



ELSEVIER

Contents lists available at ScienceDirect

Geriatric Nursing

journal homepage: www.gnjournal.com

Featured Article

Psychometric properties of the client activation self-efficacy and outcome expectation scales for nurses (CA-SE-n and CA-OE-n) and domestic support workers (CA-SE-d and CA-OE-d): A cross-sectional study

Silke F. Metzelthin, PhD^{a,*}, Anne Claßen, MSc^a, G.A. Rixt Zijlstra, PhD^a, Erik van Rossum, PhD^{a,b}, Janneke M. de Man-van Ginkel, PhD^{c,d}, Teuni H. Rooijackers, MSc^a, Gertrudis I.J.M. Kempen, PhD^a

^a Maastricht University, Faculty of Health, Medicine and Life Sciences, Care and Public Health Research Institute (CAPHRI), Department of Health Services Research, P.O. Box 616, 6200 MD Maastricht, the Netherlands

^b Zuyd University of Applied Sciences, Faculty of Health, Research Centre for Community Care, P.O. Box 550, 6400 AN Heerlen, the Netherlands

^c University Medical Centre Utrecht, University Utrecht, Julius Centre for Health Sciences and Primary Care, P.O. Box 85500, 3508 GA Utrecht, the Netherlands

^d University Medical Centre Utrecht, Programme in Clinical Health Sciences, P.O. Box 85500, 3508 GA Utrecht, the Netherlands



ARTICLE INFO

Article history:

Received 21 October 2020

Received in revised form 29 December 2020

Accepted 30 December 2020

Available online 6 February 2021

Keywords:

Function focused care

Reablement

Self-efficacy

Outcome expectations

Validation

ABSTRACT

Self-efficacy and outcome expectations regarding client activation determine professionals' level of actively engaging clients during daily activities. The Client Activation Self-Efficacy and Outcome Expectation Scales for nurses and domestic support workers (DSWs) were developed to measure these concepts. This study aimed to assess their psychometric properties. Cross-sectional data from a sample of Dutch nurses (n=150) and DSWs (n=155) were analysed. Descriptive statistics were used to examine floor and ceiling effects. Construct validity was assessed by testing research-based hypotheses. Internal consistency was determined with Cronbach's alpha. The scales for nurses showed a ceiling effect. There were no floor or ceiling effects in the scales for domestic support workers. Three out of five hypotheses could be confirmed (construct validity). For all scales, Cronbach's alpha coefficients exceeded 0.70. In conclusion, all scales had moderate construct validity and high internal consistency. Further research is needed concerning their construct validity, test-retest reliability and sensitivity to change.

© 2021 The Authors. Published by Elsevier Inc. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>)

Introduction

Enabling older adults to age in place is a common goal for societies facing a growing gap between increasing healthcare needs and limited resources.¹ This society goal is in line with the preference of most older adults, who want to stay in their own homes for as long as possible, even if they suffer from fragile health and they are faced with challenging social situations.²

Physical activity has shown to contribute to ageing in place³, which does not necessarily mean that older adults have to work-out intensively. It rather encompasses being active in (instrumental) activities of daily living ((I)ADL), like washing, dressing, cleaning or doing the laundry.⁴ However, older adults receiving home care services are at risk of becoming deprived of opportunities to be physically active in these tasks, as home care professionals often tend to take over tasks, which may lead to client's (further) functional decline.⁵

Instead of providing care for their clients, professionals should apply client activation in home care in order to prevent this decline. Client activation allows clients to make use of their current functional capacities for carrying out physical and daily activities as much as they can, starting with participation in daily activities.⁶ This concept of care delivery is often referred to as Function Focused Care or Reablement.^{7,8}

The level of actively engaging clients during daily activities is determined by professionals' self-efficacy and positive outcome expectations regarding client activation.⁵ The concept of self-efficacy is concerned with a person's conviction of being able to conduct a particular behaviour successfully.⁹ Self-efficacy theory assumes that the level of a person's self-efficacy determines initiation and persistence of the particular behaviour. The stronger the self-efficacy is, the more likely he or she will choose to execute the behaviour and the more effort he or she will expend to maintain it when facing obstacles.⁹ Outcome expectations refer to a person's beliefs that the performance of the given behaviour contributes to a certain result.⁹ The existence of positive outcome expectations is assumed a

*Corresponding author.

E-mail address: s.metzelthin@maastrichtuniversity.nl (S.F. Metzelthin).

necessary condition for initiating and maintaining the particular behaviour. If a person does not believe that the given behaviour contributes to the desired result, he or she will not engage in the behaviour.⁹ Based on previous research it is known that self-efficacy and outcome expectations are influenced by several factors. For example, self-efficacy rises with increasing years of job experiences.¹⁰ In addition, higher levels of self-efficacy are correlated with higher levels of outcome expectations.⁹ Outcome expectations are positively influenced by knowledge about the advantages of the given behaviour.¹¹ In addition, following relevant training activities leads towards increasing levels of both self-efficacy and outcome expectations.¹¹

To be able to objectively measure self-efficacy and outcome expectations regarding client activation in (Dutch) home care, validated scales for nurses and domestic support workers (DSWs) are needed, as these professionals have a dominant role in providing home care. While nurses often assist with personal care tasks (e.g., washing and dressing), DSWs take responsibility for domestic tasks (e.g., cleaning or doing the laundry). Consequently, we developed four scales: the Client Activation Self-Efficacy and Outcome Expectation Scales for nurses (CA-SE-n and CA-OE-n) and DSWs (CA-SE-d and CA-OE-d). The scales were inspired by two scales that were developed in the United States to measure self-efficacy and outcome expectations regarding client activation among nursing assistants in nursing homes^{6,10}: the Nursing Assistants' Self-Efficacy for Restorative Care Activities (NASERCA) and Nursing Assistants' Outcome Expectations for Restorative Care Activities (NAOERCA). In order to overcome linguistic and setting-specific barriers, the original scales were translated and adapted to the Dutch home care setting.

The validity and reliability of the CA-SE-n, CA-OE-n, CA-SE-d and CA-OE-d were not yet known. Therefore, this study aimed to assess their psychometric properties in home care professionals in terms of floor and ceiling effects, construct validity and internal consistency.

