



Research article

Designing and validating the empowerment scale for the older individuals with chronic obstructive pulmonary disease (ESOCOPD)

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ABSTRACT

Introduction: A standard scale to examine the empowerment status of older individuals with chronic obstructive pulmonary disease (COPD) can be used to assess their ability for self-care and disease management. This study aimed to design and validate the empowerment scale for the older individuals with COPD (ESOCOPD).

Materials & methods: This study was conducted in two phases with a deductive-inductive approach: a qualitative phase for designing the tool (the grounded theory study re-analysis, a review of texts and interviews) and a quantitative phase for validation of the questionnaire (face and content validity and reliability). Reliability was determined by test-retest and Spearman's correlation coefficient.

Results: Based on the results of the grounded theory study re-analysis and a review of texts and interviews, 47 items were designed, 14 of which were removed in the face and content validity assessment. The total Content validity index and content validity ratio of the questionnaire were found as 0.82 and 0.95, respectively. The final number of items in the scale was 33, and its dimensions included "information seeking, achieving independence, learning to live with COPD, participation in care, having critical thinking, psychosocial capacities management, and achieving goals". Intra-class correlation of questionnaire dimensions was 0.86–0.99.

Conclusions: The ESOCOPD can be used by health care and treatment providers to determine the patient's ability for self-care and disease management because of its small number of items, its validation, and reliability.

1. Introduction

Ageing is associated with an increase in the incidence of chronic diseases. Currently, 80% of the older individuals have at least one chronic disease [1]. One of these diseases is chronic obstructive pulmonary disease (COPD) with a prevalence of 64.2% in people over 65 [2]. In Iran, the highest prevalence of COPD was 41.34% in the 65–74 years age group [3]. Notable symptoms of the disease include shortness of breath, fatigue, and limitations in daily living activities that increase the dependence of the elderly on others and reduce their quality of life. Hence, empowerment interventions have been considered by many researchers [4] to enhance the ability of this group of elderly people in adapting to the illness and carrying out their activities of daily living. Ability refers to the development of one's intrinsic capacity to take responsibility for life, self-control, self-efficacy, sense of inner power, and positive self-concept [5]. It is necessary to use a standard tool in order to determine the elderly's ability to manage an illness, plan nursing interventions, and determine the effectiveness of empowerment

interventions [6]. Scales were designed based on the rules, cultures, regulations, and health care values of their community. Hence, it is important for health care professionals to understand the impact of culture on the use of standard scales and to know that definitive decisions should be accepted automatically if the results of the study are based on a scale for another culture [5]; therefore, the translation of a scale for other chronic diseases may not have all the necessary criteria for assessing the empowerment of the older individuals with COPD. In addition, the empowerment scales that have been designed so far are specific to other chronic diseases (diabetes, cancer, psychological disorders, and heart disease) [7, 8, 9, 10, 11]. The results of studies on the empowerment of patients also show that ability has a variety of dimensions that vary according to the nature of the chronic disease, age, and environmental and cultural conditions. Hence, we need a scale that can examine self-care and self-management functions of the older individuals with COPD in the Iranian context and culture [5]. Designing and assessing the validity and reliability of a tool by accurate methodological procedures consistent with the culture can help nurses to identify the abilities of the older

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individuals with COPD in self-care and disease management in order to develop empowerment interventions based on their needs. Providing interventions based on the needs assessment could lead to significant reductions in hospitalizations, treatment, and cost of care [12]. The purpose of the study was to design and validate the empowerment scale for the older individuals with COPD (ESOCOPD) in Iranian society.

2. Materials & methods

In this study, the method of production of items was deductive-inductive, performed in two phases (Figure 1). The study was done in 2017–2019.

The Ethics Committee of Babol University of Medical Sciences approved this research proposal (code MUBABOL.REC.172, 1395). All participants signed the written consent form and the rights of the participants were preserved (all data were kept anonymous and confidential).

2.1. Phase 1

2.1.1. Analyzing the grounded theory data

The first step in designing the scale was collecting data from a grounded theory study based on the experiences of the older individuals with COPD [4]. The data was analyzed in five dimensions using inductive qualitative content analysis.

2.1.2. A review of the literature

The second step of extracting the items was done with a deductive approach and extensive review of the literature. Researchers initially sought out the published research on empowerment assessment scales in the older individuals. For this purpose, the keywords of empowered, empowerment, aging, assessment, scale design, questionnaire, concept analysis, self-efficacy, self-care, self-management, and self-sufficiency were searched in CINAHL, PubMed (Medline), British Nursing Index, EMBASE, PsycINFO, and Google Scholar. Researchers searched for information in the database in both Persian and English from 1991 to 2018 in order to increase the variety and depth of documents and papers reviewed. In addition, in order to maximize the scope of the search, a manual search of popular journals that have published papers on empowerment assessment was also carried out. As a result, 15 scales were found, which were used to produce items for the scale regarding the empowerment of the older individuals with COPD (Table 1). At this stage, 80 items were extracted which were classified into five dimensions resulting from the grounded theory study, and three items were placed in a new dimension of “achieving goals”.

