BMC Nursing

https://doi.org/10.1186/s12912-026-04291-x

Article in Press

Self-care and self-efficacy in self-care behaviors of older adults with multiple chronic conditions living in low-middle income country: an observational study

Received: 18 March 2025

Accepted: 1 January 2026

Published online: 10 January 2026

Cite this article as: Arapi A., Adëraj S., Mazzotta R. *et al.* Self-care and self-efficacy in self-care behaviors of older adults with multiple chronic conditions living in low-middle income country: an observational study. *BMC Nurs* (2026). https://doi.org/10.1186/s12912-026-04291-x

Alta Arapi, Sajmira Adëraj, Rocco Mazzotta, Dasilva Taci, Vicente Bernalte-Martí, Dhurata Ivziku, Rosario Caruso, Alessandro Stievano, Ercole Vellone, Gennaro Rocco & Maddalena De Maria

Self-Care and Self-Efficacy in Self-Care Behaviors of Older Adults with Multiple Chronic Conditions Living in Low-Middle Income Country: An Observational Study

Alta Arapi[1], Sajmira Adëraj[2], Rocco Mazzotta[2,3], Dasilva Taci[2], Vicente Bernalte-Martí[4], Dhurata Ivziku[5], Rosario Caruso[6], Alessandro Stievano[7,3], Ercole Vellone[2,8], Gennaro Rocco[9,3], Maddalena De Maria[10]

[1] Albanian Order of Nurses, Tirana, Albania
[2] University of Rome Tor Vergata, Department of Biomedicine and Prevention, Rome, Italy
[3] Centre of Excellence for Nursing Scholarship, Order of Nurses of Rome, Rome, Italy
[4] Jaume I University, Department of Nursing, Faculty of Health Sciences Castellón, Castelló de la Plana, Spain
[5] Fondazione Policlinico Campus Bio-Medico, Department of Health Professions, Rome, Italy
[6] University of Milan, Department of Biomedical Sciences for Health, Milan, Italy
[7] University of Messina, Department of Clinical and Experimental Medicine, Messina, Italy
[8] Wroclaw Medical University, Faculty of Nursing and Midwifery, Wrocław, Poland
[9] International Center for Nursing Research Montianum Our Lady of Good Counsel, Catholic University, Tirana, Albania
[10] Link Campus University, Department of Life Science, Health, and Health Professions, Rome, Italy
*Corresponding Author: Rocco Mazzotta (rocco.mazzotta@uniroma2.it)

ABSTRACT

Background. Multiple chronic conditions (MCCs) are highly prevalent worldwide, particularly among adult patients living in low- and middle-income countries (LMICs). Self-care behaviors are recommended to reduce the burden of MCCs and improve outcomes. Self-care is a naturalistic decision-making process that encompasses maintenance, monitoring, and management of chronic conditions. Self-efficacy in self-care, defined as an individual's confidence in performing effective self-care behaviors, is essential for sustaining long-term behavioral change. However, evidence on self-care and self-efficacy in self-care behaviors among older adults with MCCs in LMICs remains limited. This study aimed to describe self-care and self-efficacy in self-care behaviors among older adults with MCCs living in Albania, an LMIC.

Design. Multicenter cross-sectional observational-study.

Methods. We enrolled 376 patients affected by MCCs living in Albania, an LMIC. The Self-Care of Chronic Illness Inventory (SC-CII) and the Self-Care Self-Efficacy Scale (SC-SES) were used to assess self-care and self-efficacy in self-care behaviors, respectively. Descriptive statistics were carried out.

Results. Participants were mostly female (54.3%), with a mean age of 74.1 (SD = 6.2) years, low educational level (65.4%). On average, participants had two chronic conditions. The most frequently reported conditions were hypertension (88.2%) and diabetes mellitus (DM) (75.1%). The least frequently performed self-care behaviors included engaging in regular physical activity (63%), practicing stress management (85%), monitoring medication side effects (41.5%), and adjusting diet or fluid intake in response to symptoms (60%).

Conclusion. Older adults with MCCs living in Albania, a representative of LMIC reported inadequate self-care and self-efficacy in self-care in specific behaviors. These findings highlight the urgent need for tailored interventions to enhance self-care and self-efficacy in self-care behaviors in this vulnerable population. Further research is needed to identify factors influencing self-care behaviors among older adults with MCCs in LMICs.

Keywords. Self-care, self-care self-efficacy, chronic conditions, older adults, low- and middle income countries.

Background

The global population is aging at an unprecedented rate, with the number of individuals aged 65 and older expected to double to 2.1 billion. Approximately 80% of these individuals live in low- and middle-income countries (LMICs) [1]. As this demographic expands, there will be a significant increase in the prevalence of Multiple Chronic Conditions (MCCs), defined as the concurrent presence of two or more chronic diseases in a single individual [2, 3]. Currently, the global prevalence of MCCs is estimated at 37.2% [4], with wide variation across LMICs ranging from 3.2% to 90.5% [5]. Individuals with MCCs are often confronted with disability [6], reduced quality of life [7], elevated rates of hospitalization and mortality [8], and overall poorer health outcomes [9]. Additionally, MCCs contribute to increased healthcare costs and a higher demand for medical resources [10].

To contrast the burden of MCCs, the World Health Organization (WHO) recommends self-care as a critical strategy for achieving universal health coverage, promoting health, and safeguarding vulnerable populations across all economic settings. The-Middle Range Theory of Chronic Illness [11] defines self-care as a naturalistic decision-making process that involves three interrelated components: self-care maintenance, self-care monitoring, and self-care management. Self-Care maintenance involves behaviors to maintain stability (e.g., follow disease-specific diet). Self-Care monitoring refers to regularly checking for symptoms and assessing health status to detect changes early enabling proactive responses (e.g., monitor medication side-effect). Self-Care management involves actions taken when symptoms occur (i.e., seeking medical advice to manage and alleviate symptoms effectively) [12]. These three components are dynamic and interdependent, collectively

contributing to improved outcomes for patients with chronic illnesses (Riegel et al., 2021). Evidence indicates that adequate self-care is associated with fewer hospitalizations, improved quality of life, and better event-free survival [13-15]. However, adherence to self-care behaviors is often poor, particularly in individuals with MCCs, due to the complexity of managing multiple illnesses, competing treatment regimens, and the burden of continuous monitoring [13, 16-18].

