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The content validity of the Rural ADL Manual Handling Sort - a new instrument for contextual medico-legal practice in South Africa

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ABSTRACT

Background: South African medico-legal occupational therapists assess claimants' performance in activities of daily living and instrumental activities of daily living (ADL and iADL) which is a prerequisite of work ability. Evaluation of rural claimants can be problematic, since existing assessment instruments do not consider the manual handling demands of iADLs such as firewood and water collection, unique to these settings. This paper reports the content validity determined by subject matter experts (SMEs) for the Rural Activities of Daily Living Manual Handling Sort (RAMS), an outcome measure developed to assess ADLs in rural areas.
Method: A quantitative descriptive research design with purposive stratified sampling was employed to identify 12 SMEs to determine item-level content validity index (I-CVI), scale-level content validity index-average (S-CVI/Ave) and index-universal agreement (S-CVI/UA) for the RAMS.
Results: The results supported good content validity of the RAMS instrument. Items with a score below 0.87 were edited and after recommended changes were made, they were retained in the final RAMS version. The I-CVI scores for the lifting, carrying and pushing domains were 0.97, 1 and 0.99 respectively, while the mean I-CVI was 0.99. The Scale-level content validity index–average (S-CVI/Ave) score for relevance was 0.99.
Conclusion: The RAMS was found to be a valid instrument for assessment of the manual handling domains of ADLs unique to rural contexts and with further field testing will enable medico-legal occupational therapists to provide realistic evidence to compensation funds.

Implications for practice
There is currently no other contextual ADL or iADL instrument available for use in the medico-legal or other practice fields in South Africa. It is anticipated that the use of the RAMS in medico-legal practice will enable South African occupational therapists and those further afield to advocate for appropriate ADL and iADL accommodations for claimants who live in rural resource-scarce contexts. The RAMS is anticipated to contribute substantially to the medico-legal field of occupational therapy in South Africa and to have an impact on improving quality of life of rural claimants. Further studies involving field-testing to investigate the remainder of the psychometric properties of the RAMS, additional contextual occupations and the application of the RAMS in other settings and fields of practice are recommended.

INTRODUCTION

Occupational therapists in South Africa provide an essential service to claimants seeking compensation in the medico-legal industry. As a prerequisite of work ability, occupational therapists evaluate performance in activities of daily living (ADLs) and instrumental activities of daily living (iADLs) utilising a combination of objective and subjective or Patient-Reported Outcome Measures (PROMS). These assessments establish the baseline status, progress and outcomes and allow cross-reference between self-perceived abilities,

observation and abilities evaluated on objective scales[1,2]. Assessments of ADLs in South African medico-legal settings are often subjective. Occupational therapists regularly use non-standard self-report of abilities based on patient interviews, since ADL outcome measures based on existing theoretical frameworks can be difficult to access due to costly licensure requirements or are contextually unsuitable[3 4].

The current study formed part of a larger doctoral project, with earlier phases investigating and identifying household occupations typical of rural resource-scarce contexts[5]. For the purposes of this broader study, the term rural area was defined as: An area typified by villages or settlements with formal and semi-formal dwellings such as houses, huts and rondavels. The area may be under tribal authority and villages often appear as pockets of houses clustered together with large tracts of grassland in between[4 6]. These dwellings may not have access to piped water and adequate electricity.

Therefore, commonly used ADL outcome measures such as the Barthel Index (BI), the Katz Activities of Daily Living Index, the Lawton Instrumental Activities (IADL) of Daily Living Scale and the Functional Independence Measure (FIM), amongst others, have limitations regarding item descriptions and exclusions when utilised in rural contexts[7–13]. Existing ADL frameworks and assessment instruments have poor applicability in South African resource-scarce rural contexts, given that many households have to fetch water and use fire for cooking and heating water. The lack of onsite water and electricity affects the type and form of ADLs performed by individuals[5]. Contextually appropriate assessment in these communities is particularly important in the medico-legal field where assessment findings and resultant recommendations need to withstand court scrutiny[14,15]. For this reason, it was necessary to develop an assessment instrument that includes contextual ADLs identified as typical of resource-scarce rural settings[4] .

The Rural Activities of Daily Living Manual Handling Sort (RAMS)

The first version of the RAMS instrument was developed as a measure to be utilised in medico-legal or work practice. It is a new time-efficient outcome measure, taking the context and unique manual handling demands of rural settings in which claimants live into consideration[16]. The RAMS structure was based on a patient self-report outcome measure (PROM) utilizing a Pictorial Activity and Task Sorts (PATS) format[17]. The PATS approach is a variation used in PROMs and consists of pictorial representations of functional activities, with a short text description, and a rating scale, on which the patient is required to report on their perceived ability to perform each activity. An example of a commonly used PATS instrument is the Spinal Function Sort (SFS) which has a series of images of common daily activities, each with its respective manual handling load[17–19]. One SFS item depicts lifting two bags of groceries from the boot of a sedan vehicle, with the associated text "Load two 10-pound grocery bags from the trunk of an automobile"[18]. The score achieved by an individual on this instrument allows the occupational therapist to evaluate the physical demand level in which they feel capable of performing tasks. However, the SFS was designed for resourced Global North countries and does not include items or domains typical of a South African rural resource-scarce context. Its suitability for claimants residing in such contexts is thus called into question. Instruments that use a PATS format have been found to be time-efficient, rapidly providing clinical information with validity that is parable to objective measures[17] . Furthermore, the inclusion of PATS instruments has been reported as a reliable addition to Functional Capacity Evaluation (FCE) test batteries where scores are easily linked to the levels of physical demand described by the Dictionary of Occupational Titles (DOT)[19,20].

