b>Amount of physiotherapy visits, median (IQR)</b>	3 (2-7)	

*Abbreviations: n = numbers of patients; sd = standard deviation;*

### *Validity sample*

The validity sample included 64 patients, with a mean age of 73.52 (sd=13.53) and 54.7% was male. Patients were admitted for a duration of three to 75 days, and received between one and 32 physiotherapy visits during hospitalization. Table 2 shows their living situation prior to the admission, Katz-ADL score prior to admission, number of patients receiving a single physiotherapy visit and discharge location. A majority of patients was admitted from their home where they lived alone (34.4%) or with a partner (37.5%). Missing data was present in one case regarding the pre-admission Katz-ADL score because none could be found in the medical record and was only excluded for this specific hypothesis. None of the patients died during hospitalization.

The mean of a patients' first AM-PAC BM score was 43.85 (sd=9.90). Table 2 shows the raw and standardized AM-PAC BM scores of each subgroup.

Table 2: Characteristics continued and AM-PAC '6-clicks' Basic Mobility scores of the Validity sample

Characteristic	Amount, n (%)	First visit raw Basic Mobility, median (range)	First visit Basic Mobility t-scale score, mean (sd)
<b>Living situation prior to admission</b>			
Home alone	22 (34.4)	21.5 (10.0-24.0)	47.41 (8.75)
Home with partner	24 (37.5)	20.0 (11.0-24.0)	44.80 (7.68)
Home with caregiver / home-care	12 (18.8)	18.0 (9.0-24.0)	42.84 (9.90)
Rehabilitation center / Assisted living home	3 (4.7)	14.0 (7.0-18.0)	32.00 (11.26)
Nursing home / Hospice	3 (4.7)	9.0 (6.0-14.0)	25.98 (9.48)
<b>Katz-ADL</b>			
0	19 (29.7)	23.0 (16.0-24.0)	49.86 (6.04)
1	5 (7.8)	19.0 (18.0-24.0)	45.85 (6.82)
2	5 (7.8)	21.0 (18.0-22.0)	44.12 (2.90)
3	5 (7.8)	23.0 (20.0-24.0)	51.16 (6.48)
4	8 (12.5)	17.5 (9.0-23.0)	39.26 (10.18)
5	15 (23.4)	17.0 (7.0-24.0)	38.56 (8.92)
6	6 (9.4)	13.0 (6.0-24.0)	33.90 (13.70)
Missing data	1 (1.6)	-	-
<b>Physiotherapy visits</b>			
One	12 (18.8)	23.50 (18.0-24.0)	52.72 (5.83)
Two or more	52 (81.3)	18.00 (6.0-24.0)	41.80 (9.53)
<b>Discharge location</b>			
Home alone	8 (12.5)	23.5 (20.0-24.0)	52.75 (5.77)
Home with partner	15 (23.4)	22.0 (16.0-24.0)	47.11 (6.89)
Home with caregiver / home-care	16 (25.0)	21.0 (9.0-24.0)	45.04 (9.27)
Rehabilitation center / Assisted living home	16 (25.0)	17.50 (7.0-24.0)	39.39 (9.51)
Nursing home / Hospice / Different hospital	9 (14.1)	14.0 (6.0-23.0)	36.34 (11.10)
Death	0 (0)	-	-

Abbreviations: n = numbers of patients; sd = standard deviation;

### Construct validity

Five of the six hypotheses (83.33%) were confirmed. 1) Lower age does not correlate moderately ( $r=0.180$ ,  $p=0.528$ ) with higher first visit scores. 2) The patients' length of stay is significantly, inversely correlated with the first visit score ( $r=-0.408$ ,  $p=0.001$ ). 3) There is a trend showing that patients living at home have significantly higher first visit scores than those living in more restrictive settings ( $p=0.011$ ), 4) patients score significantly higher first visit scores when they were more independent in their ADL prior to admission ( $p=0.001$ ), and 5) patients who are discharged to home have significantly higher first visit scores than patients returning to more restrictive settings ( $p=0.001$ ). Finally, 6) patients with a single physiotherapy visit score received significantly higher first AM-PAC BM scores than patients with more than one visit (mean difference=10.92,  $p=0.000$ ).