2.1.3. Semi-structured interviews

A qualitative content analysis study was conducted with a guided approach and the primary theory was developed and validated [13]. In a targeted sampling approach, individual face-to-face interviews were conducted with five older people with COPD. The semi-structured interview began with an open question based on the main question of the study. The interviews lasted 30–60 min based on the participants' tolerance and interests. Criterion-based and purposive sampling was employed. The following four criteria were used to select participants: (i) Persons with COPD aged 60 years or older (in Iran, >60 years is considered old age); (ii) Persons with COPD have an interest in and the ability to explain own experiences, (iii) have a minimum of 5 years' history of COPD. Study participants (n = 5) were recruited from two district hospitals under the management of Mazandaran medical sciences university in the north of Iran.

Data collection continued to reach data saturation. Credibility, dependability, transferability, and confirmability criteria [13] were investigated to assure the reliability and scientific accuracy of the qualitative data. To do this, the text of the interviews, the list of dimensions, and codes were reviewed by two people (supervisors) familiar with the qualitative research. Also, the accuracy of the initial coding of the interviews was checked by the interviewees through member check. In this study, the researchers accurately recorded and reported the study stages in order to increase transferability.

2.2. Phase 2: Validation of the scale

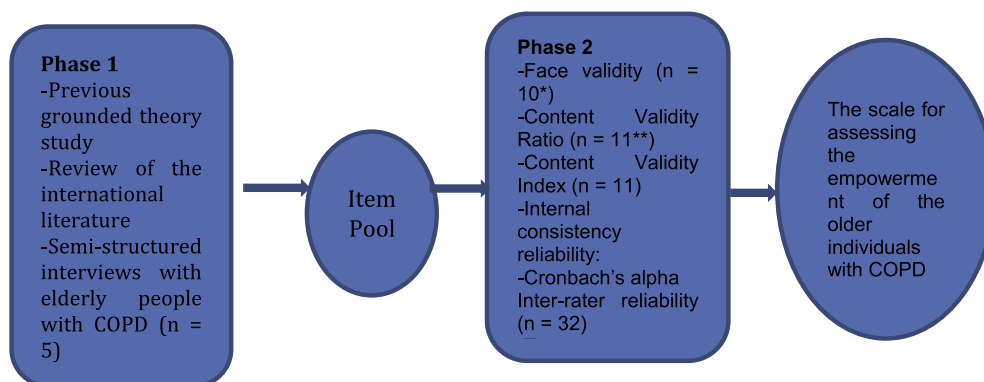
In this phase, the face and content validity and reliability of the designed scale was assessed.

2.2.1. Face validity

Face validity was determined using two qualitative and quantitative methods. In the qualitative method, the items were first provided to 10 older people with COPD, and the level of difficulty, irrelevancy, and ambiguity of the items was examined by them (Table 2). In the next step, the Item Impact Method was used to reduce and remove irrelevant items and determine the importance of the items. For this purpose, the same 10 older people with COPD were asked to rate the importance of each item based on their experiences on a 5-point Likert scale (very important, important, moderately important, slightly important, not important). In this study, items with an impact score of equal to or greater than 1.5 were maintained [14].

2.2.2. Content validity

Content validity ratio (CVR) and content validity index (CVI) were used to determine the content validity of the scale.



* Older individuals with COPD
** Professional team members

Figure 1. A summary of the study method.

Table 1. Available scales in the field of assessment empowerment in the older individuals with COPD.

No.	Scale Title	Authors	Source	Number of items (demographic data are not included)	Stability (Cronbach's Alpha)	Psychometric evaluation methods
1.	Patient empowerment in long-term conditions: development and preliminary testing of a new measure	Small et al (2013) (7)	Based on Qualitative and quantitative study	47 Item; 5 dimensions (identity, knowledge and understanding, personal control, personal decision-making, and enabling other patients).	0.7–0.81	Content validity, Exploratory Factor analysis
2.	Development of a Reliable and Valid Chinese Version of the Diabetes Empowerment Scale	Shiu et al (2003) (8)	Based on Qualitative and quantitative study	20 items; dimensions: overcoming barriers, determining suitable methods, achieving goals, obtaining support, and coping.	0.76–0.89	Content validity, Exploratory factor analysis
3.	COPD Self-Efficacy Scale (CSES)	Wigal et al (1991) (13)	Based on Qualitative and quantitative study	34 items; 5 dimensions: Negative affect, intense emotional arousal, physical exertion, weather/ environmental, and behavioral risk factors	0.7–0.95	Content validity, Exploratory factor analysis
4.	Development and validation of diabetes empowerment questionnaire in Iranian people with type 2 diabetes	Aghili et al (2013) (9)	Based on Qualitative and quantitative study	15 items; 4 Dimensions: Active self-care, basic knowledge related to diabetes management, and coping with personal and social concerns.	0.51–0.78	Content validity Exploratory factor analysis
5.	Empowerment in Older Psychiatric Inpatients: Development of the Empowerment Questionnaire for Inpatients (EQulP)	Lopez et al (2010) (10)	Based on qualitative and quantitative study	16 items; 3 dimensions: Information, Selection, and relationships.	0.88	Triangulation method; Delphi survey, questionnaires, and focus group sessions.
6.	Development of a Valid and Reliable Diabetes Empowerment Scale: An Iranian Version	Tol et al (2012) (14)	Based on Qualitative and quantitative study	28 items (4 dimensions): Managing the psychosocial aspect, Assessing dissatisfaction, and readiness to change, Setting and achieving diabetes goal	0.94–0.97	Content validity Exploratory factor analysis
7.	Development of a Cancer Related Patient Empowerment Scale Using the Polytomous Rasch Measurement Model	Bulsara et al (2013) (11)	Based on Qualitative and quantitative study	15 items	0.78	Rasch Analysis
8.	Elders Health Empowerment Scale. Spanish adaptation and psychometric analysis	Serrani Azcurra et al (2014) (15)	Based on Qualitative and quantitative study	8 Items: Satisfaction and dissatisfaction related to health, Identification and achievement of personally meaningful goals, Application of a systematic problem-solving process, Coping with the emotional aspects of living with health, Stress management, Social support, Self-motivation, Making cost/benefit decisions about making behavior changes	0.89–0.96	Psychometric analysis
9.	The European Heart Failure Self-care Behaviour scale revised into a nine-item scale (EHFScB-9)	Jaarsma et al (2009) (16)	Based on Qualitative and quantitative study	9 items; 3 dimensions: Consulting behaviour with a Cronbach's alpha of 0.85. The EHFScB-9 measures a different construct than quality of life and adherence consulting behaviour with a Cronbach's alpha of 0.85. The EHFScB-9 measures a	0.68–0.87	Content validity Confirmatory factor analysis