The Development of the Rural Activities of Daily Living Manual Handling Sort (RAMS)

The study to support the development of the RAMS took place in Limpopo Province, South Africa and allowed for collection of rich data regarding contextual ADLs[4]. The forms of many rural ADL and iADL tasks were found to differ significantly from those carried out in a typical urban resourced context due to limited access to adequate water and electricity. Some ADL and iADL tasks identified were reflected in the classifications and frameworks such as the International Classification of Disability and Functioning (ICF)[21] and the Occupational Therapy Practice Framework (OTPF-IV)[22], but collection of water and fuelwood were not[5] . The iADL tasks of collecting water and fuelwood formed part of the five ADL and iADL domains which also included bathing, doing laundry and cooking and three manual handling domains namely lifting, carrying and pushing, identified for the development of the 30-item RAMS[4].

Each item of the RAMS comprised Version 1: a photograph or Version 2: a black and white drawing as illustrated in Figure 1 (below). The items in each of the three manual handling domains were sequenced according to increasing physical demand.



Figure 1 Example of transforming the photograph version of an instrument item into a drawing version

Each black and white drawing was then provided with a text question in English and Sepedi asking whether the individual can perform the contextual manual handling task as shown in Figure 2, below

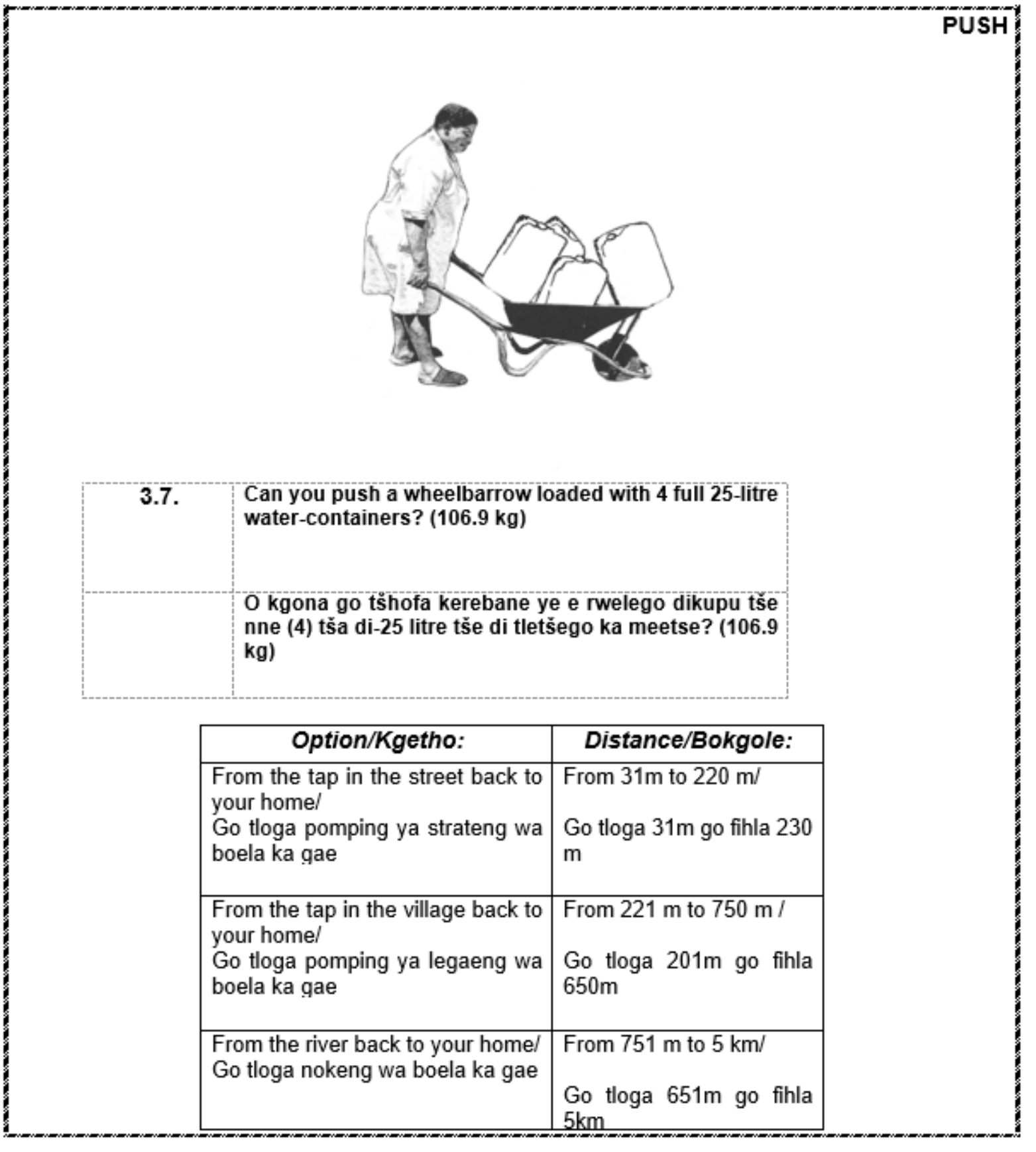

Figure 2 Drawing version: item for pushing a wheelbarrow loaded with 4 full 25-litre water containers