### *Inter-rater reliability*

The inter-rater reliability sample included 50 patients, with a mean age of 70.94 (sd=14.99) and an almost equal amount of men and women. This sample was admitted to a variety of medical wards whereby a great part stayed at the Geriatrics department.

Three physiotherapists participated in the data collection. Two physiotherapists assessed both 25 patients separately, in collaboration with the third physiotherapist. This way, the third physiotherapist observed all 50 patients. One of the two physiotherapists assessing the patients had a bachelor's degree with one month working experience, while the other had a Master's degree and four years of working experience. The third, observing physiotherapist had a Bachelor's degree and three years of working experience.

The overall ICC for the inter-rater reliability across rater pairs was 0.919 (95% CI: 0.862-0.953). For both the first and the second pair the ICC was 0.920 (95% CI: 0.828-0.964). The weighted Kappa's for each item are described in Table 3.

*Table 3: Kappa Coefficients*

AM-PAC '6-clicks' Basic Mobility Item	Weighted Kappa	95% Confidence Interval	
		Lower bound	Upper bound
Turning in bed left and right	0.831	0.708	0.955
From supine to sitting on the edge of the bed	0.732	0.591	0.873
Transfer from bed to chair and back	0.761	0.625	0.898
From sitting in a chair to standing	0.841	0.730	0.951
Walk in room	0.827	0.728	0.926
Walking three to five steps of a stairs	0.649	0.497	0.801

## DISCUSSION

This is the first study that reports the translation of the AM-PAC BM to Dutch, and focused on its validation and reliability in a Dutch hospital setting. The results provide evidence for the construct validity of the newly translated AM-PAC BM in assessing the mobility of hospitalized patients. Since five of the six hypotheses were confirmed, the construct validity was good. The results found in this study also show that the inter-rater reliability of the Dutch AM-PAC BM is moderate to excellent, with ICC's exceeding 0.90.

Given the compact form of the AM-PAC BM, the backward-forward translation progressed successfully. Most of the discussion was about the response options 'a lot' and 'a little' of the AM-PAC BM. A literal translation from English to Dutch gave little distinction between these two response options. The expert committee assumed this might have also been the case in the English version and chose the best Dutch equivalent options after a thorough discussion.

The results of the present validity analysis were compared with the results of the study investigating the validity of the original, English AM-PAC BM.<sup>20</sup> Contrary to what was found in the original study, we could not find a relationship between age and the first AM-PAC score. A possible explanation for the difference is the way in which hypotheses were drafted. Within this study, this specific hypothesis looked at the magnitude of the relationship, as recommended by the COnsensus-based Standards for the selection of health Measurements Instruments (COSMIN), whereas the original study chose to base this specific hypothesis solely on p-values.<sup>20,24</sup> This difference changed the method of analysis, which consequently could have led to the difference in outcome. The results of hypothesis 3, 4 and 6 were in line with the results of the corresponding hypotheses that were investigated in the original studies.<sup>13,20</sup> In addition to the above mentioned four hypotheses, we defined two supplementary hypotheses (2 and 4) based on the input of the research team and involved physiotherapists. Earlier research showed that both a patient's length of stay and the performance of ADL have a moderate to strong relationship with the patient's mobility.<sup>32-35</sup> This moderate to strong relationship was also found within this study when the AM-PAC BM was used to measure the patient's independent mobility.

Jette et al.<sup>21</sup> also examined the inter-rater reliability of the English AM-PAC BM. The ICC's of the English AM-PAC BM were investigated on four separate services with an overall of 0.849, whereas the ICC's of the Dutch AM-PAC BM are slightly higher (0.919; 0.920; 0.920). The Weighted Kappa Coefficients of the Dutch AM-PAC BM (0.649 to 0.841) are also slightly higher when compared with the English AM-PAC BM (0.492 to 0.712).<sup>21</sup> This difference can be explained by the small number of physiotherapists who participated in this study. Despite the small number of physiotherapists, this study indicated that the inter-rater reliability of the Dutch AM-PAC, like the English version, is moderate to excellent.