In this context, self-efficacy in self-care, defined as the belief in one's ability to successfully perform specific actions to achieve desired outcomes [19], plays a pivotal role. Higher self-efficacy in self-care is associated with greater confidence in disease management, persistence in the face of challenges, and improved emotional regulation [20, 21]. Conversely, patients with low self-efficacy in self-care may perceive self-care as overwhelming, leading to reduced engagement and poorer outcomes [22, 23]. Strengthening self-efficacy in self-care is essential for improving adherence to complex self-care regimens and, ultimately, health outcomes [24, 25].

Although several studies have explored self-care in people with single chronic condition [26-29] often documenting inadequate behaviors across all self-care components [30, 31] research focusing on MCCs remains scarce. Nevertheless, a recent systematic review suggested that self-care interventions may improve outcomes among socioeconomically disadvantaged older adults [32].

To date, however, only one study has examined self-care behaviors within the framework of the Middle - Range Theory [11] in the context of MCCs, conducted in a high-income European country; it revealed suboptimal behaviors across all three self-care components [33, 34]. No studies have yet described the self-efficacy in self-care behaviors among patients with MCCs in an LMIC where the burden of chronic disease is particularly high and healthcare resources are limited. This lack of evidence represents a critical knowledge gap. Understanding self-care behaviors and self-efficacy in self-care among older adults with MCCs in LMICs is essential for several reasons.

First, it provides insights into how patients manage their conditions in environments with limited healthcare resources. Second, it informs the development of tailored interventions targeting inadequately performed self-care behaviors, with the potential to strengthen the overall self-care process, enhance self-efficacy in self-care [35], and improve health outcomes. Finally, such evidence can support healthcare systems in optimizing scarce resources and building more sustainable models of chronic illness management in vulnerable populations. Therefore, the present study aimed to describe (i) self-care behaviors across the three theoretical components of self-care maintenance, monitoring, and management, and (ii) self-efficacy in self-care behaviors among older adults with MCCs living in Albania, a LMIC.

Methods

Design

A multicenter cross-sectional observational study design was used. The data were drawn from an ongoing study, the Self-Care of Patient and Caregiver DyAds in Multiple Chronic Conditions: A Longitudinal Study (SODALITY), aimed to assess self-care among patients with MCCs and their caregivers [36]. The study adheres to the EQUATOR guidelines and follows the STrengthening the Reporting of OBservational studies in Epidemiology guidelines for reporting cross-sectional observational studies [37].

Participants and settings

A sample of 376 patients with MCCs and their caregivers was recruited from community and outpatient settings across all 12 districts of Albania, including Berat, Dibër, Durres, Elbasan, Fier, Gjirokastër, Korçë, Kukës, Lezhë, Shkodër, Tiranë, and Vlorë.

Patients were eligible if they were at least 65 years old with a diagnosis of Diabetes Mellitus (DM), Chronic Obstructive Pulmonary Disease (COPD), or Hearth Failure (HF) and at least one additional chronic disease. Patient with a diagnosis of cancer and/or dementia were excluded.

Caregivers were eligible if over 18 years they were recognized by the patient as their primary, unpaid, informal caregiver. Caregivers were excluded if they were under 18 years of age.

For this analysis, we used all patients enrolled in the study at the time of analysis.

Instruments

The Albanian version of Self-Care of Chronic Illness Inventory (SC-CII- Al) was used to assess the self-care maintenance, self-care monitoring and self-care management behaviors performed by MCCs patient [38]. The SC-CII- Al, a 19-item instrument based on the Middle - Range theory of Chronic Illness [11], includes three scales: self-care maintenance, self-care monitoring and self-care management. The Self-Care Maintenance Scale (seven items) evaluates behaviors that individuals perform to maintain physical and emotional stability (e.g., taking prescribed medications). The Self-Care Monitoring Scale (five items) measures how individuals routinely monitor their symptoms and overall health status (e.g., checking for changes in symptoms). The Self-Care Management Scale (six items) assesses how individuals respond to symptoms when they occur (i.e., change what he/she eats or drinks to manage symptoms). One item (item #14, how quickly did you recognize it as a symptom of your illness?) measures symptom recognition. For this item, response options include not applicable for people without symptoms, 0 (I did not recognize the symptom), or from 1 (not quickly) to 5 (very quickly). For the self-care maintenance and monitoring scales each item is measured using a 5-point Likert scale ranging from “Never” (1) to “Always” (5) [39]. For the self-care management each item ranging from 1 (not likely) to 5 (very likely). All three scales use a standardized score from 0 to 100, with higher scores indicating better self-care. A cut-off point score≥70 was used to identify adequate CC to self-care [40]. The SC-CII, freely available in more than ten languages including

Albanian (https://self-care-measures.com), demonstrated good validity in a cross-cultural study involving patients, in the US, Italy, and Sweden, with chronic conditions [41]. Partial scalar invariance for all the three scales was reached across the three cultural groups (Comparative Fit Index [CFI] ranging from 0.946 to 0.996 across the three scales). Also, the SC-CII has good reliability with reliability coefficients ranging from 0.67 to 0.81 across the three scales. Additionally, the Albanian version of the SC-CII was tested in a sample of MCCs patients living in a LMIC confirming good psychometric properties (factorial validity: CFI ranging from 0.96 to 0.99 across the three scales; reliability coefficients ranging from 0.70 and 0.87) [38].

Self-Care Self-Efficacy Scale (SCSES) [42]

The Self-Care Self-Efficacy Scale (SC-SES) is a widely used instrument for measuring self-efficacy in self-care behaviors across any type and number of chronic conditions. The SC-SES is composed of 10 items and uses a 5-point Likert scale ranging from “Not confident” (1) to “Very confident” (5). The SC-SES has a standardized score ranging from 0 to 100, with higher scores indicating greater self-efficacy in self-care behaviors. Across chronic patients in the US, China, Italy and Brazil, the SC-SES demonstrated strong validity, tested by measurement equivalence (a partial scalar invariance level was found across countries), as well as good reliability, tested with Cronbach's alpha coefficients (ranging from 0.89 to 0.93 across the four cultural groups) [42]. The SC-SES, originally drafted in English, was translated into Albanian following the Principles of Good Practice for the Translation and Cultural Adaptation Process for Patient-Reported Outcomes (PRO) Measures [43]. For this study, we tested the reliability by Cronbach Alpha coefficient that was adequate and equal to 0.91.