Material and methods

Study design and participants

A cross-sectional observational study was conducted in the south of the Netherlands using baseline data that were collected alongside the Stay Active at Home study, a cluster randomised controlled trial.¹³ The study population comprised home care professionals (i.e., nurses and DSWs) working for MeanderGroup South-Limburg. The managers of MeanderGroup selected ten nursing teams out of five working districts (two teams per district) to participate in the study. All nurses working in the selected teams were eligible for study participation ($n = 157$), and clients of these nurses were identified. Next, if a client of an eligible nurse received domestic support as well, this DSW was also selected to participate in this study ($n = 173$). No additional inclusion and exclusion criteria were applied.

Development of the CA-SE-n, CA-OE-n, CA-SE-d and CA-OE-d scales

As mentioned above, the scales were inspired by the NASERCA and NAOERCA scales that were developed and validated in the United States by Resnick and colleagues^{6,12} to measure self-efficacy and outcome expectations regarding client activation among nursing assistants working in nursing homes. As the items of the original NASERCA and NAOERCA scales were developed for the nursing home setting, a linguistic translation alone was not sufficient. Consequently, the content of the scales had to be adapted as well. For example, in home care, clients are often able to walk (short distances). Therefore, items about walking short distances are less sensitive in home care. In contrast, preparing a meal is a highly relevant activity for community-dwelling older adults, but less applicable in nursing home residents.

In order to overcome linguistic and setting-specific barriers while ensuring the validity of the original scales, a structured translation and adaptation process was applied that consisted of seven steps.¹⁴ First, a forward translation from English to Dutch was done by two researchers, who were not involved in the validation study (CM and NdK), followed by a synthesis of their results together with a third researcher (author SFM). Second, a backward translation from Dutch to English was conducted by two native English speakers, followed by a synthesis of their results together with two of the researchers (CM and SFM). Third, the researchers and native speakers that were involved in step 2, together with an expert panel of three other researchers (authors GARZ, EvR and GIJMK) participated in a face-to-face meeting to compare the original scales with the results of the forward and backward translation (step 1 and 2). Fourth, researchers CM and SFM developed an initial translated version of the scales, which were again evaluated by the expert panel in a blinded e-mail round, resulting in an adapted version. This version was pre-tested with seven nurses, who were not working at MeanderGroup South-Limburg (step 5). Sixth, the pre-test resulted in a final translated version. In the last step, the expert panel and researcher SFM evaluated all items for their relevance in the Dutch home care setting. In order to deal with setting-specific differences, items were adapted, deleted or added. More details about the adaptation process, including all preliminary versions of the scales, are published elsewhere.¹⁴

Description of the CA-SE-n, CA-OE-n, CA-SE-d and CA-OE-d scales

The four scales consist of ten items each for eliciting both self-efficacy and outcome expectations regarding client activation during daily activities. More specifically, the scales for nurses (CA-SE-n and CA-OE-n) focus on ADL activities, such as washing or dressing, while the scales for DSWs (CA-SE-d and CA-OE-d) focus on IADL activities, such as cleaning or doing the laundry.

The ten items of the self-efficacy scales (CA-SE-n and CA-SE-d) consist of statements that are followed by a five-point Likert scale to indicate home care professionals' level of confidence regarding successful client activation during daily activities (ADL/IADL), ranging from 1 ('no confidence') to 5 ('total confidence'). The first six statements focus on client activation under ordinary circumstances, while the last four statements focus on client activation under more challenging circumstances. For example, when more clients than usual are assigned to the professional (e.g. higher workload).

The ten items of the outcome expectation scales (CA-OE-n and CA-OE-d) consist of statements that are followed by a five-point Likert scale to indicate home care professionals' level of agreement with the benefits of client activation during daily activities (ADL/IADL), ranging from 1 ('strongly disagree') to 5 ('strongly agree'). The first six statements focus on benefits for the client's independent functioning, while the last four statements focus on benefits for professionals, such as higher job satisfaction.

All four scales theoretically range from 10 to 50, in which higher scores indicate higher self-efficacy or outcome expectations.

The four scales including, answer options and instructions are displayed in Appendix 1.

Data collection

The four scales were assessed in nurses (CA-SE-n and CA-OE-n) and DSWs (CA-OE-n and CA-OE-d) during a team meeting, in which the home care professionals individually filled in a paper-based questionnaire. Missing values for self-efficacy and outcome expectation scores were imputed using case mean substitution, namely, by replacing missing values with the respondent's average value of the other items of that particular scale. For validation purposes, a knowledge test was added to this questionnaire to measure home care

professionals' knowledge regarding client activation during daily activities. This test was inspired by the Nursing Assistants' Theoretical Testing of Restorative Care Activities (NATTRCA) measure for the United States nursing home setting.^{6,12} The knowledge test comprises ten multiple-choice items, with three to seven answer options each, of which one or more options are correct. For example: 'If a healthy person has two weeks of bed rest, how much percentage of his or her muscle tissue disappears?' (answer options: 4%, 8% or 10%)

For each option ticked correctly, one point is awarded, while for each option ticked incorrectly, one point is subtracted. The knowledge test score theoretically ranges from 0 to 39 points, with higher scores indicating more knowledge about client activation. Finally, some background characteristics of the sample were assessed as part of the questionnaire, including sex, age, years of job experience and level of education (eight categories ranging from 'no education' to 'university'). The level of education was treated as a numerical variable, as the original eight-level categorisation was transformed into a numerical variable by assigning the number of years of education required to attain the educational level, ranging from 3 years (less than primary school) to 16 years (university or higher professional education). In addition, professionals were asked, if they received a training on client activation (yes/no). This training was offered before the start of the current study at MeanderGroup South-Limburg to teach and motivate professionals to actively engage their clients during daily activities.

Ethical considerations

The current study respected the principles of the World Medical Association Declaration of Helsinki. Participation was voluntary, and the participants' confidentiality and anonymity were maintained throughout the study. All study-related information was stored securely at the university, and only the involved researchers had access to the complete dataset. Results are presented in an anonymised way. All potential participants received oral information about the study and handing in the completed survey was considered as informed consent. According to the Dutch Medical Research Committee Zuyderland this study is not in need of ethical approval (METC #17N110).