One of the strengths of the AM-PAC BM is that it does not only offer Dutch physiotherapists an easy way to measure mobility during admission more validly, it also offers them a way to improve the validity of their clinical recommendations with regard to post-acute care and discharge. From the first moment the physiotherapist visits the patient, a moderate to good assessment can be made whether the patient can go home.<sup>13</sup> In a system which aims to decrease the length of stay of hospital admissions nationwide, the added value of this measuring tool as an early prediction instrument of the patient's ability to go home should definitely not be underestimated.<sup>36</sup> Whereas other measuring tools focus on

measuring mobility in order to mainly measure clinically important improvements, this tool is useful for efficient and effective discharge planning processes as well.<sup>14–19,37</sup>

Also, the AM-PAC BM has been designed to be easy to use within regular care. Physiotherapists base their answers on their observations made during the assessment or on their clinical judgement about the patient's probable capabilities.<sup>20</sup> Even though this method of data collection might influence the psychometric properties, it does reflect usual care procedures of a physiotherapeutic assessment in a hospital. For instance, patients with poor exercise capacity due to the admission diagnosis might not be assessed according to the entire measuring tool, while a physiotherapist must still be able to estimate the amount of help needed for all basic mobility activities in order to make good clinical recommendations. This study showed that despite this method of data collection, the validity is good and reliability is moderate to excellent.

One of the limitations of this study is that in addition to the hypothesis testing, no convergent validity with other mobility instruments was explored. The research team chose not to compare the AM-PAC BM with the other measuring tools like the MILOA and the DEMMI, because none of these have been studied in the same language and the same patient population yet.<sup>19,24,38,39</sup> Also, none of these were used in the usual care by the involved physiotherapists because of the aforementioned limitations of these measuring tools.

Another limitation of the study is that fifty percent of the population already scored 20 out of 24 points on the first visit. When the physiotherapeutic goal is to evaluate patient mobility, one should consider a tool which is specifically designed to be responsive to change and which avoids floor and ceiling effects. With a minimal detectable change of two to three points<sup>20</sup>, one could consider using a different tool with a wider range of activities when a patient scores high on the first visit.

Future research should focus on investigating the inter-rater reliability of the Dutch AM-PAC BM on wards other than internal medicine. Jette et al describes a difference in ICCs when they were compared between wards, such as: medical/surgical, orthopedics, neurology and cardiovascular.<sup>21</sup> Furthermore, to counteract the loss in mobility and ADL patients experience, multiple hospitals in the Netherlands currently explore possibilities to stimulate patients to be more active in a hospital. The lack of activity when hospitalized has also been referred as the 'pyama paralysis'.<sup>40</sup> To be able to draw up efficient policies and interventions to stimulate patients to be more active, the independent mobility of every patient should be assessed early on, and in an easy and time efficient way. However, to be able to measure the mobility of every hospitalized patient within usual care, other healthcare staff should be involved too because physiotherapists only visit a subset of patients. Therefore, further research should also focus on examining the validity and reliability of the AM-PAC BM when administered by other healthcare staff, such as nurses.

## CONCLUSION

In conclusion, this study provides evidence for the validity of the new Dutch AM-PAC BM when physiotherapists use it to assess the mobility of patients who have been admitted to internal medicine wards. This study also demonstrates a moderate to excellent inter-rater reliability, with ICC's of 0.919 (95% CI: 0.862-0.953) to 0.920 (95% CI: 0.828 – 0.964), and Kappa Coefficients between 0.649 and 0.841. Therefore, the AM-PAC BM can be used as a valid, easy to use, quick tool to assess the mobility

of patients who have been admitted to a Dutch internal medicine ward in order to substantiate clinical recommendations.