The sociodemographic characteristics (e.g., sex, age, education level) and clinical characteristics (e.g., number and type of chronic diseases, disease severity) of the participants were assessed using a questionnaire developed specifically for this study.

Data collection

Data were collected between August 2020 and April 2023 in community and outpatient settings. Participants were enrolled by nurse research assistants who were trained specifically to collect data for the study. After identifying eligible participants, the research assistant explained the purpose of the study and invited them to participate. Participants completed the paper questionnaires independently whenever possible. In case of visual or writing difficulties, the research assistants administered the questionnaires through face-to-face interviews.

Data analysis

All data analyses were performed using IBM SPSS, version 27.0. The dataset was complete, and no missing values were observed. Descriptive statistics were used to provide a detailed description of the sample characteristics, including means and standard deviations (SD). Additionally, frequencies and percentages were calculated to summarize categorical variables. To assess self-care and self-efficacy in self-care the prevalence of each specific behavior was described by computing item-level frequencies within the SC-CII and SC-SES. For each item, we calculated the percentage of inadequacy, defined as the proportion of patients who scored ≤3 on the Likert scale across all scales. Specifically, this included responses up to 'Sometimes' (for Self-care Maintenance and Self-care Monitoring scales), 'Moderately Likely' (for Self-care Management scale), and 'Somewhat Confident' (Self-care Self-efficacy). This approach has been previously used to define inadequacy self-care behaviors [34, 44].

Ethical considerations

Ethical approval for the study was granted by the Catholic University of Our Lady of Good Counsel (Protocol Number 237/2020). Informed consent was obtained from all participants prior to enrollment. All study procedures adhered to the principles outlined in the Declaration of Helsinki. All data were treated confidentially, participation was voluntary, and all participants

provided written informed consent. Participants were anonymized using alphanumeric codes and stored on secure, password-protected servers compliant with GDPR and Albanian data protection laws to ensure privacy and confidentiality. The participants could withdraw of the study at any time without providing a reason.

Results

Characteristics of the Sample

A sample of 376 MCCs patients were enrolled. Participants were mainly female (54.3%) with a mean age of 74.1 years (**Table 1**). Most participants had a low educational level (65.4%), were retired (97.1%), and married (67.8%). A majority perceived their income as sufficient to meet daily needs (76.1%). The most common chronic conditions were hypertension (88.2%) and DM (75.1%), followed by HF (23.6%) and COPD (13.6%).

Table 1. Socio-demographic characteristics of the participants (N=376 MCCs patients)

Variable	**Mean (SD)**
Age (years)	74.1 (6.2)
Number of chronic conditions	2.5 (0.7)
	N (%)
Gender	
Female	204 (54.3)
Male	172 (45.7)
Education level	
≤ 8 years	246 (65.4)
≥ 9 years	130 (34.6)
Employment status	
Retired	365 (97.1)
Employed	11 (2.9)
Marital status	
Married	255 (67.8)
Single/Divorced/Widowed	121 (32.2)

Perceived income adequacy	
More than needed	15 (4.0)
Enough for living	286 (76.1)
Less than needed	75 (19.9)
Chronic conditions	
Hypertension + other	337 (88.2)
DM + other	287 (75.1)
HF + Other	90 (23.6)
COPD + Other	52 (13.6)
OP + Other	45 (11.8)
RA + Other	44 (11.5)

Legend. SD: Standard Deviation; COPD: Chronic Obstructive Pulmonary Disease; DM: Diabetes Mellitus; HF: Heart Failure; HTA: Hypertension; OP: Osteoporosis; RA: Rheumatoid Arthritis.

Self-care maintenance behaviors

Table 2 summarizes self-care maintenance behaviours at the item-level among patients with MCCs. Physical activity (item #3) and stress management (item #8) emerged as the least frequently performed behaviors. More than 63% of participants reported engaging in physical activity only “sometimes” or less, and over 82% reported inadequate stress management, with very few indicating that they “often” (9.3%) or “always” (8.2%) managed stress effectively. In contrast, participants reported that they “often” or “always” took their prescribed medications without missing a dose (94.9%) (item #6), making this the most consistently performed behaviour. Similarly, 70.2% of patients reported that they “often” or “always” visited their healthcare provider for routine care (item #5). Adequate sleep was also relatively common, with 63.3% indicating that they “often” or “always” ensured sufficient rest.

Table 2. Self-care maintenance behaviors of adult patients affected by multiple chronic condition living in low middle income (N=376 patients)

	Never	Rarely	Sometimes	Often	Always
			N (%)		
1. Make sure to get enough sleep?	20 (5.3)	19 (5.0)	99 (26.3)	124 (32.9)	114 (30.3)
2. Try to avoid getting sick (e.g., flu shot. wash your hands)?	5 (1.3)	5 (1.3)	55 (14.6)	134 (35.6)	177 (20.4)
3. Do physical activity (e.g., take a brisk walk. use the stairs)?	33 (8.7)	77 (20.4)	130 (34.5)	59 (15.7)	77 (20.4)
4. Eat a special diet?	31 (8.2)	41 (10.9)	122 (32.4)	102 (27.1)	80 (21.2)
5. See your healthcare provider for routine health care?	5 (1.3)	22 (5.8)	85 (22.6)	130 (34.6)	134 (35.6)
6. Take prescribed medicines without missing a dose?	1 (0.2)	4 (1.0)	14 (3.7)	91 (24.2)	266 (70.7)
8. Manage stress?	87 (23.1)	100 (26.5)	123 (32.7)	35 (26.6)	31 (8.2)

Self-care monitoring behaviors

Regarding self-care monitoring, 45% of participants reported that they never, rarely, or only sometimes monitored the side effects of their medications (item #11) and 41.5% reported monitoring whether they felt more tired than usual during normal activities (item #12) (**Table 3**). Conversely, over 69% of participants frequently or always monitored their chronic conditions (item #9), and 66% paid close attention to changes in how they felt (item #10).