Data analysis

To gain insight into the characteristics of the study sample, descriptive statistics on all background characteristics, as well as on self-efficacy, outcome expectations and knowledge test scores, were performed. In view of the research aims, the following analyses were conducted:

First, potential floor and ceiling effects in the four scales (CA-SE-n, CA-OE-n, CA-SE-d and CA-OE-d) were evaluated by calculating the range and standard deviation (SD) of the total scores, and by plotting their frequency distribution.

Second, to evaluate the construct validity of the four scales (CA-SE-n, CA-OE-n, CA-SE-d and CA-OE-d) five research-based hypotheses concerning self-efficacy and outcome expectations were formulated and tested (see Table 1,^{9–11}) using non-parametric tests, as the collected data were not normally distributed. Spearman's rank correlation coefficients were calculated for the numerical variables (i.e. job experience, knowledge test score and outcome expectation score). Hypotheses that were related to the completion of a training on client activation were tested by conducting the Mann–Whitney–U test, as this variable was dichotomous. For all tests, the level of statistical significance was set at $p \leq 0.05$.

Third, the reliability (internal consistency) of each of the four scales (CA-SE-n, CA-OE-n, CA-SE-d and CA-OE-d) was evaluated by calculating Cronbach's alpha coefficient. The minimum acceptable

Table 1
Hypotheses for testing construct validity of the scales.

Hypothesis	Literature base
<i>Self-efficacy</i>	
2. Self-efficacy rises with increasing number of years of job experience	Klassen and Chiu ¹⁰
4. Self-efficacy rises when training has been completed	Bandura ¹¹
5. Self-efficacy rises with increasing outcome expectations	Bandura ⁹
<i>Outcome expectations</i>	
6. Outcome expectations rise when training has been completed	Bandura ¹¹
7. Outcome expectations rise with an increasing knowledge	Bandura ¹¹

value for Cronbach's alpha coefficient was set at 0.70, as this is the lower boundary of the commonly accepted cut-off points.¹⁵

As a sensitivity analysis, the analyses were also conducted without imputation. All statistical analyses were performed using IBM SPSS Statistics for Windows, version 24.0.

Results

Description of the sample

Three hundred and thirty home care professionals were eligible to participate in the study. Out of 157 nurses and 173 DSWs, 150 nurses (96%) and 155 DSWs (90%) agreed to participate. The majority (98%) of the sample included female home care professionals. Only six males participated (five nurses and one DSW). In total, 68% of the participants (80% of nurses and 56% of DSWs) completed a training on client activation before the data collection. The average self-efficacy and outcome expectation scores were 43.11 (range: 30–50; SD: 5.15) and 45.61 (range: 11–50; SD: 5.43) for nurses, and 33.96 (range: 10–50; SD: 6.71) and 36.42 (range: 10–50; SD: 7.47) for DSWs, respectively. Table 2 provides the participants' socio-demographic characteristics and their knowledge test scores.

Floor and ceiling effects

On the sum score level, the self-efficacy and the outcome expectation scales for nurses (CA-SE-n and CA-OE-n) showed a ceiling effect. The effect was stronger for outcome expectations than for self-efficacy. For the DSWs scales (CA-SE-d and CA-OE-d), the sum scores were generally more normally distributed. Consequently, there were no floor or ceiling effects observed. Fig. 1 shows the distribution for both scores in both groups.

Table 2
Background characteristics of the study sample, including self-efficacy and outcome expectation scores.

Variables	N	Mean	SD	Min	Max
<i>Nurses</i>					
Age (years)	147	46.71	12.32	19.00	64.00
Job experience (years)	149	13.97	11.90	0.30	44.00
Education (years)	149	11.34	2.11	8.00	16.00
Knowledge test score	150	31.95	3.32	22.00	38.00
Self-efficacy score	150	43.11	5.15	30.00	50.00
Outcome expectations score	150	45.61	5.43	11.00	50.00
<i>Domestic support workers</i>					
Age (years)	151	48.27	10.52	21.00	65.00
Job experience (years)	153	11.07	8.12	0.05	43.00
Education (years)	154	9.42	2.18	3.00	16.00
Knowledge test score	155	28.66	3.96	18.00	38.00
Self-efficacy score	155	33.96	6.71	10.00	50.00
Outcome expectation score	155	36.42	7.47	10.00	50.00

Theoretical ranges: knowledge test score: 0–39; self-efficacy score: 10–50; outcome expectation score: 10–50; higher scores indicate favourable outcomes.