(continued on next page)

Table 1 (continued)

No.	Scale Title	Authors	Source	Number of items (demographic data are not included)	Stability (Cronbach's Alpha)	Psychometric evaluation methods
				different construct than quality of life and adherence consulting behavior, quality of life, adherence		
10.	Assessment of relationship between self-efficacy and self-care in COPD patients	Abedi et al (2011) (17)	Based on quantitative study	35 items	0.89	Psychometry analysis
11.	Design and psychometric properties of a self-care questionnaire for the elderly	Maslak pak et al (2015) (18)	Based on Qualitative and quantitative study	40 items (5 dimensions): Physical, social, affective, daily self care, and self care encountering with disease	0.74–0.9	Content validity, Exploratory factor analysis
12.	The Diabetes empowerment scale: A measure of psychosocial self-efficacy	Mahjouriet al (2012) (19)	Based on Qualitative and quantitative study	28 items; 3 dimensions: Self-awareness and managing psychological aspects of diabetes, goal achievement ability, the ability of setting goals	0.81–0.93	Psychometric analysis
13.	Assessment of psychometrics properties of DES –SF in Iran (DES-SF)	Zarea et al (2012) (20)	Based on a quantitative study	8 items	0.62–0.91	Psychometry analysis
14	Designing and Psychometric Properties of Elderly Cognitive Empowerment Questionnaire of Individual Changes	Tarighat et al. (2016) (21)	Based on Qualitative and quantitative study	8 dimensions (25 items); physical abilities, self-respect, spirituality, commitment, performance role, positional identification, self-management and self-assessment	0.62–0.84	Exploratory factor analysis
15	Examining the Validity and Reliability of the Cardiovascular Disease Questionnaire in Measuring the Empowerment of Elderly Patients to Receive Social Support	Musavinasab et al. (2016) (22)	Based on Qualitative and quantitative study	31 Items (7 domains): awareness of personal changes, role playing, adaptation, independence, perceived satisfaction, being in control, and self-management	0.94–0.96	Psychometric analysis

Table 2. Demographic variables of the older individuals with COPD participating in Face validity phase (n=10).

Age (year)	Education	Marital status	working	Disease Duration (year)	Disease severity (Stage)	Living status
80	reading and writing	Widow	Housekeeper	5	2	Alone
81	Illiterate	Married	Non-governmental	14	3	Wife
61	Illiterate	Married	Non-governmental	5	2	Wife and Children
69	reading and writing	Widow	Housekeeper	5	3	Alone
63	Illiterate	Married	Non-governmental	10	4	Wife and Children
67	reading and writing	Married	Retirement	6	3	Alone
74	Diploma	Married	Housekeeper	10	3	Wife and Children
79	Super- diploma	Married	Retirement	10	4	Relatives
60	Illiterate	Married	Housekeeper	5	2	Children
67	Illiterate	Married	Retirement	15	4	Wife

Table 3. Demographic variables of the professionals members participating in Content validity phase (n = 11).

N.	Age (Year)	Length of clinical experience (Year)	Education	Area of Practice
1	42	17	Ph.d in Nursing	Education and Clinical Practice
2	53	22	Ph.d in Nursing	Education and Clinical Practice
3	40	15	Ph.d in Nursing	Education and Clinical Practice
4	31	2	Ph.d in Nursing	Education and Clinical Practice
5	49	20	Master degree in Nursing	Clinical Practice
6	51	27	Master degree in Nursing	Clinical Practice
7	52	28	Master degree in Nursing	Clinical Practice
8	49	20	Pulmonologist	Education and Clinical Practice
9	52	27	Internal diseases specialist	Clinical Practice
10	48	5	Bachelor in Nursing	Clinical Practice
11	49	17	infectious diseases specialist	Education and Clinical Practice

2.2.3. CVR

In order to calculate CVR, 11 specialists (faculty members specialized in aging nursing and infectious and internal medicine physicians) were asked to rate each item in terms of operationalizing the construct as not essential, useful but not essential, or essential (Table 3). The Lawshe table was used for quantification [14].