Twelve percent of participants reported not experiencing any symptoms. Among those who did experience symptoms, 27% indicated that they did not recognize them quickly, whereas about 10% reported recognizing them very quickly.

Table 3. Self-care monitoring behaviors of adult patients affected by multiple chronic condition living in low middle income (N=376 patients)

	Never	Rarely	Sometimes	Often	Always
			N (%)		
9. Monitor your condition?	6 (1.6)	14 (3.7)	95 (25.3)	123 (32.7)	138 (36.7)

10. Pay attention to changes in how you feel?	8 (2.1)	15 (4.0)	106 (28.2)	120 (31.9)	127 (33.8)
11. Monitor for medication side effects?	19 (5.1)	32 (8.6)	116 (30.9)	105 (27.9)	104 (27.7)
12. Monitor whether you tire more than usual doing normal activities?	16 (4.3)	27 (7.2)	109 (29.0)	116 (30.9)	108 (28.7)
13. Monitor for symptoms?	13 (3.5)	23 (6.1)	116 (30.9)	119 (31.6)	105 (27.9)

	Have not had symptoms	**I did not recognize the symptom**	**Not Quickly**	**Not very Quickly**	**Somewhat Quickly**	**Quickly**	**Very Quickly**
14. If you had symptoms in the past month, how quickly did you recognize it as a symptom of your illness?	46 (12.2)	36 (9.6)	103 (27.4)	36 (9.6)	86 (22.9)	32 (8.5)	37 (9.8)

Self-care management behaviors

Regarding the self-care management scale, more than 60% of participants were not likely," "somewhat likely," or "moderately likely" to change what they ate or drank to reduce or eliminate symptoms when they occurred (item #15) (**Table 4**). Additionally, participants reported being likely to adjust their level of physical activity when symptoms occurred (item #16). Over 75% of participants reported taking medication to alleviate symptoms (item #17), while 80% stated that they would inform their healthcare provider about the symptoms at the next office visit (item #18).

Table 4. Self-care management behaviors of adult patients affected by multiple chronic condition living in low middle income (N=376 patients)

	Not Likely	Somewhat Likely	Moderately Likely	Likely	Very Likely
When you have symptoms, how likely are you to . . .			**N (%)**		
15. Change what you eat or drink to make the symptom decrease or go away?	42 (11.2)	32 (8.5)	152 (40.4)	84 (22.3)	66 (17.6)

16. Change your activity level (e.g., slow down, rest)?		20 (5.3)	18 (4.8)	119 (31.6)	114 (30.3)	105 (27.9)
17. Take a medicine to make the symptom decrease or go away?		13 (3.5)	9 (2.4)	71 (18.9)	103 (27.4)	180 (47.9)
18. Tell your healthcare provider about the symptom at the next office visit?		11 (2.9)	15 (2.4)	49 (13.0)	109 (29.0)	192 (51.1)
19. Call your healthcare provider for guidance?		43 (11.4)	42 (11.2)	80 (21.3)	98 (26.1)	113 (30.1)
	I did not do anything	**Not Sure**	**Somewhat sure**	**Moderately sure**	**Sure**	**Very sure**
20. Think of a treatment you used the last time you had symptoms. Did the treatment you used make you feel better?	69 (18.4)	51(13.5)	51 (13.6)	115 (30.6)	54 (14.4)	36 (9.6)

Self-Efficacy in Self-Care behaviors

The descriptive statistics of the self-care self-efficacy behaviors revealed that nearly half of the participants (48.4%) were "not confident at all," "slightly confident," or "somewhat confident" in their ability to keep themselves stable and free from symptoms (item #1) (**Table 5**). Additionally, 62% of participants lacked confidence in persisting to find a remedy for symptoms, when faced with challenges (item #10). Conversely, over 78% of patients reported feeling confident in following their prescribed treatment plan (item #2), and 67% were confident in routinely monitoring their health condition (item #4).

Table 5. Self-efficacy in self-care of adult patients affected by multiple chronic condition living in low middle income (N=376 patients)

	Not Confident at all	**Slightly confident**	**Somewhat Confident**	**Fairly confident**	**Completely Confident**
In general, how confident are you that you can:			**N (%)**		
1. Keep yourself stable and free of symptoms?	18 (4.8)	21 (5.6)	143 (38.0)	138 (36.7)	56 (14.9)
2. Follow the treatment plan you have been given?	8 (2.1)	14 (3.7)	59 (15.7)	149 (39.6)	146 (38.8)

3. Persist in following the treatment plan even when difficult?	18 (4.8)	17 (4.5)	121 (32.2)	137 (36.4)	83 (22.8)
4. Monitor your condition routinely?	20 (5.3)	17 (4.5)	86 (22.9)	140 (37.2)	113 (30.1)
5. Persist in routinely monitoring your condition even when difficult?	25 (6.6)	23 (6.6)	132 (35.1)	124 (33.0)	70 (18.6)
6. Recognize changes in your health if they occur?	14 (3.7)	17 (4.5)	119 (31.6)	135 (35.9)	91 (24.2)
7. Evaluate the importance of your symptoms?	20 (5.3)	34 (9.0)	129 (34.3)	105 (27.9)	88 (23.4)
8. Do something to relieve your symptoms?	18 (4.8)	19 (5.1)	103 (27.3)	136 (36.1)	100 (26.5)
9. Persist in finding a remedy for your symptoms even when difficult?	36 (9.6)	51 (13.6)	145 (38.5)	84 (22.3)	60 (15.9)
10. Evaluate how well a remedy works?	31 (8.2)	33 (8.8)	133 (35.3)	124 (32.9)	55 (14.6)

Discussions

This study aimed to describe the self-care behaviors across the three theoretical components of self-care (maintenance, monitoring, and management), and self-efficacy in self-care among older adult patients with MMCs in a LMIC. To our knowledge, this is the first study to provide an item-level description of how MCCs patients in LMIC context manage their health through specific self-care behaviors. The results reveal marked variability across behaviors, reflecting the complexity and multifaceted nature of the self-care process in this vulnerable population.