A numeric scoring scale was developed (Table I page 4) and a hard copy and electronic version of the RAMS were developed[4] using a 3-point ordinal scale for the RAMS similar to other PATS instruments including the RISC Tool Sort, WEST Tool Sort, Spinal Function Sort and Hand Sort, which are rated able, restricted and unable[17,18,24]. 1= unable to do, 2 = has difficulty, 3 = able to do and 4 = N/A - Not done/not applicable.

For some of these assessments a category of *don't know* was reflected in the RAMS as *Not Applicable* (N/A)[24] . This category was intended for when the client did not routinely carry out the task in question. The number of response options in a Likert scale is an important consideration as an optimum number of response categories promotes discrimination between the rated items[25] . A 5-point scale such as the one utilised in another PATS instrument, the M-TAP, was considered for the RAMS[24], however the 3-point scale was deemed more appropriate since questions on the RAMS are quantifiable and based on the ADL and iADL tasks typical of a rural resource-scarce context. It was also deemed acceptable for the anticipated target population of rural dwellers in terms of their anticipated level of formal education.

A user manual was compiled to guide occupational therapists in the use of the RAMS as part of a standard FCE assessment battery, with administration instructions to be given to the patient or caregiver completing the RAMS. The background of the origin and development of the RAMS was included. Definitions of the constructs and domains in the RAMS were presented (Table I page 4) followed by an explanation of the procedure for administering and scoring the RAMS.

Table I Definitions of domains of the Rural ADL Manual Handling Sort

Domain	Definition
Lifting	"Raising or lowering an object from one level to another (includes upward pulling)" [26] For the purposes of the RAMS, 'Lifting' is defined as the ability to lift household equipment used in ADL tasks in rural contexts.
Carrying	"Transporting an object, usually holding it in the hands or arms or on the shoulder" [26] For the purposes of the RAMS, 'Carrying' is defined as the ability to carry household equipment used in ADL tasks in rural contexts over various distances.
Pushing	"Exerting force upon an object so that the object moves away from the force (includes slapping, striking, kicking, and treadle action) [26] For the purposes of the RAMS, 'Pushing' is defined as the ability to push a wheelbarrow loaded with household equipment used in ADL tasks in rural contexts over various distances.
Collecting water	According to the ICF, the code 'd6201 Gathering daily necessities' includes accessing water, as follows: "Obtaining, without exchange of money, goods and services required for daily living (including instructing and supervising an intermediate to gather daily necessities), such as by harvesting vegetables and fruits and getting water and fuel [21] For the purposes of the RAMS, 'Collecting water' is defined as the ability to access water required for survival and hygiene purposes from a communal source outside of the rural homestead.
Collecting fuelwood	According to the ICF, the code 'd6201 Gathering daily necessities' includes accessing fuelwood, as follows: "Obtaining, without exchange of money, goods and services required for daily living (including instructing and supervising an intermediate to gather daily necessities), such as by harvesting vegetables and fruits and getting water and fuel" [21] For the purposes of the RAMS, 'Collecting fuelwood' is defined as the ability to access water required for the needs of the household from a source outside of the rural homestead.
Doing laundry	According to the ICF, the code 'd6400 Washing and drying clothes and garments", defines doing laundry as follows: "Washing clothes and garments by hand and hanging them out to dry in the air" [21] For the purposes of the RAMS, 'Doing Laundry' is defined as the ability to wash one's own or the household's clothing by hand, either outdoors in the yard or next to a nearby communal tap or river.
Cooking	According to the ICF, the code 'd630 Preparing meals' includes cooking, as follows: "Planning, organising, cooking and serving simple and complex meals for oneself and others, such as by making a menu, selecting edible food and drink, getting together ingredients for preparing meals, cooking with heat and preparing cold foods, and serving the food" [21] For the purposes of the RAMS, 'Cooking' is defined as the ability to cook one's own or the household's food on an outdoor fuelwood fire.
Bathing	According to the ICF, the code 'd510 Washing oneself' includes bathing, as follows: "Washing and drying one's whole body, or body parts, using water and appropriate cleaning and drying materials or methods, such as bathing, showering, washing hands and feet, face and hair, and drying with a towel" [21] For the purposes of the RAMS, 'Bathing' is defined as the ability to wash one's own or one's child's or other dependant's body using a plastic basin or a plastic or zinc bath.

The occupational therapist would complete the FCE assessment of medico-legal claimants in the usual way, utilising an interview, standardised assessments and clinical observations[27,15] . The RAMS should be completed as part of the battery of assessments carried out during the FCE.