Since the number of initial items was not high, relaxed CVR was used, that is, the useful but not essential items were also included. According to the Lawshe table, a CVR value of equal to or greater than 0.59 was considered as item acceptance, however, if the strict CVR was between 0 and 0.59, items with an average numerical value equal to or greater than 1.5 were included. In these cases, the relaxed CVR was only used for verifying the numerical mean of judgments, and if the strict CVR was lower than 0.59 and the numerical mean of judgments was less than 1.5, then it was removed.

2.2.4. CVI

To examine CVI in this study, the questionnaire was provided to 11 experts (the same group that were invited to determine the CVR) to examine each item in terms of relevance based on a 4-point Likert scale (ranging from (1) not relevant to (4) completely relevant). In this study, the minimum accepted CVI was considered as 0.78 [14]. The Kappa coefficient was also calculated to assess the agreement between evaluators. A Kappa coefficient above 0.74 is excellent [15].

2.4. Reliability

The reliability of this study was checked using the internal consistency and stability methods. The Cronbach's alpha coefficient was used to determine internal consistency for the 33-items scale. The acceptable alpha is recommended as 0.7 [14]. The Test-retest and Interclass Correlation Coefficient (ICC) were performed to check the stability by asking

Table 4. Examples of designed items based on the analysis of grounded theory information.

Main categories	Subcategories	Primary items designed according to patient experience regarding the ability
Management of life with COPD	Information seeking	I gather information about my condition through studying (books, magazines, etc.). I gather information about the patients from the physician.
	Participation in care	I take care of myself in order to control the disease and other comorbidities (diabetes, cardiovascular, etc.). I practice care recommendations.
	Achieving independence	I do my daily work and activities without the help of others. I make the most important decisions of my life.
	Psychosocial capacities management	I can cope with the stressors of the illness and old age. I participate in collective, cultural, and voluntary activities in order to maintain my peace.
	Learning to live with COPD	I can use respiratory assistive devices (oxygen capsules, BIPAP, etc.). I can avoid harmful health behaviors.

Table 5. Examples of semi-structured interviews, items, and categories.

Statement	Category	Item
First I tried short cigarettes. After a while, I realized that they had tar and nicotine. Then I said 'this won't work either'. I bought short thin cigarettes that only had nicotine. This cigarette just has nicotine; tar hurts the lungs anyway. I actually changed my cigarette. I also enjoyed the benefit. Because my chest was less wheezy, I didn't need to visit my doctor or take as much medication (male, 73 years old).	Having critical thinking	I can recognize the value of changing my behaviors (avoiding pollution and stimulants, quit smoking, etc.).
As a mechanic knows the bolts and nuts and learns how to work with them over time, I have to manage my life with these medications. As time passes, I become more skilled in identifying ways of self-care (male, 65 years old).		I have enough skill in self-care behaviors.
That's right, this illness upsets me and has made problems for me, but I got more information to make better decisions to take care of myself. I choose the best way to live well, like in the past (female, 80 years old).		I have enough knowledge to independently select the right choice.
In general, I take care of myself in order to control my illness. I am careful not to work too much and not to catch a cold. It is important that disease management is done by myself, so I avoid depending on my family. Because they are not always at home and near me (female, 70 years old).		I'm trying to control and manage many of the affairs related to my illness.
I am careful not to stay in the cold and to smoke less. I take care of myself. I was never vaccinated and I am careful not to catch a cold. I can decide which disease recurrence preventive method is the best for me (male, 73 years old).		I can decide which one (which medicine, which method of recurrence prevention, etc.) is better for me.
When the illness recurs, I think what harmful thing have I done. I want to use my behavioral mistakes to prevent recurrences. I can say that during the six years that I had this illness, I have used my mistakes to control the disease a lot (female, 70 years old).		I can specify my mistakes in implementing my illness control strategies (medication use, aerobic exercises, etc.).
These drugs are a double-edged sword. They do some good and have some complications. This spray, for example, or heart medications. They say that local spray works and when it's used for 10 years it will surely affect the body in other places. Or my blood pressure medications—they make you slack. They cause dizziness (male, 65 years old).		With my knowledge and experience, I can comment on various issues of my illness.

32 older individuals to fill the questionnaire two times in two weeks interval.

3. Results

1) Qualitative findings

In the present study, during the re-analysis of grounded theory, empowerment in the elderly with COPD was summarized in five dimensions: information seeking, achieving independence, learning to live with COPD, participation in care, and psychosocial capacities management. These categories were considered as basic dimensions of ability of the older individuals with COPD. In this stage, 34 items were obtained (Table 4).

In the literature review phase, 80 items were obtained. According to the research team, and after comparison and removal of duplicate items resulting from the literature review, 12 items that were not relevant to the five above mentioned dimensions were placed in a new dimension named "achieving goals." The analysis of the text of interviews with participants also made up seven items that were not in previous dimensions, so they were placed in another new dimension named "having critical thinking" (Table 5).