In LMICs, where healthcare resources are often severely constrained due to inadequate funding, economic instability, and a shortage of trained healthcare providers, access to advanced treatments and essential medications is a significant challenge [45, 46]. In this context, performing adequate self-care behaviors is crucial for effectively managing MCCs. The insights gained from this study are not only valuable but vital for healthcare professionals working with adult patients in LMICs who are affected by MCCs. By identifying critical gaps in patient self-care behaviors, these findings provide a clear guide for clinicians to develop targeted, evidence-based interventions that address these deficiencies. Implementing such

interventions in clinical practice can lead to more effective management of MCCs, ultimately improving patient outcomes. Additionally, these results can help clinicians optimize the use of scarce resources, thereby enhancing the quality of care in these challenging environments.

Our findings showed that MCCs adult patients living in LMICs performed inadequate self-care behaviors. These results are consistent with similar research conducted in Italy, a high-income country (HIC), where De Maria et colleagues (2025) also observed inadequate self-care behaviors specially in self-care maintenance and self-care management behaviors. In Italy, patients exhibited more robust self-care monitoring behaviors compared to those in our sample. These differences may be attributed to the varying levels of healthcare infrastructure, access to resources, and patient education between LMICs and high-income countries (HICs) like Italy. In high-income settings, better access to healthcare services and educational resources may enhance patients' ability to effectively monitor their conditions, even when maintenance and management behaviors fall short. Conversely, in LMICs, the overall constraints on healthcare resources and education may affect not just the ability to maintain and manage conditions but also limit the effectiveness of self-care monitoring behaviors [47, 48].

Self-care maintenance behaviors

Regarding self-care maintenance behaviors our results showed that our participants infrequently engage in physical activity and poorly manage stress. However, most consistently took prescribed medications and actively try to avoid illness. The findings align with results found in previous studies in HICs [31, 34]. In all these studies physical activity and stress management behaviors were found to be suboptimal. This similarity suggests that regardless of the country's economic status, older adults with MCCs face significant challenges in these areas of self-care [49]. The consistent adherence to medication in LMICs is also mirrored in the Italian context,

indicating that while some aspects of self-care are managed well, physical activity and stress management require more targeted interventions globally.

Self-care monitoring behaviors

Regarding self-care monitoring behaviors, our results show that a substantial portion of participants did not consistently monitor the side effects of their medications or assess whether they felt more tired than usual during normal activities. However, most participants frequently monitored their chronic conditions, and paid attention to changes in how they felt. These findings are inconsistent with previous evidence derived from a HIC which also reported similar challenges in medication monitoring and fatigue assessment [34]. Specifically, in Italy fewer patients were inadequate in monitoring medication side effects, and a higher percentage effectively monitored changes in their physical and psychological states. These differences may be attributed to factors such as better access to healthcare services, higher health literacy, cultural attitudes toward health, and stronger support systems in HICs like Italy [50]. Collectively these factors contribute to more effective self-care monitoring in Italy compared to LMICs.

Self-care management behaviors

Our findings on self-care management behaviors reveal that many participants were unlikely to change their diet or adjust their physical activity to manage symptoms, although most took their medication and reported symptoms to their healthcare provider at the next visit. These trends in LMICs differ from those observed in HICs, where patients regularly reported symptoms but were often dissatisfied with treatment efficacy [34]. These differences may stem from limited access to healthcare, lower health literacy, and cultural factors in LMICs that discourage proactive symptom management. In contrast, patients in HICs, with better access to healthcare and education, may have higher expectations and are more critical of

treatment outcomes [51]. Cultural norms in HICs also likely promote more frequent communication with healthcare providers, resulting in higher rates of symptom reporting.

These findings are particularly novel in demonstrating how systemic constraints in LMICs not only affect access to treatment but also influence patients' capacity to engage in effective self-care, highlighting the urgent need for context-specific interventions.

Self-care self-efficacy behaviors

Patients reported low self-efficacy in self-care, particularly in maintaining the stability of their MCCs and in persisting to find remedies for managing symptoms. These findings aligns with previous studies conducted in HICs, where multiple comorbidities have also been shown to lower self-efficacy and complicate self-care [31, 52]. The presence of MCCs exacerbates challenges, as patients struggle with naturalistic decision-making, affecting their perception of their health and environment [52]. Several factors can contribute to this low of self-efficacy in self-care. Limited access to healthcare resources often leaves patients without the necessary tools and support to manage their conditions independently. Lower health literacy further compounds the issue, as patients may not fully understand the importance of proactive management [53]. In some LMICs, cultural beliefs may discourage self-directed health management, fostering reliance on healthcare providers rather than promoting personal responsibility for health [54]. Financial constraints also play a significant role, limiting access to treatments and follow-up care, thereby weakening patients' confidence in effectively managing their symptoms [55].

On the other hand, patients expressed greater confidence in following treatment plans and monitoring their health. This may be due to the structured nature of these activities, with clear guidance from healthcare

providers, making them easier to follow. Additionally, support from family caregivers is crucial in ensuring adherence to treatment plans [28] and health monitoring, providing a safety net that boosts patients' confidence in these aspects of self-care [56]. This support system, combined with the directive nature of prescribed treatments, likely makes these tasks more manageable for patients, even amid broader systemic challenges.

Implication for practice and research

This study reveals important clinical and research implications for improving self-care among patients with MCCs in LMICs. It emphasizes the importance of systematically assessing self-care practices to identify at-risk patients and developing targeted psychoeducational programs to enhance self-care and self-efficacy in self-care behaviors. These interventions should be tailored to the specific challenges in LMICs, such as limited healthcare resources, low health literacy, and cultural barriers, to ensure effectiveness. The findings also highlight a universal need to improve strategies for physical activity and stress management among older adults with chronic conditions, regardless of their economic or geographic context. Implementing these strategies in clinical practice can significantly improve patient outcomes and help optimize the use of limited healthcare resources in LMICs, ultimately contributing to better management of MCCs globally.