Establishing content validity

Content validity is usually the psychometric property of a PROM assessment instrument that is determined during the development of the assessment as positive results for additional psychometric properties such as test-retest, concurrent validity, external validity, internal consistency and criterion validity depend on good content validity[28] . Content validity involves determining whether the instrument content covers the construct to be measured and is addressed by demonstrating that the instrument items are consistent with and adequately represent the current knowledge base about the construct that the instrument was designed to measure [28,30].

Content validity is determined through rating of the relevance and clarity of each item to the overall constructs of the assessment instrument by Subject Matter Experts (SMEs). The SMEs rate each item using a Likert scale and these scores are utilised to calculate the Content Validity Index (CVI). The CVI can be calculated in two ways, namely the so-called Item-CVI (I-CVI) and Scale-CVI (S-CVI). The I-CVI index refers to the individual items in a measure, whereas the S-CVI index refers to the overall measure[29,30] . Feedback is also ideally obtained from the SMEs regarding aspects such as the wording, structure of items and the appropriateness of the selected scoring scale, and ensuring the instrument is clear and succinct[39,31].

The current article reports on the content validity study of the RAMS instrument.

METHODOLOGY

A quantitative, descriptive research design was used with SMEs to establish the content validity of the RAMS which was evaluated using the COSMIN methodology for assessing the content validity of PROMs, according to 10 pre-defined criteria[29,32].

Participants

Purposive stratified sampling was used to identify Subject Matter Experts (SMEs) who were occupational therapists with medico-legal or community experts.

Inclusion criteria

Inclusion criteria were set for SMEs according to professional experience and expertise in the fields of medico-legal and community practice. The SMEs were selected according to the following inclusion criteria:

- six occupational therapists with expertise in the field of Primary Healthcare and community occupational therapy service delivery
- six occupational therapists who had 10 or more years' experience in vocational rehabilitation conducting medico-legal evaluations on claimants residing in rural contexts[33].

Occupational therapists with expertise in fields other than community and medico-legal were excluded from study and not invited to participate as SMEs. The recommended number of SMEs required to calculate the content validity index (CVI) varies between three and ten, with several authors recommending five SMEs[29,30,34,35]. As indicated above, twelve SMEs were approached to participate in the current content validity study to have equal representation between community and medico-legal experts.

Research instruments

Data were collected using a biographical information sheet and a content validity record form developed by the first author. Section A of the content validity record form made provision for the SMEs to rate the validity and clarity of each of the items in the RAMS on a 4-point ordinal scale. Section B of the content validity record form included closed and Yes/No questions to elicit the SMEs' opinions regarding item composition and inclusion, as presented in Table II, below.

Table II Content Validity Rating Scale and Questions included in section B of the content validity study

i. Relevance		ii. Clarity		Classification
1	Not relevant	1	Not clear	**Irrelevant/Unclear**
2	Somewhat relevant	2	Item needs some revision	
3	Quite relevant	3	Clear but needs minor revision	**Relevant/Clear**
4	Very relevant	4	Very clear	

Question number:	Question:
1	Should duplicate items be included in the instrument?
2	Should items that relate to empty containers be included, versus only including the items where the containers are full or have the maximum weight for the respective ADL or iADL task component?
3	Should there be separate lift, carry and push items for the different steps of the same ADL or iADL task, or only items that reflect the step with the greatest physical demand?
4	Should items pertaining to each individual piece of equipment or material used for the ADL or iADL tasks be included?
5	Please indicate whether you prefer the photograph or drawing version of the instrument.
6	Should the Household Amenities tick-off form be included at the beginning of this instrument?
7	Please could you suggest a name for the newly developed instrument.

Research procedure

Ten SMEs were included in the first round of the content validity study. This allowed for two additional SMEs to be available for a second round should extensive revisions be necessary after the first round[29,30]. The purpose of the study, and the implications of their participation were explained to the SMEs in an email communication with an information sheet. The SMEs who agreed to participate in the study attended a presentation by the first author regarding the background of the study. The constructs under consideration, the procedure followed for the development of the RAMS as well as the process for determining content validity were discussed[29,30]. Hard copies of the content validity record form, a photographic version of the RAMS and a drawing version of the RAMS were provided for each SME. The SMEs were asked to evaluate both versions of the RAMS instrument and the individual instrument items critically and to make comments on the record form provided.

Data analysis

The data were entered into an Excel spreadsheet for analysis. Descriptive statistics were used to analyse the data of the SME's demographic factors to establish their profile. The first round of scores for the content validity was analysed using the 4-point Likert scale and converted into a dichotomous scale. Items that were given a rating of 1 and 2 were regarded as irrelevant or unclear and were edited or deleted. Items that received ratings of 3 or 4 were regarded as relevant or clear and were retained in the RAMS. The I-CVI for lifting. carrying

and pushing, S-CVI/Ave and S-CVI/UA were determined for the RAMS. Once the revisions had been made to the RAMS, two remaining SMEs assessed the content validity in the second round and statistical analysis was completed.