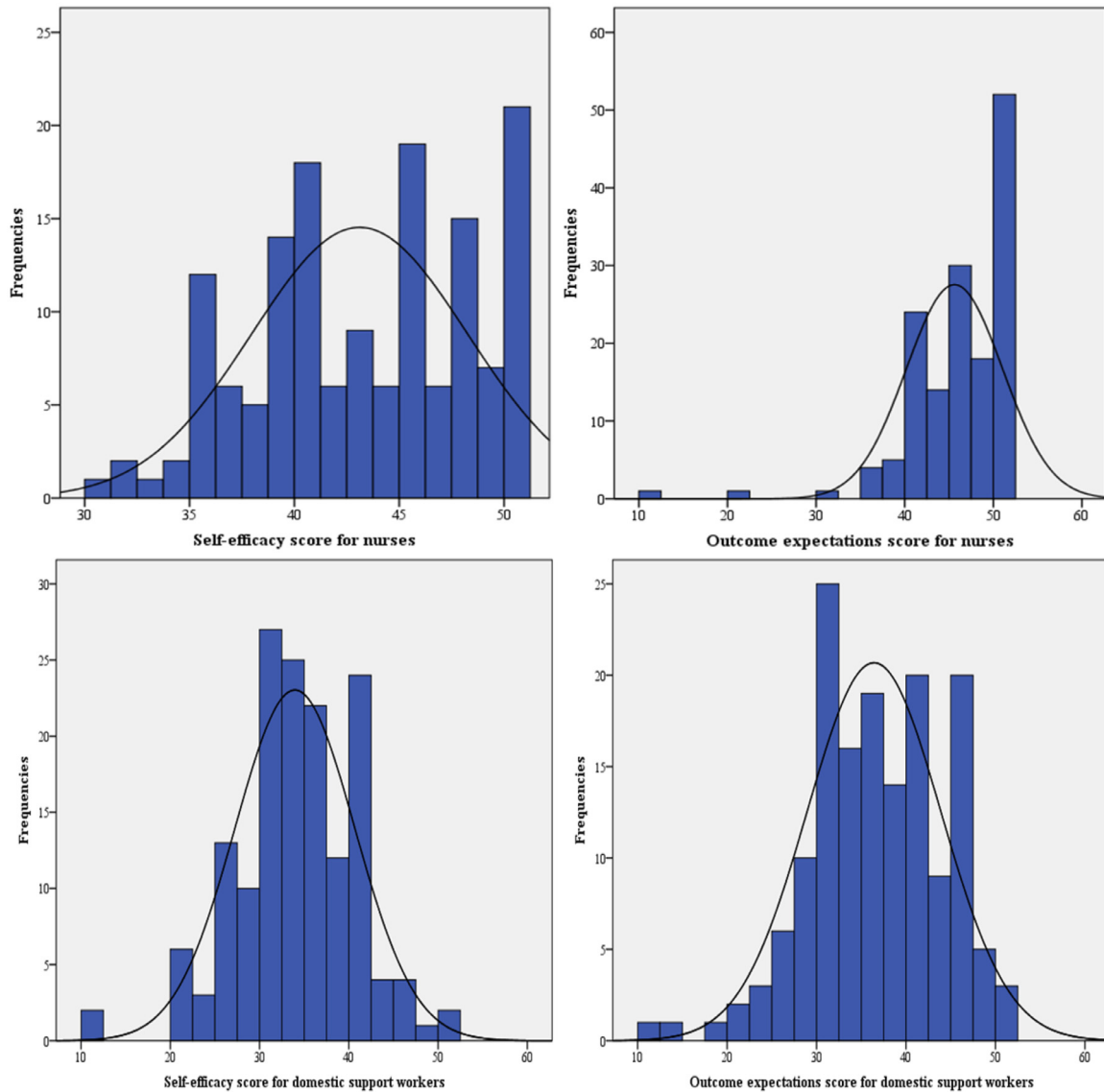


Fig. 1. Distribution of self-efficacy and outcome expectation scores per professional group. Theoretical ranges: self-efficacy score: 10–50; outcome expectation score: 10–50; higher scores indicate favourable outcomes.

On the item level, the first six items of the CA-SE-n, which measure self-efficacy regarding client activation under ordinary circumstances, showed high levels of self-efficacy (score ≥ 4) more often than the last four statements, which assess self-efficacy under challenging circumstances (95.0% vs. 71.5%). The same tendency was observed for the CA-OE-n scale, for which, the first six statements focus on benefits for clients' independent functioning, while the last four statements focus on benefits for professionals (95.9% vs. 86.4%). Overall, most nurses rated the items of the CA-SE-n and CA-OE-n scales with a score of 4 and higher (83.3% and 91.2%, respectively), whereas, low levels of self-efficacy and outcome expectations (scores ≤ 2) were scarce (2% and 2%, respectively).

For DSWs, in comparison to the nurses, high levels of self-efficacy and outcome expectations regarding client activation on the item level were observed less often, with 48.8% and 59.1% assigning a score of 4 or higher to the items of CA-SE-d and CA-OE-d scales, respectively. Low levels of self-efficacy and outcome expectations (score ≤ 2) were also observed (20.6% and 14.6%, respectively). Most DSWs had high levels of self-efficacy and outcome expectations regarding client activation (score ≥ 4) when doing 'light housework' (36.2% and 40.0%, respectively), 'putting away purchases'

(36.6% and 34.2%, respectively) and 'preparing meals' (36.9% and 37.3%, respectively). Remarkably low numbers of DSWs reported high levels of self-efficacy and outcome expectations for client activation when doing 'heavy housework' (6.9% and 7.5%, respectively). There were differences between high self-efficacy scores for client activation under ordinary and challenging circumstances (52.4% vs. 43.5%). The same was observed for outcome expectations regarding benefits for client's independent functioning and benefits for professionals (53.3% vs. 67.8%). Table 3 presents an overview of the response distribution per item of the self-efficacy and the outcome expectation scales.

Construct validity

Three out of five research-based hypotheses could be confirmed regarding the construct validity. First, in both professional groups, self-efficacy scores were significantly higher with increasing outcome expectation scores (nurses: $\rho = 0.44$, $p < 0.05$; DSWs: $\rho = 0.56$, $p < 0.05$). Second, outcome expectation scores were significantly higher with increasing knowledge of client activation, but only in DSWs ($\rho = 0.25$, $p < 0.05$). Third, with regard to professionals'

Table 3

Response distribution on the five-point Likert scale per item of the four scales (CA-SE-n, CA-SE-d, CA-OE-n and CA-OE-d).