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**APPENDIX A: English version AM-PAC ‘6-clicks’ Basic Mobility short form**

Please check the box that reflects your (the patient’s) best answer to each question

Table 4: English AM-PAC ‘6-clicks’ basic mobility short form

<b>How much help from another person does your patient currently need...</b> (If the patient hasn’t done an activity recently, how much help from another person do you think he/she would need if he/she tried?)	<b>Total</b>	<b>A lot</b>	<b>A little</b>	<b>None</b>
1. Turning from your back to your side while in a flat bed without using bedrails?	1	2	3	4
2. Moving from lying on your back to sitting on the side of a flat bed without using bedrails?	1	2	3	4
3. Moving to and from a bed to a chair (including a wheelchair)?	1	2	3	4
4. Standing up from a chair using your arms (e.g. wheelchair, or bedside chair)?	1	2	3	4
5. To walk in hospital room?	1	2	3	4
6. Climbing 3-5 steps with a railing?	1	2	3	4
Raw score: _____				
Standardized score: _____				

*Answering options:*

- Total: requires total assistance, or cannot do at all
- A lot: Requires a lot of help (maximum to moderate assistance). Can use assistive devices
- A little: Requires a little help (supervision, minimal assistance). Can use assistive devices
- None: Does not require any help and does the activity independently. Can use assistive devices

Footnote #1: Basic Mobility assess bed mobility activity in a flat bed without using the handrails. Ask the patient to do the activity without using the bedrails and estimate how much help from another person is needed if the bedrail is not used.

Footnote #2: Often a medical device interferes with a patient’s mobility (e.g., IV pole, catheter bag). If help from another person is required only to manage medical device(s), this help is not considered when selecting a response.

## APPENDIX B: Dutch version of the AM-PAC '6-clicks' Basic Mobility

Kruis bij iedere vraag alstublieft het vakje aan dat het beste overeenkomt met uw antwoord met betrekking tot deze patiënt.

Table 5: Dutch version AM-PAC '6-clicks' basic mobility

<b>Hoeveel hulp heeft de patiënt op dit moment nodig van een ander persoon bij...</b> <i>(Als de patiënt de activiteit recent niet uitgevoerd heeft, hoeveel hulp denkt u dat de patiënt nodig zou hebben van een ander persoon als hij/zij de activiteit nu zou uitvoeren?)</i>	<b>Volledig</b>	<b>Veel</b>	<b>Een beetje</b>	<b>Geen</b>
1. Draaien van ruglig naar zijlig op een plat bed zonder gebruik te maken van de beddekken?	1	2	3	4
2. Verplaatsen vanuit ruglig naar zit op de rand van het bed, op een plat bed zonder gebruik te maken van de beddekken?	1	2	3	4
3. Verplaatsen vanuit een bed naar een (rol)stoel en terug?	1	2	3	4
4. Opstaan vanuit een (rol)stoel met steun van zijn/haar armen?	1	2	3	4
5. Lopen in een ziekenhuiskamer?	1	2	3	4
6. Drie tot vijf treden traplopen met behulp van een trapleuning?	1	2	3	4
Ruwe score: _____				
Gestandaardiseerde score: _____				

### Antwoordopties:

- Volledig: Is aangewezen op volledige assistentie, of de activiteit is niet uitvoerbaar.
- Veel: Is aangewezen op veel hulp (middelmatig tot veel assistentie). Gebruik van loophulpmiddelen is toegestaan.
- Een beetje: Is aangewezen op een geringe hoeveelheid hulp (supervisie of minimale assistentie). Gebruik van loophulpmiddelen is toegestaan.
- Geen: Is niet aangewezen op hulp en voert de activiteit zelfstandig uit. Gebruik van loophulpmiddelen is toegestaan.

Voetnoot #1: AM-PAC '6-clicks' Basic Mobility beoordeelt de mobiliteit in een plat bed. Vraag de patiënt de activiteit uit te voeren zonder het gebruik van de beddekken. Schat in hoeveel hulp nodig is van een ander persoon als de beddekken niet gebruikt worden.

Voetnoot #2: Vaak beperkt de medische apparatuur de mobiliteit van de patiënt (bijvoorbeeld een infuuspaal of een katheter). Als hulp van een ander persoon enkel nodig is voor het hanteren van de medische apparatuur, dan dient dit niet te worden meegenomen in de beoordeling.