Future research should prioritize longitudinal designs to identify the determinants and risk factors for inadequate self-care in this specific population. Understanding these drivers is essential for developing targeted interventions aimed at strengthening self-efficacy and improving self-care behaviors in LMIC contexts.

Additionally, comparative studies between LMICs and HICs could provide deeper insights into effective interventions across different settings, guiding the development of globally applicable self-care frameworks. These efforts will ultimately aim to optimize patient outcomes and ensure that the

limited healthcare resources in LMICs are utilized effectively to manage MCCs.

Strengths and limitations

This study has several strengths. It is the first to provide an in-depth analysis of self-care behaviors among MCC patients in an LMIC, thereby making a significant contribution to the existing literature on this topic. The study's methodology is robust, employing a validated and reliable instrument that was specifically tested in this population, which enhances the reliability of the findings. However, there are notable limitations. The reliance on a convenience sample may limit the broader applicability of the results. Additionally, although the study was conducted across multiple centers, it was confined to a single LMIC, meaning that specific sociocultural factors unique to this setting could have influenced the outcomes, potentially limiting the generalizability of the findings to other LMICs.

Conclusions

Patients living in LMICs reported inadequate self-care and self-efficacy in self-care in specific behaviors. Further research is necessary to identify the factors influencing these behaviors and to develop targeted interventions to improve the self-care process in this vulnerable population. These findings highlight the urgent need for interventions to promote better self-care practices in LMICs, where resources and education on managing chronic conditions are often limited.

Abbreviations

LMICs = low- and middle-income countries.

HICs = high income countries.

MCCs = Multiple Chronic Conditions.

WHO = World Health Organization.

SC-CII-Al = Albanian version of Self-Care of Chronic Illness Inventory.
SC-SES = Self-Care Self-Efficacy Scale

Declarations

Ethics approval and consent to participate

Ethical approval for the study was granted by Catholic University of Our Lady of Good Counsel (Protocol Number 237/2020).

Consent for publication

N.A.

Availability of data and materials

Dataset is available upon request from the authors.

Competing interests

The authors declare no competing interests.

Funding

This study was supported by a grant Catholic University of Our Lady of Good Counsel (Protocol Number 237/2020).

Sample CRediT author statement

Alta Arapi: investigation, data curation and writing—original draft; **Sajmira Adëraj**: investigation, data curation and writing—original draft; **Rocco Mazzotta**: formal analysis, writing—original draft; **Dasilva Taci:** investigation, data curation and writing—original draft; **Vicente Bernalte-Martí**: writing—original draft; **Dhurata Ivziku**: writing—original draft; **Rosario Caruso**: writing—original draft; **Alessandro Stievano**: writing—original draft; **Ercole Vellone**: Conceptualization, methodology and supervision; **Gennaro Rocco**: Conceptualization, methodology, data

curation and supervision; **Maddalena De Maria:** Conceptualization, methodology, formal analysis, data curation and supervision.

Acknowledgements

N.A.

Clinical trial number

Not applicable.

References

1. World Health Organization. Ageing and health 2022 [Available from: https://www.who.int/news-room/fact-sheets/detail/ageing-and-health.
2. Dattalo M, DuGoff E, Ronk K, Kennelty K, Gilmore-Bykovskyi A, Kind AJ. Apples and Oranges: Four Definitions of Multiple Chronic Conditions and their Relationship to 30-Day Hospital Readmission. J Am Geriatr Soc. 2017;65(4):712-20. 10.1111/jgs.14539
3. Rizzuto D, Mossello E, Fratiglioni L, Santoni G, Wang HX. Personality and Survival in Older Age: The Role of Lifestyle Behaviors and Health Status. Am J Geriatr Psychiatry. 2017;25(12):1363-72. 10.1016/j.jagp.2017.06.008
4. Chowdhury SR, Chandra Das D, Sunna TC, Beyene J, Hossain A. Global and regional prevalence of multimorbidity in the adult population in community settings: a systematic review and meta-analysis. EClinicalMedicine. 2023;57:101860. 10.1016/j.eclinm.2023.101860
5. Abebe F, Schneider M, Asrat B, Ambaw F. Multimorbidity of chronic non-communicable diseases in low- and middle-income countries: A scoping review. J Comorb. 2020;10:2235042X20961919. 10.1177/2235042X20961919
6. Calderon-Larranaga A, Vetrano DL, Ferrucci L, Mercer SW, Marengoni A, Onder G, et al. Multimorbidity and functional impairment-bidirectional

interplay, synergistic effects and common pathways. J Intern Med. 2019;285(3):255-71. 10.1111/joim.12843

7. Makovski TT, Schmitz S, Zeegers MP, Stranges S, van den Akker M. Multimorbidity and quality of life: Systematic literature review and meta-analysis. Ageing Res Rev. 2019;53:100903. 10.1016/j.arr.2019.04.005

8. Rodrigues LP, de Oliveira Rezende AT, Delpino FM, Mendonca CR, Noll M, Nunes BP, et al. Association between multimorbidity and hospitalization in older adults: systematic review and meta-analysis. Age Ageing. 2022;51(7). 10.1093/ageing/afac155

9. Thanakiattiwibun C, Siriussawakul A, Virotjarumart T, Maneeon S, Tantai N, Srinonprasert V, et al. Multimorbidity, healthcare utilization, and quality of life for older patients undergoing surgery: A prospective study. Medicine (Baltimore). 2023;102(13):e33389. 10.1097/MD.0000000000033389

10. Sambamoorthi U, Tan X, Deb A. Multiple chronic conditions and healthcare costs among adults. Expert Rev Pharmacoecon Outcomes Res. 2015;15(5):823-32. 10.1586/14737167.2015.1091730

11. Riegel B, Jaarsma T, Stromberg A. A middle-range theory of self-care of chronic illness. ANS Adv Nurs Sci. 2012;35(3):194-204. 10.1097/ANS.0b013e318261b1ba

12. Riegel B, Jaarsma T, Stromberg A. An Update to the Middle-Range Theory of Self-Care of Chronic Illness. ANS Adv Nurs Sci. 2025. 10.1097/ANS.0000000000000594