2) Quantitative findings

3.1. Face validity

At this stage, seven of the 47 items were excluded due to having a score of less than 1.5 [14]. Based on the qualitative face validity, 11 items (42, 41, 40, 38, 35, 34, 24, 23, 4, 3, 2) were reviewed before entering the content validity stage. At the end of this stage, 38 items were retained by integrating three items (4, 3, 2) (Table 6).

3.2. Content validity

When calculating the CVR, three items (28, 8, 7) were removed because their strict CVR was less than 0.59 and their mean numerical value was less than 1.5. When calculating the CVI, two items (23 and 22) were removed because of scoring less than 0.78 (Table 7).

3.3. Scoring

After assessing the face and content validity, a 33-item scale with the seven following dimensions was finally prepared:

1. Information seeking (items 1–3)
2. Learning to live with COPD (items 4–6)
3. Participation in care (items 7–15)
4. Psychosocial capacities management (items 16–23)
5. Achieving independence (items 24–26)
6. Having critical thinking (items 27–30)
7. Achieving goals (items 31–33)

This scale was scored based on a 4-point Likert scale (very low (1), low (2), high (3), very high (4)). Scores ranged between 1 and 132. A score of 1–44 indicated low empowerment, 45–88 indicates moderate empowerment, and a score of 89–132 indicates high empowerment of the elderly with COPD in managing the disease.

3.4. Reliability

The total internal consistency of the questionnaire was found to be 0.85 in the reliability check; indicating that internal consistency or internal correlations are good.

Table 6. Impact score of each item in the questionnaire for the ability of the elderly with COPD.

No.	Items	Impact score
1	I find the information on self-care from public media (radio, television, newspapers and social networks).	1.60
2	I get information about my condition from the nurse.	1.60
3	I get information about the patients from the physician.	1.73
4	I get information about aerobic exercise from the physiotherapist.	1.60
5	I get the information I need from the elderly with this disease.	1.60
6	I gather information about the patients through studying (books, magazines, etc.).	1.12
7	I get help from my family to learn how to work with respiratory assistive devices.	4.90
8	I use my experiences to live with my disease.	4.12
9	Despite the difficulty of learning the instructions, I find a way to learn.	1.15
10	I can identify the symptoms of my disease.	2.90
11	I can avoid harmful health behaviors.	1.60
12	I practice self-care recommendations.	0.87
13	I am trying to learn the training materials, despite aging and weakness of memory.	0.70
14	I will overcome my loss of physical performance with different care strategies.	0.68
15	I take care of myself to control the disease and other comorbidities (diabetes, cardiovascular, etc.).	4.20
16	I take my medications according to the doctor's instructions.	1.60
17	I know the complications of my medications and I take appropriate measures in the event of complications.	3.64
18	I can use respiratory assistive devices (oxygen capsules, BIPAP, etc.).	4.29
19	I use different methods of physiotherapy to clean my lungs (effective coughs, pursed lip breathing, diaphragmatic breathing, etc.)	4.20
20	I use preventive measures to reduce the recurrence of my illness (flu vaccination, avoiding polluted air, smoking, etc.)	4.04
21	I keep my diet according to my physical condition.	4.20
22	I perform physical activities, such as walking and exercise according to my physical condition.	4.20
23	I use the recommended strategies to improve my sleep quality.	3.42
24	I use the right solutions when I have disease symptoms (shortness of breath, fatigue, etc.).	34.3
25	I visit my family and friends.	2.64
26	I plan my time for having fun and relaxation.	0.58
27	I take part in social activities such as recreational, cultural, and voluntary activities in order to maintain my peace.	1.98
28	When I feel lonely, I communicate with others.	3.49
29	I talk about my concerns with my family, relatives, and friends.	1.64
30	I share my concerns with the treatment team.	1.60
31	I can identify the stressors related to my illness and old age.	1.60
32	I can deal with problems related to my illness and old age (such as shortness of breath, forgetfulness, etc.).	1.90
33	I request support if needed.	0.52
34	I can control my psychological and emotional sensitivities.	2.90
35	I look at my disease positively.	3.49
36	I use spiritual solutions (prayers, etc.) to deal with my problems.	2.36
37	I do my daily work and activities without the help of others.	2.90
38	Despite the problems related to my illness and my age, people still rely on me.	1.58
39	I try to reduce my dependence on others by doing self-care.	1.73
40	I'm trying to control and manage many of the affairs related to my illness.	3.64
41	I make the most important decisions in my life despite my disease.	3.42
42	I am looking for financial support from social organizations and institutions to reduce financial dependence on others.	1.78
43	With my knowledge and experience, I can comment on various issues of my disease.	2.02
44	I can recognize the value of changing my behaviors (avoiding contamination and stimulants, quit smoking, etc.).	2.83
45	I can decide which one (which medicine, which method of recurrence prevention, etc.) is better for me.	1.73
46	I can specify my mistakes in implementing my disease control strategies (medication use, aerobic exercises, etc.).	2.52
47	I can decide what is best for me to overcome obstacles to achieve goals.	2.82

Cronbach's alpha coefficient for the subscales ranged from 0.83 to 0.87, indicating that the total internal consistency of the questionnaire dimensions was within acceptable range.