The responses to the closed-ended questions were analysed using descriptive statistics to elicit the SMEs' opinions regarding the RAMS. The frequencies and percentages were calculated as indications of the strength of responses. The responses to the open-ended questions were coded by the first author using quantitative directed content analysis with frequencies[36]. All the recommendations of the SMEs in response to the open-ended questions and the feedback from the SMEs regarding the instrument items was summarised for the purposes of analysis and implementation.

Ethical considerations

Ethical clearance was obtained through the University of the Witwatersrand, University Human Research Ethics Committee to undertake this study (Certificate no. M150925). Participants who met the inclusion criteria were recruited using a written invitation in an information sheet and they provided signed informed consent. The voluntary nature of participation and the processes that were followed to maintain confidentiality throughout the research process were stressed.

RESULTS

All twelve SMEs who were approached agreed to participate in the study; six SMEs worked in the medico-legal field and six in community practice. Of the SMEs who worked in medico-legal practice, all were female, one worked in Limpopo Province and five worked in Gauteng Province. Their experience varied from 13 years to 30 years, with a median of 21.6 years. They had graduated from four of the eight universities offering occupational therapy training in South Africa. All but one had a post-graduate qualification (Table III below). All but one of the SMEs who worked in the community were female, with three based in Mpumalanga Province and three based in Limpopo Province.

Table III Demographic profile of subject matter experts (n= 12)

		Medico-Legal n = 6	Community n = 6	Median
		Median (range)		
Years of experience	Years	21.6 (13-30)	10.3 (5-25)	16 years
		n (percentage)		
Gender	Female	6 (100%)	5 (83.4%)	11 (91.6%)
	Male	0	1 (16.6)	1 (8.4%)
Province where currently practicing	Gauteng	5 (83.3 %)	0	17 (63%)
	Limpopo	1 (16.6 %)	3 (50.0 %)	10 (37%)
	Mpumalanga	0	3 (50.0 %)	
		Medico-Legal n = 6	Community n = 6	Total
Has postgraduate qualification	Masters OT	2 (33.3 %)	1 (16.6 %)	
	Diploma Vocational Rehab (UP)	2 (33.3 %)	0	
	Diploma Hand Therapy (UP)	1 (16.6 %)	2 (33.3 %	
	Sensory Integration Certification	1 (16.6 %)	1 (16.6 %)	
	Neuro-Developmental Therapy certification	1 (16.6 %)	0	
	PhD	1 (16.6 %	1 (16.6 %)	
	Master's in public health	1 (16.6 %)	1 (16.6 %)	
	None	1 (16.6 %)	0	
University of undergraduate OT qualification	Wits	1 (16.6%)	4 (66.6%)	5 (41.6%)
	UP	1 (16.6%)		1 (8.3 %)
	US	1 (16.6%)		1 (8.3 %)
	UFS	2 (33.3%)	1 (16.6%)	3 (25.0 %)
	UCT	1 (16.6%)	1 (16.6 %)	2 (16.6 %)

Content validity index

The item (I-CVI) and scale (S-CVI) content validity indices were calculated, in accordance with the recommendations made by Lynn (1986) and presented in Table IV, below[29,30]. Ten SMEs participated in the first round of the content validation five of whom were medico-legal and five were community experts respectively. The I-CVI for all three of the manual handling domains (for lifting. carrying and pushing) was above the 0.78 cut-off point (for more than nine experts), with a mean I-CVI at 0.93[31]. The Scale-level content validity index–average method (S-CVI/Ave) score for relevance was 0.93, which falls above the 0.80 cut-off level. The Scale-level content validity index–universal agreement method (S-CVI/UA) score was 0.56, which fell below the 0.8 cut-off level and indicated the need for item revision (Table IV, below).

Table IV: Content validity on the relevance and clarity of the items of the Rural ADL Manual Handling Sort

	Domain	Item-level content validity index (I-CVI)		Scale-level content validity index – average method (S-CVI/Ave)		Scale-level content validity index – universal agreement method (S-CVI/UA)	
		Round 1 (n=10)	Round 2 (n=2)	Round 1 (n=10)	Round 2 (n=2)	Round 1 (n=10)	Round 2 (n=2)
Relevance	Lifting	1	0.97	**0.99**	**0.99**	**0.96**	**0.96**
	Carrying	1	1				
	Pushing	0.99	1				
	Mean I-CVI	**0.99**	**0.99**				
Clarity	Lifting	0.89	1	**0.86**	**1**	**0.16**	**1**
	Carrying	0.86	1				
	Pushing	0.84	1				
	Mean I-CVI	**0.86**	**1**				
Overall (Relevance + Clarity)		0.95	0.99	**0.93**	**0.99**	**0.56**	**0.98**

The I-CVI scores for clarity were generally lower than for relevance. The weakest indices in terms of clarity were reported for items 2 (carrying a panga), 13 (carrying a load of wood in the arms – revised to carrying a load of wood) and 15 (carrying a full 'potjie' pot – revised to carrying a pot full of water), with scores of 0.7, 0.7 and 0.6 respectively. Despite these low scores, the authors opted to revise items 13 and 15, and to reject only item 2 from the draft instrument. A number of the SMEs were of the opinion that the pictorial representation of this item did not reflect the way a *panga* would usually be carried therefore the item was rejected on this basis.