a) Self-efficacy scales: CA-SE-n and CA-SE-d											
Nurses (%)	Scores on the Likert scale					DSWs ¹ (%)	Scores on the Likert scale				
	1	2	3	4	5		1	2	3	4	5
<i>Confidence to be able to apply client activation during this activity</i>						<i>Confidence to be able to apply client activation during this activity</i>					
Washing or bathing	0.0	0.0	3.3	32.7	63.3	Light housework	2.6	1.3	23.2	38.1	34.2
Dressing	0.0	0.0	3.3	37.3	58.7	Heavy housework	36.8	28.9	19.7	7.9	5.9
Personal care	0.0	0.0	2.7	32.0	65.3	Changing bed sheets	8.6	13.9	37.1	23.8	16.6
Toileting activities	0.7	0.0	6.7	36.7	55.3	Washing and ironing	8.4	17.5	33.6	28.7	11.9
Making transfers	0.0	0.0	7.4	38.9	53.0	Putting away groceries	4.1	5.5	17.1	39.0	34.2
Walking short distances	0.0	0.0	3.4	37.6	59.1	Preparing meals	4.8	4.8	16.6	36.6	37.2
<i>Confidence to be able to apply client activation during challenging circumstances</i>						<i>Confidence to be able to apply client activation during challenging circumstances</i>					
Client's refuses participation	0.0	4.0	30.0	40.0	25.3	Client's refuses participation	7.4	17.4	42.3	25.5	7.4
More clients than usual	0.0	4.0	25.3	40.7	30.0	More clients than usual	5.6	12.6	39.9	29.4	12.6
Client has time pressure	0.0	1.3	20.1	50.3	28.2	Client has time pressure	2.1	5.5	34.5	35.9	22.1
Family wants total care	2.0	3.3	22.7	40.0	31.3	Family wants total care	7.6	10.4	40.3	23.6	17.4
b) Outcome expectation scales: CA-OE-n and CA-OE-d											
Nurses (%)	Scores on the Likert scale					DSWs ¹ (%)	Scores on the Likert scale				
	1	2	3	4	5		1	2	3	4	5
<i>Agreement that participation in this activity is important for independent functioning</i>						<i>Agreement that participation in this activity is important for independent functioning</i>					
Washing or bathing	0.7	0.7	0.7	18.7	79.3	Light housework	1.3	1.3	17.5	30.5	49.4
Dressing	0.7	0.7	0.7	17.3	80.7	Heavy housework	29.7	29.0	26.5	11.0	3.9
Personal care	0.7	0.7	2.0	18.8	77.9	Changing bed sheets	7.1	13.5	40.6	23.9	14.2
Toileting activities	1.3	0.0	4.7	22.7	71.3	Washing and ironing	7.1	16.1	32.9	21.9	21.9
Making transfers	0.7	0.7	5.4	22.3	70.9	Putting away groceries	3.3	4.0	24.5	35.8	32.5
Walking short distances	1.3	1.3	1.3	20.8	74.5	Preparing meals	5.4	4.7	15.4	34.9	39.6
<i>Agreement that client activation has benefits for home care professionals</i>						<i>Agreement that client activation has benefits for home care professionals</i>					
Makes work easier	0.7	1.3	10.1	34.9	52.3	Makes work easier	2.6	7.2	30.3	33.6	26.3
Improves job satisfaction	1.3	2.7	8.7	36.2	49.7	Improves job satisfaction	2.0	1.3	27.3	38.7	30.7
Feeling that work is important	0.7	2.0	10.7	31.5	53.7	Feeling that work is important	1.3	1.3	23.8	37.7	35.8
Makes me feel prouder	0.7	1.3	9.3	34.7	52.7	Makes me feel prouder	2.6	5.3	23.8	42.4	25.8

The percentages per item do not always add up to 100, as some participants indicated values between the given ones. Those are not considered here. ¹DSWs: domestic support workers.

outcome expectations, scores were significantly higher when training on client activation was completed, but only in nurses (mean: 46.5 vs. 42.8, $p < 0.05$).

Against our research-based hypotheses, self-efficacy scores were not significantly associated with job experience for both professional groups. In addition, self-efficacy scores did not differ significantly between professionals that had or had not completed training on client activation, in both nurses (mean 43.4 vs. 42.0, $p = 0.26$) and DSWs (mean 34.3 vs. 33.3, $p = 0.44$). Moreover, in DSWs, the outcome expectation scores did not differ significantly between the two groups (mean: 36.3 vs. 36.2, $p = 0.98$). Table 4 lists the correlation coefficients and the corresponding p -values for the hypothesised associations.

Table 4

Spearman's rank correlation coefficients for self-efficacy and outcome expectation scales.

	Self-efficacy scales		Outcome expectation scales	
	CA-SE-n ρ (p -value)	CA-SE-d ρ (p -value)	CA-OE-n ρ (p -value)	CA-OE-d ρ (p -value)
Job experience (years)	0.08 (0.36)	0.01 (0.91)	-	-
Outcome expectation score	0.44 (0.00)	0.56 (0.00)	-	-
Knowledge test score	-	-	0.15 (0.06)	0.25 (0.00)

For all numerical variables, Spearman's rank correlation coefficients (ρ) were calculated. Theoretical ranges: knowledge test: 0–39; self-efficacy: 10–50; outcome expectations: 10–50; higher scores indicate favourable outcomes. The significance level was set at $p \leq 0.05$.

Internal consistency

Cronbach's alpha coefficients for the self-efficacy and outcome expectation scales for nurses (CA-SE-n and CA-OE-n) and DSWs (CA-SE-d and CA-OE-d) were 0.905, 0.922, 0.847 and 0.899, respectively. For all scales, removal of items did not lead to an increased Cronbach's alpha coefficient.

The sensitivity analyses, without imputation of missing values, confirmed the results regarding floor and ceiling effects, construct validity and internal consistency (data not displayed).

Discussion

This study sought to assess the psychometric properties of four scales (CA-SE-n, CA-OE-n, CA-SE-d and CA-OE-d) in terms of floor and ceiling effects, construct validity and internal consistency. First, this study showed that the self-efficacy and outcome expectation scores for nurses were not normally distributed. The left-skewed distribution indicates a trend towards an over-representation of maximum scores and an under-representation of minimum scores. Second, regarding the construct validity, three out of five hypotheses could be confirmed, which indicates a moderate construct validity. Third, all four scales (CA-SE-n, CA-OE-n, CA-SE-d and CA-OE-d) showed a high internal consistency.