## APPENDIX C: Translation table AM-PAC '6-clicks' Basic Mobility

Table 6: Transformation table AM-PAC '6-clicks' Basic Mobility Raw score to T-scale score

Raw score	Scale Score	Scale Score Standard Error	Approximate Degree of Functional Impairment
6	16.59	3.18	100%
7	19.39	3.27	93.19%
8	22.61	3.23	85.35%
9	25.80	2.96	77.59%
10	28.13	2.78	71.92%
11	30.25	2.66	66.76%
12	32.23	2.57	61.94%
13	33.99	2.51	57.65%
14	35.55	2.49	53.86%
15	36.97	2.48	50.40%
16	38.32	2.46	47.12%
17	39.67	2.44	43.83%
18	41.05	2.42	40.47%
19	42.48	2.46	36.99%
20	43.99	2.60	33.32%
21	45.55	2.87	29.52%
22	47.40	3.31	25.02%
23	50.88	4.44	16.55%
24	57.68	6.67	0%

## SAMENVATTING

**Doelstelling:** Een groot deel van de ziekenhuispatiënten ervaren beperkingen in mobiliteit. De implementatie van bestaande meetinstrumenten om een vermindering van mobiliteit in kaart te brengen wordt beperkt doordat er veel tijd nodig is om deze meetinstrumenten te gebruiken, deze te analyseren of het meetinstrument is niet specifiek ontworpen voor ziekenhuispatiënten. De Activity Measure voor Post-Acute Care '6-clicks' Basic Mobility (AM-PAC BM) is een makkelijk te gebruiken, snel meetinstrument, en is valide en betrouwbaar bevonden in een ziekenhuisbevolking. De doelstellingen van deze studie waren daarom: (1) de AM-PAC BM naar Nederlands vertalen, en vanuit daar (2) de constructvaliditeit en (3) inter-rater betrouwbaarheid bepalen bij ziekenhuispatiënten die in een Nederlands centrum opgenomen zijn.

**Methode:** Ten eerste werd door gebruik te maken van een 'backward-forward' vertaalprotocol de AM-PAC BM van Engels naar Nederlands vertaald. Ten tweede, om de construct validiteit vast te stellen, beoordeelden fysiotherapeuten ziekenhuispatiënten binnen de Interne Geneeskunde om zes hypothesen te toetsen over het construct 'mobiliteit'. Ten derde, om de inter-beoordelaars betrouwbaarheid te bepalen, hebben paren van fysiotherapeuten patiënten gezamenlijk beoordeeld.

**Resultaten:** Vijf van de zes hypothesen (83,33%) werden bevestigd. De scores verschillen aanzienlijk tussen de pre-opnamesituatie, ontslaglocatie, prestatie van dagelijkse activiteiten en het aantal fysiotherapie consulten. Er is een correlatie tussen het eerste fysiotherapie consult en de opnameduur van een patiënt ( $r = -0.408$ ,  $p = 0.001$ ), terwijl er geen correlatie met de leeftijd van de patiënt gevonden werd ( $r = -0.180$ ,  $p = 0.528$ ). ICC's werden gevonden tussen 0.919 (95% CI: 0.862-0.953) tot 0.920 (95% CI: 0.828-0.964) en Kappa's tussen 0.649 (traplopen) en 0.841 (van zit naar stand).

**Conclusie:** Deze studie geeft bewijs voor de validiteit van de Nederlandse AM-PAC '6-clicks' Basic Mobility short form wanneer fysiotherapeuten het gebruiken om de mobiliteit van ziekenhuispatiënten te beoordelen. Het meetinstrument laat tevens een matige tot goede inter-beoordelaars betrouwbaarheid zien.

**Klinische relevantie:** Niet alleen biedt de pas vertaalde AM-PAC BM de Nederlandse fysiotherapeut een gemakkelijke manier om de mobiliteit te meten, het biedt de Nederlandse fysiotherapeuten ook een manier om de validiteit van hun klinische aanbevelingen te verbeteren met betrekking tot post-acute zorg en ontslagbestemming.