Once the experts' suggestions had been implemented, a second round of content validation was conducted with the remaining two SMEs. The I-CVI for all three manual handling domains was above the 0.78 cut-off point, with the mean I-CVI at 0.99[37]. The Scale-level content validity index–average method (S-CVI/Ave) score for relevance was 0.99, which falls above the 0.80 cut-off level for two experts and indicated the item revisions had improved the content validity of the RAMS.

The Scale-level content validity index–universal agreement method (S-CVI/UA) score was 0.98, which also falls above the 0.78 cut-off level and indicated the item revisions had improved the content validity of the RAMS. S-CVI was judged as good in this study. The recommended changes were then retained in the final version on the basis that their clarity had been improved (Table V, below).

Table V Subject matter experts' comments regarding items

Issue raised by SMEs:	Number of comments:	Actions taken:
Demonstration of manual handling effort in drawings and photographs	11	Deferred to future ongoing validity studies
Wording changes	19	All suggestions were implemented
Mismatch between words and drawings/photographs	4	All suggestions were implemented
Inclusion of distance into the carrying and pushing items	11	Distance options added to each carry and push item
Inclusion of weights into all items	8	Weights added to all items
Confusion regarding lift categories	1	Kept instrument the same. Explanation of lift categories and ranking of lift items included in the instrument manual
Clarity of drawings and photographs	15	Drawings revised to improve clarity
Contextual correctness of items	6	Deferred to future ongoing validity studies
Suggested additional items	2	Deferred to future ongoing validity studies
Ergonomic considerations	6	Wording changed to better explain the ergonomic aspects of each item
Application of instrument for individual with impairment or disability	1	Deferred to future ongoing validity studies

Nineteen suggestions regarding changes to the wording of the item text were made which included replacing the word *bakkie* with the word *vehicle* in item 8. The suggestion was accepted as the word *vehicle* is more generic. Similarly, four suggestions were made by SMEs regarding mismatches between the item text and drawings and were incorporated into the final version. Six comments were made regarding the need for the wording of the item text to better describe the origin and endpoint of the action being portrayed. For example, for item 5, the text *Can you load wood onto a wheelbarrow?* was changed to *Can you load wood from the ground onto a wheelbarrow?* In this way, the text clearly described a floor to knuckle lift.

The SMEs also suggested the inclusion of the weights lifted and carried, the forces pushed and the distances over which the loads were carried and pushed into each item, to enable claimants to gauge their performance more accurately. Fifteen suggestions were made by SMEs regarding improving the clarity of the drawings. The second author electronically altered the images. All changes were included onto each item in the final version of the RAMS.

Suggestions made by the SMEs which were not implemented concerned the extent to which the item drawings reflected the physical effort involved in executing the item action. Six comments were made by SMEs relating to the contextual correctness of the actions depicted in the instrument items. For example, for item 19, an expert questioned whether the 25-litre water container would be carried on the head if the individual preferred not to use a wheelbarrow. Similarly, one of the SMEs suggested the addition of an item regarding carrying water on the head, as this is a well-documented practice in many rural areas of South Africa[38,39]

Another expert posed a question regarding the ability of Persons with Disabilities to carry out the ADL and iADL domains depicted in the instrument items. This issue was incorporated into the explanation in the user manual. Several closed-ended questions were included in section B of the content validity record form, to ascertain the SMEs' opinions on broader aspects of the development of the instrument and to add rigour to the decisions that the first author had taken during the instrument development phase of the larger study (Figure 3, below).