The results showed that the scores of first and second tests were statistically significant (CI: 95%; $P < 0.001$), approving the repeatability of the subscales and the questionnaire besides showing high stability (Table 8).

4. Discussion

The present study aimed to develop a scale for assessing the empowerment of the older individuals with COPD (Table 9). It showed the validity and reliability of the ESECOPD. The psychometric evaluation resulted in seven factors that were measured using a 4-point Likert scale.

Table 7. Accepting or removing items of empowerment in the older individuals with COPD.

No	t	CVR					CVI		
		E	U	N	CVR strict	CVR relaxed	M	CVI	K (Kappa coefficient)
1	I find information on self-care from public media (radio, television, newspapers and social networks).	7	4	0	0.27	1	1.63	0.81	0.80
2	I get information about my care from the treatment team members (physician, nurse, physiotherapist, etc.)	10	1	0	0.81	1	1.90	0.90	0.89
3	I get the information I need from the elderly with this disease.	7	4	0	0.27	1	1.63	0.81	0.80
4	I use my experiences to live with my disease.	9	2	0	0.63	1	1.81	0.81	0.80
5	I get help from my family to learn how to use sprays, medications, respiratory assistive devices, etc.	8	2	1	0.45	0.81	1.63	0.81	0.80
6	I can identify the symptoms of my disease.	9	2	0	0.63	1	1.81	0.90	0.89
7	I can avoid harmful health behaviors.	5	6	0	-0.90	1	1.45	-	-
8	I take my medications according to the doctor's instructions.	5	6	0	-0.90	1	1.45	-	-
9	If my disease symptoms get worse, I take measures such as using sprays, taking medicines, taking a break during activities, etc.	11	0	0	1	1	2	1	1
10	I know the complications of my medications and I take appropriate measures in the event of complications.	11	0	0	1	1	2	1	1
11	I can use respiratory assistive devices (oxygen capsules, BIPAP, etc.).	10	1	0	0.81	1	1.90	1	1
12	I use different methods to clean my lungs such as effective coughs, pursed lip breathing, diaphragmatic breathing, etc.	11	0	0	1	1	2	1	1
13	I use preventive measures to reduce the recurrence of my illness (flu vaccination, avoiding polluted air, not smoking, etc.)	11	0	0	1	1	2	1	1
14	I keep my diet according to my physical condition.	10	1	0	0.81	1	1.90	1	1
15	I perform physical activities, such as walking and exercise according to my physical condition.	11	0	0	1	1	2	1	1
16	I use recommended strategies (limiting sleeping during the day, etc.) to improve my sleep quality.	11	0	0	1	1	2	1	1
17	I take care of myself to control the disease and other comorbidities (diabetes, cardiovascular disease, etc.).	11	0	0	1	1	2	1	1
18	I visit my family and friends.	6	5	0	0.09	1	1.54	0.90	0.89
19	I participate in collective, cultural and voluntary activities in order to maintain my peace.	6	5	0	0.09	1	1.54	0.81	0.80
20	When I feel lonely, I communicate with others.	6	5	0	0.09	1	1.54	0.81	0.80
21	I talk about my concerns with my family, relatives, or friends.	8	3	0	0.45	1	1.72	0.90	0.89
22	I share my concerns with the treatment team.	8	3	0	0.45	1	1.72	0.63	0.62
23	I can identify the stressors related to my disease and old age.	7	4	0	0.27	1	1.63	0.63	0.62
24	If I need financial support, I ask from supporting organizations such as insurance, bureau of welfare, Imam Khomeini Relief Foundation, etc.	11	0	0	1	1	2	1	1
25	I can control my emotional reactions (such as anger, anxiety, and frustration).	10	1	0	0.81	1	1.90	1	1
26	I look at my life and disease problems positively.	10	1	0	0.81	1	1.90	1	1
27	I use spiritual solutions (prayers, etc.) to deal with my disease problems.	6	5	0	0.09	1	1.54	0.90	0.89
28	I try to reduce my dependence on others by doing self-care.	5	6	0	-0.90	1	1.45	-	-
29	I do my work and activities of daily living without the help of others.	8	3	0	0.45	1	1.72	1	1
30	I am a supporter and sponsor of my family or others.	8	3	0	0.45	1	1.72	0.81	0.80
31	I make the most important decisions of my life.	8	3	0	0.45	1	1.72	1	1
32	With my knowledge and experience I can comment on various issues relating to my illness.	6	5	0	0.09	1	1.54	1	1
33	I can recognize the value of changing my behaviors (avoiding pollution and stimulants, quit smoking, etc.).	11	0	0	1	1	2	0.90	0.89
34	I can decide which medicine, which method of recurrence prevention, etc. is better for me.	6	5	0	0.09	1	1.54	0.90	0.89
35	I can specify my mistakes in implementing my disease control strategies (medication use, aerobic exercises, etc.).	8	3	0	0.45	1	1.72	1	1
36	I can deal with problems related to my disease and old age (such as shortness of breath, forgetfulness, etc.).	10	1	0	0.81	1	1.90	1	1
37	I am able to control and direct many issues related to my disease.	8	3	0	0.45	1	1.72	0.90	0.89
38	I can decide what is best for me to overcome obstacles to achieving goals.	8	3	0	0.45	1	1.72	1	1

Table 8. The results of internal consistency evaluation of the empowerment questionnaire for the older individuals with COPD.