A ceiling effect was also found for the original scales of Resnick and colleagues.^{6,10} On the NASERCA, nursing assistants had, on average, a mean score of 9.2 for self-efficacy (theoretical range 0–10), and a mean score of 4.4 for outcome expectations on the NAOERCA (theoretical range 1–5).¹² In general, Likert scales are prone to lead to an

accumulation of responses at the positive end of the scale.^{16,17} Some researchers recommend the use of a 10-¹⁸ or 11-point Likert scale¹⁹ or even a scale from 0–100²⁰, as scales with more response options have shown to reduce ceiling effects and generate psychometrically stronger results. However, the fact that Resnick and Simpson found a ceiling effect for the NASERCA, even when they applied an 11-point Likert scale¹², indicates that expanding the scale alone is not sufficient to overcome the arising ceiling effect. Resnick and Simpson suggest that the generally high scores for self-efficacy and outcome expectations could be the result of the high educational level of the participants in their study.¹² This explanation might be supported by the current study that found no ceiling effects in DSWs, who have a lower educational level than nurses. Another possible explanation for the ceiling effect could be an ‘unaware–unskilled’ phenomenon, which means that many people tend to overestimate their self-performance but, also, fail to recognise deficiencies in their performance.^{21,22}

Regarding the construct validity, only three out of five research-based hypotheses could be confirmed, indicating moderate construct validity. It needs to be considered that the hypotheses were derived from diverse settings and activities. According to the self-efficacy theory, findings are transferable to other settings, but this might not be unrestricted.²³ However, there is insufficient research on self-efficacy and outcome expectations regarding client activation in home care. In addition, it would also be desirable to make use of more objective data (i.e., performance-based data) for testing construct validity. For example, Resnick and Simpson observed nursing assistants in nursing homes and compared their actual performance of client activation with their self-reported self-efficacy and outcome expectations.¹² As a result, they found that better performance was significantly associated with higher levels of self-efficacy among nursing assistants. However, they also hypothesised that better performance was positively associated with higher outcome expectations, but this hypothesis was not supported by their data.¹² Likewise, their hypothesis that higher knowledge test scores led to higher self-efficacy and outcome expectation scores among nursing assistants was not confirmed either, although their data showed a tendency in the hypothesised direction.¹² These findings were confirmed by another study.⁶

The internal consistency of the four scales (CA-SE-n, CA-OE-n, CA-SE-d and CA-OE-d) was high. Furthermore, all items per scale contributed to its internal consistency, indicating that all items should be maintained. This finding correlates with the study of Resnick and colleagues, in which Cronbach’s alpha coefficients were, respectively, 0.80–0.91 for the NASERCA scale and 0.89–0.93 for the NAOERCA scale.⁵ In another study, Resnick and colleagues obtained person reliability scores (analogous to Cronbach’s alpha coefficient) of 0.76 for the NASERCA scale and 0.81 for the NAOERCA scale, respectively.⁶

This study has several limitations and strengths. First, due to the cross-sectional design of this study, test-retest reliability and sensitivity to change could not be evaluated, which is highly relevant for testing the effects of interventions that aim to improve client activation during daily activities, such as Function Focused Care or Reablement.^{7,8} Second, the available data for testing construct validity was limited in this study. For example, hypotheses about personality factors, such as the Big Five traits, intelligence and general mental ability, which have shown to affect self-efficacy and outcome expectations^{24,25}, could not be tested. Furthermore, objective data (i.e., performance-based data) to test construct validity were lacking. Third, team managers selected the participating nursing teams. Therefore, we have limited insights into the sample selection process. Furthermore, 80% of the nurses and 56% of the DSWs had completed training on client activation before data collection, which may limit the generalisability of findings. The training might have resulted in over-estimated levels of self-efficacy and outcome expectations regarding client activation in our sample, which manifested in a

ceiling effect in nurses. The strengths of this study were the large sample size ($n = 305$) and the high response rate (92%).

In conclusion, this study provided some evidence for the validity and reliability of the CA-SE-n, CA-OE-n, CA-SE-d and CA-OE-d. The four scales complement the NASERCA and NAOERCA scales for the nursing home setting^{6,12} and enable researchers to measure self-efficacy and outcome expectations regarding client activation among home care professionals. Furthermore, the scales also have a great value for practical application. For example, home care organisations may gain insight into their employees’ self-efficacy or outcome expectations and their training needs. Self-efficacy can be trained by skills training to gain confidence in performing client activation, while outcome expectations can be strengthened by providing knowledge about its benefits. Training might even be tailored to specific ADL/IADL activities or challenging circumstances by identifying particular items for which the professionals scored low. However, further research is needed to test the construct validity, test-retest reliability and sensitivity to change of the four scales.

Conclusions

This study assessed the psychometric properties of four scales (CA-SE-n, CA-OE-n, CA-SE-d and CA-OE-d) in terms of floor and ceiling effects, construct validity and internal consistency. The findings showed that the two scales for nurses had a ceiling effect, which was stronger in the outcome expectation scale (CA-OE-n) compared with the self-efficacy scale (CA-SE-n). All four scales (CA-SE-n, CA-OE-n, CA-SE-d and CA-OE-d) had moderate construct validity and high internal consistency. Besides complementing the pre-established NASERCA and NAOERCA scales that were developed for the nursing home setting, these four scales enable the measurement of self-efficacy and outcome expectations regarding client activation among home care professionals, which is of great value for research and practice. However, further research is needed regarding the construct validity, test-retest reliability and sensitivity to change.

Authors’ contributions

SFM, GARZ, EvR, JMdMvG, GIJMK developed the four scales under study.

AC, GIJMK and SFM contributed to drafting the study protocol.

THR collected the data.

AC analysed the data.

AC and SFM wrote the first draft of the manuscript.

All authors commented on the manuscript and approved the final version.

Declaration of Competing Interest

The authors declare that they have no competing interests.

Acknowledgements

The authors are grateful to the home care professionals of MeanderGroep South-Limburg for their willingness to participate in this study. Furthermore, they want to thank Ralph Jung and Fiona Aspinall for English editing of the four scales.

Appendix 1

Client activation self-efficacy scale for nurses (CA-SE-n)

The following 10 items measure how confident you are in applying client activation in home care, which means actively engaging clients in

activities of daily living (ADL). Please indicate your level of confidence for each item below on a scale ranging from 1 (no confidence) to 5 (total confidence).