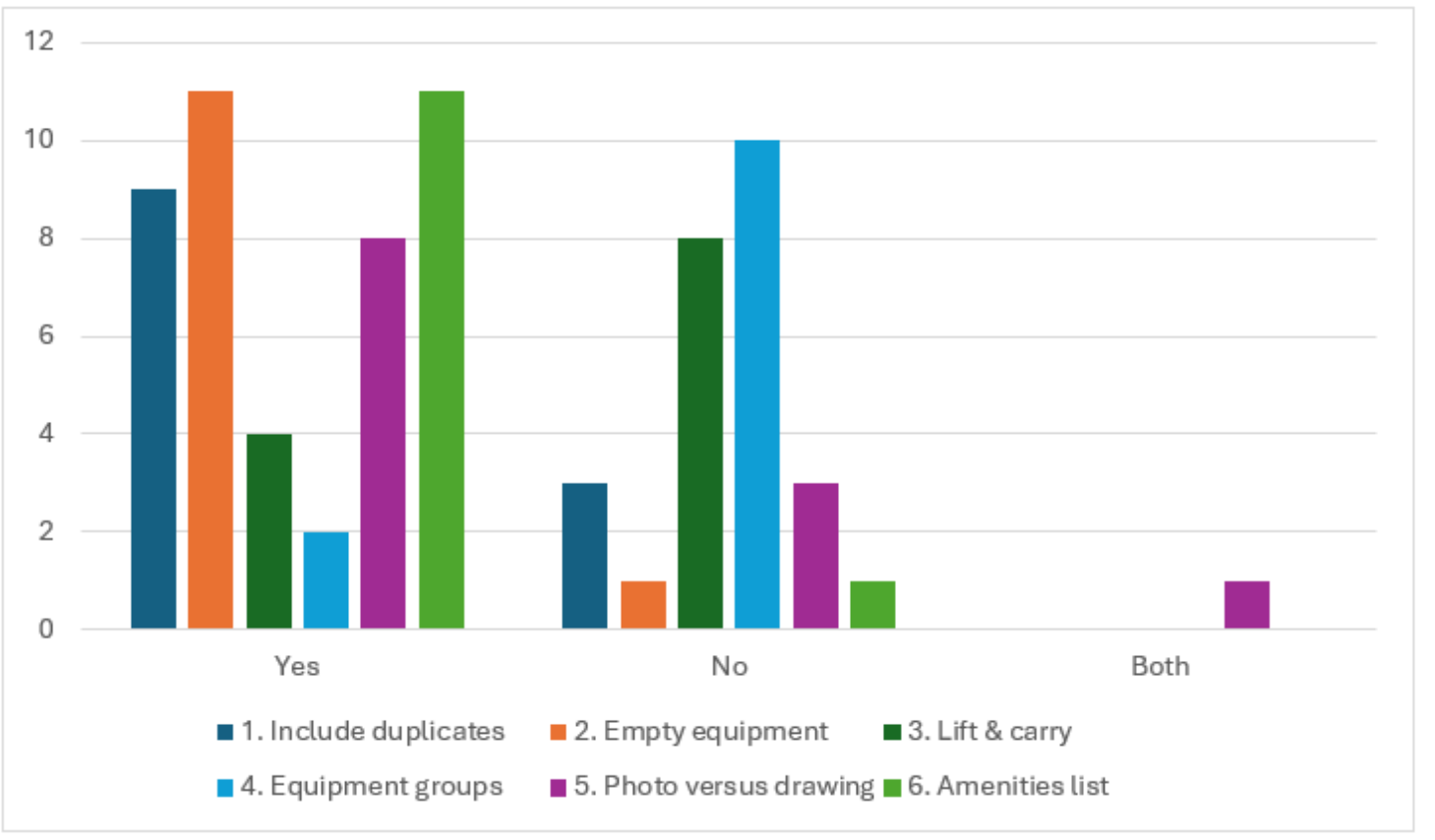

Figure 3 Results of Questions

In terms of question 1: inclusion of duplicate items in the instrument was supported by 75% of the SMEs. This result affirmed the inclusion of the following duplicate instrument items in the Lifting sub-test namely:

- Items 1.3 and 1.4, which both pertain to floor to knuckle lifts of fuelwood, weighing on average 2.2kg;
- Items 1.13 and 1.14, which both pertain to floor to knuckle lifts of 25-litre water-containers, weighing 25kg;
- Items 1.15 and 1.16, which both pertain to knuckle to shoulder lifts of 25-litre water-containers, weighing 25kg.

The results for question 2: inclusion of instrument items that pertained to the manual handling of empty containers indicated that 92% of the SMEs recommended the inclusion. The following instrument lifting or pushing items were thus not eliminated from the final version:

- Item 1.1, which pertains to the lifting of an empty 25-litre water-container from the floor into a wheelbarrow;
- Item 1.5, which pertains to lifting an empty bath for doing laundry;
- Item 1.8, which pertains to lifting an empty *potjie* pot from the ground;
- Item 3.2, which pertains to pushing four empty 25-litre water-containers in a wheelbarrow.

The results for question 3: the inclusion of instrument items that illustrated the element of an ADL and iADL domain involving the greatest physical demand showed that 67% of the SMEs supported the inclusion.

The results for question 4: the instrument only include items comprising the sum of the weights, as opposed to a separate item for each individual weight, when the ADL and iADL domain depicted indicated that 83% of the SMEs recommended this

Question 5 asked the SMEs to indicate their preference between the photograph and drawing versions of the draft instrument. While most of the SMEs (67%) opted for the drawing version, 25% preferred the photograph version and one expert (8%) felt that both versions were effective, having different advantages and disadvantages.

In response to question 6, 92% of the SMEs supported the inclusion of the Household Amenities Checklist in the instrument. Reasons cited included that the checklist would provide clinicians with individualised, clear and comprehensive information regarding the particular combination of household amenities of each patient, which would enable the clinician to predict the form of the ADL and iADL domains in the patients' context.

The suggestions made by the SMEs in question 7 to name the newly developed instrument the RAMS were utilised. All the recommendations of the SMEs were incorporated into the final

version of the RAMS, which was deemed ready for field testing at the conclusion of the current study.

COSMIN Evaluation

The findings above were applied to the RAMS for the ten criteria on the COSMIN methodology for assessing the content validity of PROMS (Table VI, below)[28,32].