13. He X, Li J, Wang B, Yao Q, Li L, Song R, et al. Diabetes self-management education reduces risk of all-cause mortality in type 2 diabetes patients: a systematic review and meta-analysis. Endocrine. 2017;55(3):712-31. 10.1007/s12020-016-1168-2

14. Lee CS, Bidwell JT, Paturzo M, Alvaro R, Cocchieri A, Jaarsma T, et al. Patterns of self-care and clinical events in a cohort of adults with heart failure: 1 year follow-up. Heart Lung. 2018;47(1):40-6. 10.1016/j.hrtlng.2017.09.004

15. Lee CS, Moser DK, Lennie TA, Riegel B. Event-free survival in adults with heart failure who engage in self-care management. Heart Lung. 2011;40(1):12-20. 10.1016/j.hrtlng.2009.12.003

16. Auld JP, Mudd JO, Gelow JM, Hiatt SO, Lee CS. Self-care Moderates the Relationship Between Symptoms and Health-Related Quality of Life in Heart Failure. J Cardiovasc Nurs. 2018;33(3):217-24. 10.1097/JCN.0000000000000447

17. Gregoire C, Faymonville ME, Vanhaudenhuyse A, Charland-Verville V, Jerusalem G, Willems S, et al. Effects of an intervention combining self-care and self-hypnosis on fatigue and associated symptoms in post-treatment cancer patients: A randomized-controlled trial. Psychooncology. 2020;29(7):1165-73. 10.1002/pon.5395

18. Riegel B, Jaarsma T, Lee CS, Stromberg A. Integrating Symptoms Into the Middle-Range Theory of Self-Care of Chronic Illness. ANS Adv Nurs Sci. 2019;42(3):206-15. 10.1097/ANS.0000000000000237

19. Bandura A. Self-efficacy: The exercise of control. New York, NY, US: W H Freeman/Times Books/ Henry Holt & Co; 1997. ix, 604-ix, p.

20. Maeda U, Shen BJ, Schwarz ER, Farrell KA, Mallon S. Self-efficacy mediates the associations of social support and depression with treatment adherence in heart failure patients. Int J Behav Med. 2013;20(1):88-96. 10.1007/s12529-011-9215-0

21. Tharek Z, Ramli AS, Whitford DL, Ismail Z, Mohd Zulkifli M, Ahmad Sharoni SK, et al. Relationship between self-efficacy, self-care behaviour and glycaemic control among patients with type 2 diabetes mellitus in the Malaysian primary care setting. BMC Fam Pract. 2018;19(1):39. 10.1186/s12875-018-0725-6

22. Lee KS, Oh S. An Integrative Review of the Symptom Perception Process in Heart Failure. J Cardiovasc Nurs. 2022;37(2):122-33. 10.1097/JCN.0000000000000750

23. Katch H, Mead H. The role of self-efficacy in cardiovascular disease self-management: a review of effective programs. Patient Intelligence. 2010;2:33-44. https://doi.org/10.2147/PI.S12624

24. Anderson RM, Funnell MM. Patient empowerment: reflections on the challenge of fostering the adoption of a new paradigm. Patient Educ Couns. 2005;57(2):153-7. 10.1016/j.pec.2004.05.008

25. Deccache A, van Ballekom K. From patient compliance to empowerment and consumer's choice: evolution or regression? An overview of patient education in French speaking European countries. Patient Educ Couns. 2010;78(3):282-7. 10.1016/j.pec.2010.01.012

26. Baroni I, Caruso R, Dellafiore F, Arrigoni C, Fabrizi D, Luciani M, et al. Diabesity in Adults With Type 2 Diabetes Mellitus: A Cross-sectional Study Exploring Self-care and Its Determinants. Can J Diabetes. 2022. 10.1016/j.jcjd.2022.03.009

27. Brito Villa A, De Maria M, Caruso R, Matarese M, Arrigoni C, Dellafiore F. Self-Care of Chronic Illness Inventory: An Initial Psychometric Evaluation in People Living With HIV in Italy. J Assoc Nurses AIDS Care. 2022;33(4):459-67. 10.1097/JNC.0000000000000331

28. De Maria M, Ferro F, Vellone E, Ausili D, Luciani M, Matarese M. Self-care of patients with multiple chronic conditions and their caregivers during the COVID-19 pandemic: A qualitative descriptive study. J Adv Nurs. 2022;78(5):1431-47. 10.1111/jan.15115

29. Wang X, Liu Y, Liu Y, Zhang J, Liu L, Matarese M, et al. Exploring patients with COPD self-care behaviours and self-efficacy and their interconnections: A network analysis. J Clin Nurs. 2024. 10.1111/jocn.17378

30. Caruso R, Rebora P, Luciani M, Di Mauro S, Ausili D. Sex-related differences in self-care behaviors of adults with type 2 diabetes mellitus. Endocrine. 2020;67(2):354-62. 10.1007/s12020-020-02189-5

31. Cocchieri A, Riegel B, D'Agostino F, Rocco G, Fida R, Alvaro R, et al. Describing self-care in Italian adults with heart failure and identifying