How confident are you that you are able:

1. To actively engage clients in washing or bathing.
 2. To actively engage clients in dressing.
 3. To actively engage clients in personal care (e.g. combing hair, brushing teeth/dentures, shaving).
 4. To actively engage clients in toileting activities.
 5. To actively engage clients in making transfers.
 6. To encourage clients to walk short distances (e.g. to the bathroom or living room).
- How confident are you that you are also able to apply client activation in challenging situations, for example if:
7. The client refuses to participate in care activities.
 8. You get assigned more clients than usual.
 9. The client is concerned to not be ready in time for an appointment or a visit from someone.
 10. The family wants you to provide total care.
-

All statements in the CA-SE-n scale are followed by a five-point Likert scale ranging from 1 (no confidence) to 5 (total confidence).

Scoring instructions

For each item a score of 1 to 5 can be obtained, resulting in a sum score ranging from 10 to 50 (with a higher score indicating higher levels of self-efficacy). If more than one box is ticked for an item, the average of the ticked boxes is calculated as the score for that item. If no box is ticked, the score for that item is calculated by replacing the missing value with the respondent's average value of the other items. The maximum number of missing values is 25%. If more than 2 items have been left blank, the questionnaire is considered 'incomplete' and no sum score can be calculated.

Client activation outcome expectation scales for nurses (CA-OE-n)

The following 10 items focus on the perceived benefits of applying client activation in home care, which means actively engaging clients in activities of daily living (ADL). Please indicate below your level of agreement with each of the statements below on a scale ranging from 1 (strongly disagree) to 5 (strongly agree).

To what extent do you agree that:

1. Actively engaging clients in washing or bathing helps them to maintain or improve their independent functioning.
 2. Actively engaging clients in dressing helps them to maintain or improve their independent functioning.
 3. Actively engaging clients in personal care (e.g. combing hair, brushing teeth/dentures, shaving) helps them to maintain or improve their independent functioning.
 4. Actively engaging clients in toileting activities helps them to maintain or improve their independent functioning.
 5. Actively engaging clients in making transfers helps them to maintain or improve their independent functioning.
 6. Encouraging clients to walk short distances (e.g. to the bathroom or living room) helps them to maintain or improve their independent functioning.
 7. Applying client activation makes your work easier.
 8. Applying client activation improves your job satisfaction.
 9. Applying client activation gives you the feeling that you provide care that is important.
 10. Applying client activation makes you feel prouder of the work that you do.
-

All statements in the CA-OE-n scale are followed by a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

Scoring instructions

For each item a score of 1 to 5 can be obtained, resulting in a sum score ranging from 10 to 50 (with a higher score indicating higher levels of outcome expectations). If more than one box is ticked for an item, the average of the ticked boxes is calculated as the score for that item. If no box is ticked, the score for that item is calculated by replacing the missing value with the respondent's average value of the other items. The maximum number of missing values is 25%. If more than 2 items have

been left blank, the questionnaire is considered 'incomplete' and no sum score can be calculated.

Client activation self-efficacy scale for domestic support workers (CA-SE-d)

The following 10 items measure how confident you are in applying client activation in home care, which means actively engaging clients in instrumental activities of daily living. Please indicate your level of confidence for each item below on a scale ranging from 1 (no confidence) to 5 (total confidence).

How confident are you that you are able:

1. To actively engage clients in light housework (e.g. dusting, cleaning up, washing dishes, making the bed).
 2. To actively engage clients in heavy housework (e.g. vacuuming/mopping, cleaning the windows, kitchen or bathroom).
 3. To actively engage clients in changing bed sheets.
 4. To actively engage clients in washing and ironing.
 5. To actively engage clients in putting away groceries.
 6. To actively engage clients in preparing meals (e.g. sandwich or hot meal).
- How confident are you that you are also able to apply client activation in challenging situations, for example if:
7. The client refuses to participate in care activities.
 8. You get assigned more clients than usual.
 9. The client is concerned to not be ready in time for an appointment or a visit from someone.
 10. The family wants you to provide total care.
-

All statements in the CA-SE-d scale are followed by a five-point Likert scale ranging from 1 (no confidence) to 5 (total confidence).

Scoring instructions

For each item a score of 1 to 5 can be obtained, resulting in a sum score ranging from 10 to 50 (with a higher score indicating higher levels of self-efficacy). If more than one box is ticked for an item, the average of the ticked boxes is calculated as the score for that item. If no box is ticked, the score for that item is calculated by replacing the missing value with the respondent's average value of the other items. The maximum number of missing values is 25%. If more than 2 items have been left blank, the questionnaire is considered 'incomplete' and no sum score can be calculated.

Client activation outcome expectation scales for domestic support workers (CA-OE-d)

The following 10 items focus on the perceived benefits of applying client activation in home care, which means actively engaging clients in instrumental activities of daily living. Please indicate below your level of agreement with each statement below on a scale ranging from 1 (strongly disagree) to 5 (strongly agree).

To what extent do you agree that:

1. Actively engaging clients in light housework (e.g. dusting, cleaning up, dishwashing, making the bed) helps them to maintain or improve their independent functioning.
 2. Actively engaging clients in heavy housework (e.g. vacuuming/mopping, cleaning the windows, kitchen or bathroom) helps them to maintain or improve their independent functioning.
 3. Actively engaging clients in changing bed sheets helps them to maintain or improve their independent functioning.
 4. Actively engaging clients in washing or ironing helps them to maintain or improve their independent functioning.
 5. Actively engaging clients in putting away groceries helps them to maintain or improve their independent functioning.
 6. Actively engaging clients in preparing meals (e.g. sandwich or hot meal) helps them to maintain or improve their independent functioning.
 7. Applying client activation makes your work easier.
 8. Applying client activation improves your job satisfaction.
 9. Applying client activation gives you the feeling that you provide care that is important.
 10. Applying client activation makes you feel prouder of the work that you do.
-

All statements in the CA-OE-d scale are followed by a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

Scoring instructions

For each item a score of 1 to 5 can be obtained, resulting in a sum score ranging from 10 to 50 (with a higher score indicating higher levels of outcome expectations). If more than one box is ticked for an item, the average of the ticked boxes is calculated as the score for that item. If no box is ticked, the score for that item is calculated by replacing the missing value with the respondent's average value of the other items. The maximum number of missing values is 25%. If more than 2 items have been left blank, the questionnaire is considered incomplete and no sum score can be calculated.