Table VI. Evaluation of content validity of the RAMS

Name of the PROM:	PROM development study	Content Validity study 1	OVERALL RATINGS PER PROM	QUALITY OF EVIDENCE
Criteria	sufficient (+), insufficient (–), inconsistent (±), or indeterminate (?).			High, moderate, low, very low
Relevance				
1. Are the included items relevant for the construct of interest?	+	+		
2. Are the included items relevant for the target population of interest?	+	+		
3. Are the included items relevant for the context of use of interest?	+	+		
4. Are the response options appropriate?	+	+		
5. Is the recall period appropriate?	Not assessed	Not assessed		
RELEVANCE RATING	+	+	+	High
Comprehensiveness				
6. All key concepts included?	+	+		
COMPREHENSIVENESS RATING	+	+	+	High
Comprehensibility				
7. Are the PROM instructions understood by the population of interest as intended?	+	+		
8. Are the PROM items and response options understood by the population of interest as intended?	+	+		
9. Are the PROM items appropriately worded?				
10. Do the response options match the question?				
COMPREHENSIBILITY RATING	+	+	+	High
CONTENT VALIDITY RATING	+	+	+	High

The results from the content validity study indicate that seven of the 10 criteria had met the criteria to an excellent level with a CVI score of above 0.90 or more than 80% agreement on questions by the SMEs. Two items had agreement of below 80% by the SMEs for presentation of the domain involving the greatest physical demand and use of drawings in the questions, which were not part of the checklist but can still be considered in further psychometric testing.

No items were added based on the opinions of the SMEs in the current study, such as adding an item regarding carrying water on the head. While this method of carrying water is well-documented within the literature, it was not observed during the data collection for the development of the RAMS items, which aimed at generating relevant items based on rural daily living[38,40]. It is anticipated that further research during the field testing after completion of the current study will guide the possible addition of items.

DISCUSSION

The lower I-CVI and S-CVI scores for clarity in the first round were reflective of the numerous comments by the SMEs regarding the formatting and wording of the draft RAMS. All the SMEs suggestions regarding wording of the RAMS text were implemented, along with improved descriptions of the lift heights and the addition of information depicting the weights and distances for each item. A number of issues that were unclear to the SMEs, such as the classification of lifts and the rationale used for sequencing the RAMS items were addressed in the user manual (Table I, page 4).

The participation of the SMEs in the CVI process enhanced the development of the instrument, with both medico-legal and community practice SMEs confirming the selection of the manual handling domains of lifting, carrying and pushing as its domains. Furthermore, the SMEs rated the items within each domain as highly

relevant and supported the authenticity of the instrument in terms of the South African rural, resource-scarce context. The high CVI scores for the RAMS should be considered against the content validity of other ADL assessment instruments; one such instrument is the Barthel Index (BI), which is regarded globally as a gold standard instrument for ADL assessment[41,42]. As such, the BI has been translated and validated for implementation across numerous countries[43-45]. A recent such study conducted supported its validity for use in a stroke population in South Africa; nonetheless, the authors recommended that the Modified Barthel Index (MBI) was most suited to settings with household utilities including piped water[46] Arguably, the high CVI scores reported in this article strengthen the credibility of the RAMS as an instrument better suited to rural resource-scarce settings. In addition, they highlight possible domain and item gaps in theoretical frameworks, including the OTPF-IV and the ICF[13].

The positive response of the SMEs who participated in the content validity process demonstrated that the RAMS would likely be well accepted by the occupational therapy practitioners. Given the prevalence of South Africans living in households with limited amenities, the impact that climate change is already having on water and fuelwood security and the paucity of ADL instruments reflective of less resourced context, the RAMs may prove to have utility across more diverse occupational therapy populations than initially envisaged[13]. The usability of the first version of the RAMS instrument will improve once it is field-tested and the remainder of the psychometric properties have been explored.

Limitations of the study

The current study has only included an initial study of the psychometric characteristics of the RAMS. The newly developed instrument still needs to be field-tested on a sample of medico-legal evaluations of rural claimants to establish its reliability, validity and utility.

The measurement of performance of ADL and iADL tasks with significant physical capacity and manual handling demands in rural contexts would be more comprehensive if all occupational categories had been included in the study that informed RAMS domain and item identification [4]. Field-testing will include exploration of demands of contextual forms of iADL occupations such as home maintenance and care of children, as well as social occupations such as cooking for community events. Furthermore, the demands of occupations that can be regarded as either iADL or work, such as care of domestic animals and subsistence farming, will be explored.

CONCLUSION

The SMEs involved in the CVI process provided input into the clarity of the instrument items, and their feedback was incorporated into the current version of the RAMS. The RAMS was found to have good content validity. The I-CVI for the manual handling domains 0.97, 1 and 0.99 respectively, while the mean I-CVI was 0.99[37]. The S-CVI/Ave score for relevance was 0.99 and S-CVI/UA score was 0.98. The item revisions were shown to have improved the content validity of the RAMS and S-CVI was judged as good in this study. The final version of the RAMs was deemed ready for field testing at the conclusion of the current study.

Author contributions

Jennie McAdam, (post-graduate student) and Daleen Casteleijn and Denise Franszen (supervisors) conceptualised and completed the research and contributed to the writing of the article. All listed authors approved the final version of the manuscript.

Conflict of interests

The authors confirm that there were no conflicts of interest related to this study.

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