Empowerment Dimensions	Items Number	Cronbach's Alpha	ICC (CI = 95%)	P-value
Information Seeking	3 (1–3)	0.85	0.97 (0.92–1)	P < 001
Learning to live with COPD	3 (4–6)	0.86	0.92 (0.89–0.97)	P < 001
Participation in Care	9 (7–15)	0.87	0.99 (0.93–1)	P < 001
Psychosocial Capacities Management	8 (16–23)	0.83	0.97 (0.94–1)	P < 001
Achieving Independence	3 (24–26)	0.86	0.93 (0.89–0.97)	P < 001
Having Critical Thinking	4 (27–30)	0.83	0.94 (0.91–1)	P < 001
Achieving Goals	3 (31–33)	0.86	0.86 (0.82–0.89)	P < 001
Total	33 (1–33)	0.85	0.94 (0.82–1)	P < 001

Table 9. A scale for assessment Empowerment of the older individuals with COPD.

No.	Items	very low (1)	low (2)	High (3)	High (4)
Information Seeking					
1	I find information on self-care from public media (radio, television, newspapers and social networks).				
2	I get information about my care from the treatment team members (physician, nurse, physiotherapist, etc.)				
3	I get the information I need from the elderly with this disease.				
Learning to live with COPD					
4	I use my experiences to live with my disease.				
5	I get help from my family to learn how to use sprays, medications, respiratory assistive devices, etc.				
6	I can identify the symptoms of my disease.				
Participation in care					
7	If my disease symptoms get worse, I take measures such as using sprays, taking medicines, taking a break during activities, etc.				
8	I know the complications of my medications and I take appropriate measures in the event of complications.				
9	I can use respiratory assistive devices (oxygen capsules, BIPAP, etc.).				
10	I use different methods to clean my lungs such as effective coughs, pursed lip breathing, diaphragmatic breathing, etc.				
11	I use preventive measures to reduce the recurrence of my illness (flu vaccination, avoiding polluted air, not smoking, etc.)				
12	I keep my diet according to my physical condition.				
13	I perform physical activities, such as walking and exercise according to my physical condition.				
14	I use recommended strategies (limiting sleeping during the day, etc.) to improve my sleep quality.				
15	I take care of myself to control the disease and other comorbidities (diabetes, cardiovascular disease, etc.).				
Psychosocial capacities management					
16	I visit my family and friends.				
17	I participate in collective, cultural and voluntary activities in order to maintain my peace.				
18	When I feel lonely, I communicate with others.				
19	I talk about my concerns with my family, relatives, or friends.				
20	I can control my emotional reactions (such as anger, anxiety, and frustration).				
21	If I need financial support, I ask from supporting organizations such as insurance, bureau of welfare, Imam Khomeini Relief Foundation, etc				
22	.I look at my life and disease problems positively.				
23	I use spiritual solutions (prayers, etc.) to deal with my disease problems.				
Achieving independence					
24	I do my work and activities of daily living without the help of others.				
25	I am a supporter and sponsor of my family or others.				
26	I make the most important decisions of my life.				
Having critical thinking					
27	With my knowledge and experience I can comment on various issues relating to my illness.				
28	I can recognize the value of changing my behaviors (avoiding pollution and stimulants, quit smoking, etc.).				
29	I can decide which medicine, which method of recurrence prevention, etc. is better for me.				
30	I can specify my mistakes in implementing my disease control strategies (medication use, aerobic exercises, etc.).				
Achieving Goals					
31	I can deal with problems related to my disease and old age (such as shortness of breath, forgetfulness, etc.).				
32	I am able to control and direct many issues related to my disease.				
33	I can decide what is best for me to overcome obstacles to achieving goals.				

The results showed that 'information' seeking is one of the dimensions of the ESOCOPD. Although studies of empowerment scale development for other chronic diseases have not explicitly addressed the concept of information seeking, we can find similar concepts in some other studies [16, 17, 18, 19, 20]. For instance, in the European Heart Failure Self-care Behavior Scale by Jarsma (2009), they used the dimension of "consulting behavior." The consulting behavior dimension consisted of three items and assessed the elderly's efforts in acquiring information for disease management. In the present study, there is an item that measures the elderly's information seeking from family members. Family members can play a very important role in transferring information from the treatment team to the elderly and are considered as an accessible source of information for the older individuals. Hence, they can be an effective factor in the empowerment of the older individuals to manage their illness [18].

The results of other studies showed that information seeking is not stopped by a patient with chronic illness, but changes depending on the needs and circumstances of the patients (age, nature of the disease, and physical condition). In this regard, Clombo et al. (2014) showed that empowered patients, even years after diagnosis, search for new information on their health care and treatment because one of the characteristics of empowered patients is the ability to search for new information about self-care. Since self-care information changes with scientific advances, one of the criteria for empowering in chronic patients is the ability to search for information [21]. The "achieving independence" dimension has three items.