References

- Tarricone R, Tsouros AD. Home care in Europe: the solid facts. World Health Organization. 2008. http://www.euro.who.int/__data/assets/pdf_file/0005/96467/E91884.pdf. Accessed 15 Jan 2018.
- Liebel DV, Friedman B, Watson NM, Powers BA. Review of nurse home visiting interventions for community-dwelling older persons with existing disability. *Med Care Res Rev*. 2009;66(2):119–146. <http://dx.doi.org/10.1177%2F1077558708328815>.
- Gill TM, Baker DI, Gottschalk M, Peduzzi PN, Allore H, Byers A. A program to prevent functional decline in physically frail, elderly persons who live at home. *New Engl J Med*. 2002;347(14):1068–1074. <https://doi.org/10.1056/NEJMoa020423>.
- Caspersen CJ, Powell KE, Christenson GM. Physical activity, exercise, and physical fitness: definitions and distinctions for health-related research. *Public Health Rep*. 1985;100(2):126–131.
- Resnick B, Simpson M, Bercovitz A, Galik E, Gruber-Baldini A, Zimmerman S, et al. Testing of the Res-Care Pilot Intervention: impact on nursing assistants. *Geriatr Nurs*. 2004;25(5):292–297. <https://doi.org/10.1016/j.gerinurse.2004.08.002>.
- Resnick B, Galik E, Pretzer-Aboff I, Rogers V, Gruber-Baldini AL. Testing the reliability and validity of self-efficacy and outcome expectations of restorative care performed by nursing assistants. *J Nurs Care Qual*. 2008;23(2):162–169. <https://doi.org/10.1097/01.NCQ.0000313766.09891.43>.
- Aspinal F, Glasby J, Rostgaard T, Tuntland H, Westendorp RG. New horizons: Reablement – supporting older people towards independence. *Age Ageing*. 2016;45(5):574–578. <https://doi.org/10.1093/ageing/afw094>.
- Resnick B, Galik E, Boltz M. Function focused care approaches: literature review of progress and future possibilities. *J Am Med Dir Assoc*. 2013;14(5):313–318. <https://doi.org/10.1016/j.jamda.2012.10.019>.
- Bandura A. Self-efficacy: toward a unifying theory of behavioral change. *Psychol Rev*. 1977;84(2):191–215. <http://dx.doi.org/10.1037/0033-295X.84.2.191>.
- Klassen RM, Chiu MM. Effects on teachers' self-efficacy and job satisfaction: teacher gender, years of experience, and job stress. *J Educ Psychol*. 2010;102(3):741–756. <https://doi.org/10.1037/a0019237>.
- Bandura A. *Self-efficacy in changing societies*. New York: Cambridge University Press; 1995. <https://psycnet.apa.org/doi/10.1017/CBO9780511527692>.
- Resnick B, Simpson M. Restorative care nursing activities: pilot testing self-efficacy and outcome expectation measures. *Geriatr Nurs*. 2003;24(2):82–89. <https://doi.org/10.1067/jmgn.2003.26>.
- Metzelthin SF, Rooijackers TH, Zijlstra GA, van Rossum E, Veenstra MY, Koster A, et al. Effects, costs and feasibility of the 'stay active at home' reablement training programme for home care professionals: study protocol of a cluster randomised controlled trial. *BMC Geriatr*. 2018;18(1):276. <http://dx.doi.org/10.1186%2Fs12877-018-0968-z>.
- Maduro C. *Meten is Weten: translation and cross-cultural adaptation of four instruments that measure self-efficacy and outcome expectations among nurses and nursing home residents [bachelor's thesis]*. Maastricht, the Netherlands: Maastricht University; 2015.
- Bowling A. *Research methods in health: investigating health and health services*. 4th ed. Maidenhead, England: McGraw-Hill Education; 2014.
- Dawes JG. Survey responses using scale categories follow a "double jeopardy" pattern. In: Shaw, Adam, McDonald, eds. *ACMAC 2002 Conference Proceedings*. Geelong, Australia: Deakin University; 2002:3381–3386.
- Peterson RA, Wilson WR. Measuring customer satisfaction: fact and artifact. *J Acad Mark Sci*. 1992;20(1):61. <https://doi.org/10.1007/BF02723476>.
- Dawes J. Do data characteristics change according to the number of scale points used? An experiment using 5-point, 7-point and 10-point scales. *Int J Mark Res*. 2008;50(1):61–104. <http://dx.doi.org/10.1177%2F147078530805000106>.
- Leung SO. A comparison of psychometric properties and normality in 4-, 5-, 6-, and 11-point Likert scales. *J Soc Serv Res*. 2011;37(4):412–421. <https://doi.org/10.1080/01488376.2011.580697>.
- Pajares F, Hartley J, Valiante G. Response format in writing self-efficacy assessment: greater discrimination increases prediction. *Meas Eval Couns Dev*. 2001;33(4):214–221.
- Kruger J, Dunning D. Unskilled and unaware of it: how difficulties in recognizing one's own incompetence lead to inflated self-assessments. *J Pers Soc Psychol*. 1999;77(6):1121–1134. <http://dx.doi.org/10.1037/0022-3514.77.6.1121>.
- Ehrlinger J, Johnson K, Banner M, Dunning D, Kruger J. Why the unskilled are unaware: Further explorations of (absent) self-insight among the incompetent. *Organ Behav Human Decis Process*. 2008;105(1):98–121. <https://doi.org/10.1016/j.obhdp.2007.05.002>.
- Zimmerman BJ. Self-efficacy: an essential motive to learn. *Contemp Educ Psychol*. 2000;25(1):82–91. <https://doi.org/10.1006/ceps.1999.1016>.
- Hartman RO, Betz NE. The five-factor model and career self-efficacy: general and domain-specific relationships. *J Career Assess*. 2007;15(2):145–161. <http://dx.doi.org/10.1177%2F1069072706298011>.
- Judge TA, Jackson CL, Shaw JC, Scott BA, Rich BL. Self-efficacy and work-related performance: the integral role of individual differences. *J Appl Psychol*. 2007;92(1):107–127. <http://dx.doi.org/10.1037/0021-9010.92.1.107>.