643 determinants of poor self-care. Eur J Cardiovasc Nurs. 2015;14(2):126-36.
644 10.1177/1474515113518443
645 32. Lawless MT, Oster C, Block H, Cash B, Bulto LN, Pinero de Plaza MA,
646 et al. Self-management support interventions for socioeconomically
647 disadvantaged older adults with chronic conditions: A systematic review.
648 Patient Educ Couns. 2025;141:109305. 10.1016/j.pec.2025.109305
649 33. Ingadottir B, Svavarsdottir MH, Jurgens CY, Lee CS. Self-care
650 trajectories of patients with coronary heart disease: a longitudinal,
651 observational study. Eur J Cardiovasc Nurs. 2024;23(7):780-8.
652 10.1093/eurjcn/zvae055
653 34. De Maria M, Saurini M, Erba I, Vellone E, Riegel B, Ausili D, et al.
654 Generic and disease-specific self-care instruments in older patients affected
655 by multiple chronic conditions: A descriptive study. J Clin Nurs.
656 2025;34(6):2203-16. 10.1111/jocn.17397
657 35. Kerari A, Bahari G, Alharbi K, Alenazi L. The Effectiveness of the
658 Chronic Disease Self-Management Program in Improving Patients' Self-
659 Efficacy and Health-Related Behaviors: A Quasi-Experimental Study.
660 Healthcare (Basel). 2024;12(7). 10.3390/healthcare12070778
661 36. De Maria M, Vellone E, Ausili D, Alvaro R, Di Mauro S, Piredda M, et
662 al. Self-care of patient and caregiver DyAds in multiple chronic conditions: A
663 LongITudinal studY (SODALITY) protocol. J Adv Nurs. 2019;75(2):461-71.
664 10.1111/jan.13834
665 37. von Elm E, Altman DG, Egger M, Pocock SJ, Gotzsche PC,
666 Vandenbroucke JP, et al. The Strengthening the Reporting of Observational
667 Studies in Epidemiology (STROBE) statement: guidelines for reporting
668 observational studies. Ann Intern Med. 2007;147(8):573-7. 10.7326/0003-
669 4819-147-8-200710160-00010
670 38. Arapi A, Vellone E, Ivziku D, Duka B, Taci D, Notarnicola I, et al.
671 Psychometric Characteristics of the Self-Care of Chronic Illness Inventory in
672 Older Adults Living in a Middle-Income Country. Int J Environ Res Public
673 Health. 2023;20(6). 10.3390/ijerph20064714

39. Riegel B, Barbaranelli C, Sethares KA, Daus M, Moser DK, Miller JL, et al. Development and initial testing of the self-care of chronic illness inventory. J Adv Nurs. 2018;74(10):2465-76. 10.1111/jan.13775

40. Riegel B, Lee CS, Dickson VV, Carlson B. An update on the self-care of heart failure index. J Cardiovasc Nurs. 2009;24(6):485-97. 10.1097/JCN.0b013e3181b4baa0

41. De Maria M, Matarese M, Stromberg A, Ausili D, Vellone E, Jaarsma T, et al. Cross-cultural assessment of the Self-Care of Chronic Illness Inventory: A psychometric evaluation. Int J Nurs Stud. 2021;116:103422. 10.1016/j.ijnurstu.2019.103422

42. Yu DS, De Maria M, Barbaranelli C, Vellone E, Matarese M, Ausili D, et al. Cross-cultural applicability of the Self-Care Self-Efficacy Scale in a multi-national study. J Adv Nurs. 2021;77(2):681-92. 10.1111/jan.14617

43. Wild D, Grove A, Martin M, Eremenco S, McElroy S, Verjee-Lorenz A, et al. Principles of Good Practice for the Translation and Cultural Adaptation Process for Patient-Reported Outcomes (PRO) Measures: report of the ISPOR Task Force for Translation and Cultural Adaptation. Value Health. 2005;8(2):94-104. 10.1111/j.1524-4733.2005.04054.x

44. Jaarsma T, Stromberg A, Ben Gal T, Cameron J, Driscoll A, Duengen HD, et al. Comparison of self-care behaviors of heart failure patients in 15 countries worldwide. Patient Educ Couns. 2013;92(1):114-20. 10.1016/j.pec.2013.02.017

45. Phelan H, Yates V, Lillie E. Challenges in healthcare delivery in low- and middle-income countries. Anaesthesia & Intensive Care Medicine. 2022;23(8):501-4. 10.1016/j.mpaic.2022.05.004

46. Ozawa S, Shankar R, Leopold C, Orubu S. Access to medicines through health systems in low- and middle-income countries. Health Policy Plan. 2019;34(Supplement_3):iii1-iii3. 10.1093/heapol/czz119

47. Briggs CJ, Garner P. Strategies for integrating primary health services in middle- and low-income countries at the point of delivery. Cochrane Database Syst Rev. 2006(2):CD003318. 10.1002/14651858.CD003318.pub2

48. World Health Organization. Global action plan for the prevention and control of noncommunicable diseases 2013-2020. 2013.
49. Sadeghi H, Mohammadi Shahbolaghi F, Hosseini M, Fallahi-Khoshknab M, Ghaedamini Harouni G. Self-management in Older Adults with Multiple Chronic Conditions (MCCs): A Qualitative Content Analysis. Iran J Psychiatry Behav Sci. 2024;In Press(In Press):e150346. 10.5812/ijpbs-150346
50. Matranga D, Maniscalco L. Inequality in Healthcare Utilization in Italy: How Important Are Barriers to Access? Int J Environ Res Public Health. 2022;19(3). 10.3390/ijerph19031697
51. Mounier-Jack S, Mayhew SH, Mays N. Integrated care: learning between high-income, and low- and middle-income country health systems. Health Policy Plan. 2017;32(suppl_4):iv6-iv12. 10.1093/heapol/czx039
52. Dickson VV, Buck H, Riegel B. Multiple comorbid conditions challenge heart failure self-care by decreasing self-efficacy. Nurs Res. 2013;62(1):2-9. 10.1097/NNR.0b013e31827337b3
53. Sudore RL, Schillinger D. Interventions to Improve Care for Patients with Limited Health Literacy. J Clin Outcomes Manag. 2009;16(1):20-9.
54. Cipta DA, Andoko D, Theja A, Utama AVE, Hendrik H, William DG, et al. Culturally sensitive patient-centered healthcare: a focus on health behavior modification in low and middle-income nations-insights from Indonesia. Front Med (Lausanne). 2024;11:1353037. 10.3389/fmed.2024.1353037
55. Ryu S, Fan L. The Relationship Between Financial Worries and Psychological Distress Among U.S. Adults. Journal of Family and Economic Issues. 2023;44(1):16-33. 10.1007/s10834-022-09820-9
56. De Maria M, Ausili D, Lorini S, Vellone E, Riegel B, Matarese M. Patient Self-Care and Caregiver Contribution to Patient Self-Care of Chronic Conditions: What Is Dyadic and What It Is Not. Value Health. 2022;25(7):1165-73. 10.1016/j.jval.2022.01.007