The results of this study showed that achieving independence is one of the dimensions of the ability to manage the illness. In this dimension, gaining independence is assessed by doing activities of daily living, the ability to support family members, and the ability to make decisions. The 47-item tool of Small (2013) used "self-decision-making" and "self-control" [7] and the 16-item tool of Lopez et al. (2010) used "selection" [10] instead of "achieving independence." In Mousavinasab's empowerment scale (2016), the concept of "independence" was introduced as one of the dimensions of empowerment of the elderly with heart disease [22]. Although independence has been identified as one of the most important criteria for the ability of the older individuals to control their illness [4, 6], items that indicate the elderly's empowerment have received less attention from the researchers in many tools for measuring empowerment, which is of the strengths of the scale designed in this study.

Learning to live with COPD is another dimension of the ESOCOPD. Other scales that relate to empowerment of patients have also referred to learning to live with the illness to maintain survival and adapt to existing conditions. Other studies have used concepts such as "empowering other patients," [7] "basic knowledge about diabetes management," [9] "preparedness for change," [23] and "self-awareness" [20] to examine the empowerment of patients with chronic illnesses to learn to live with the illness.

The results of this study showed that "participation in care" was one of the dimensions of the designed questionnaire with the highest number of items. Participation in care has been introduced in different studies with concepts such as "daily self-care," "self-care in the face of illness," and "active self-care" [9]. The reliability of this dimension were 0.99 in this study and 0.78–0.86 in other studies. Another feature of the current questionnaire is that it assesses various aspects of self-care such as pharmacotherapy, diet, social relationships, etc. to deal with the problems of illness and aging. However, these dimensions have not been considered in other empowerment scales designed in Iran or other countries. Pagano (2016) showed that adherence to pharmacotherapy and a diet by the older individuals with COPD is much lower than that of other chronic diseases [24]. Comorbidity of COPD with age related problems (forgetfulness, visual impairment, hearing impairment, and muscle strength) will reduce or eliminate the use of respiratory assistive devices and weaken self-care behaviors [13]. Therefore, the inclusion of items indicating self-care status can help with determining the status of participation in care in the older individuals with COPD.

One of the unique features of the present scale is the dimension of "having critical thinking" which has not been considered in other scales [9, 10, 11, 12, 16, 17, 18, 19, 20, 23, 25]. Having "critical thinking" represents the highest level of empowerment. Only the dimension of "determining the appropriate method" with five items in the empowerment scale designed by Shiv et al. (2003) partly reflected "critical thinking" [10]. The fifth item of that dimension, "I can change how I take care of my illness if I want," corresponds to items 28 and 29 in the present scale. In the study conducted by Tariqat et al. (2016), the concept of "self-assessment" was introduced as one of the eight dimensions of empowerment for the older individuals. The reliability of this dimension was 0.94 in the present study and 0.79 (10) and 0.62 in other studies [26].

"Psychosocial capacities management" is one of the dimensions of the scale designed in this study. This dimension was introduced in other studies with labels such as "management of psych-social aspects of diabetes," [23] "stress management, proportionate social support," [17] "spiritual beliefs, acceptance, and adaptation with the disease," "relationship with peers," [11] "coping with personal and social concerns," [20] "emotional-self-care and social-self-care," "overcoming obstacles," and "dealing" [19]. A unique feature of psychosocial capacities management in the present study is that it covers all items in similar dimensions in other studies. In this study, the reliability of this dimension was 0.97, which is consistent with the results of Tol's study.

'Achieving Goals' is another dimension of the ESOCOPD. This dimension is introduced in other studies with concepts such as "achievement of objectives," [8] "setting and achieving diabetes goals," [23] and "achieving meaningful personal goals" [17]. The reliability of this dimension was 0.86 in the present study and 0.78 [8], 0.96 [23], and 0.89 [17] in other studies.

The results of the overall reliability of the ESOCOPD showed that this scale has an acceptable reliability. The high reliability of this scale shows its superiority over other existing ability tools [16, 17, 18, 19, 20, 25].

Since this questionnaire has been designed and its validity and reliability have been studied in the Iranian context and culture, it is necessary to examine its validity and reliability in other cultures. Due to the age of the target group of the current questionnaire, the subjects may not have sufficient motivation to complete it, they might not adequately reflect on their responses, or respond to the questionnaire based on their literacy. Therefore, completing the questionnaire through individual interviews will resolve the problem.

5. Conclusions

The scale designed in this study is an innovation in Iran and worldwide as it is the first scale made to assess the empowerment of the older individuals with COPD. This scale can be used by health care providers to determine the empowerment of the older individuals with COPD due to its low number of items and acceptable validity and reliability. It is necessary to examine its validity and reliability in other cultures.

Nurses and other healthcare staff need understanding in relation to the ability of older individuals with COPD to meet their needs. Understanding the experiences of the empowerment process of older individuals with COPD can help health professionals provide more focused elderly care. The ESOCOPD can be used by health care and treatment providers to determine the patient's ability for self-care and disease management because of its small number of items, its validation, and reliability.

One of the main strengths of the present study was the lack of similar scales in Iran and other countries.

Declaration

Author contribution statement

Z. Khanian: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Wrote the paper.

Z. Fotokian: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

F. Ghaffari: Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

Z. Alipoor: Contributed reagents, materials, analysis tools or data; Wrote the paper.

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Competing interest statement

The authors declare no conflict of interest.

Additional information

No additional information is available for this paper.

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