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Patient empowerment outcomes in chronic disease care in Lebanon with validation of a measurement scale and associated determinants

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Chronic diseases are a major cause of morbidity and mortality in Lebanon, straining the healthcare system. Patient empowerment is recognized as a strategy to enhance self-management and outcomes. This study aimed to develop and validate a Patient Empowerment Outcomes (PEO) scale adapted to Lebanon and to examine associated factors. A cross-sectional survey was conducted with 640 adults with chronic conditions using structured face-to-face interviews. The questionnaire included sociodemographic and behavioral items, along with four validated tools: the focused Patient Assessment of Chronic Illness Care (fPACIC), General Practice Interpersonal Care (GPIC), Health Empowerment and Self-Management (HESM), and the new PEO scale. Higher PEO scores were significantly associated with older age (B = 0.102, $p = 0.002$), proactive behaviors (B = 5.486, $p = 0.001$), and higher GPIC (B = 0.319, $p < 0.0001$), HESM (B = 0.681, $p < 0.0001$), and fPACIC (B = 0.104, $p = 0.037$) scores. Negative associations included greater medication burden (B = −0.395, $p = 0.029$) and health fatalism (B = −1.406, $p = 0.008$). The PEO scale is a valid, culturally adapted tool to assess empowerment in Lebanese patients with chronic diseases. Findings highlight the role of communication, self-management, and informed decision-making in guiding patient-centered interventions and policies.

Keywords Chronic disease management, Healthcare strategies, Lebanon, Patient empowerment, Scale validation, Self-efficacy

Patient empowerment refers to the process by which individuals, and when appropriate those responsible for their care, gain greater control over their health decisions and actions[1]. It involves active participation in care, engagement in self-management practices, and informed decision making regarding treatments, medications,

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and lifestyle changes[2]. As a cornerstone of patient-centered care, empowerment emphasizes respect for patient's values, preferences, and autonomy, while promoting shared decision-making and collaborative partnerships between healthcare providers, patients, and caregivers, particularly in the management of chronic conditions[3]. By granting individuals greater responsibility and authority in their healthcare journey, empowerment enables decisions that align with personal values, health goals, and lived experiences[4,5].

The advantages of patient empowerment are well-documented across various healthcare settings. Empowered patients are shown to have improved self-efficacy[6,7], better adherence to treatment regimens[8], and enhanced quality of life[9]. They are more likely to adopt health-promoting behaviors such as regular exercise, healthy dietary practices, and appropriate medication use, which are crucial in managing chronic diseases[10]. Moreover, empowerment has been linked to greater patient satisfaction[11] and reduced healthcare costs[12], as individuals take proactive roles managing their health. From a patient-centered perspective, empowerment also serves as a meaningful outcome indicator of healthcare quality, guiding professionals toward more individualized, responsive, and effective care delivery[13].

According to the World Health Organization (WHO), non-communicable diseases (NCD) have become a significant global health burden, accounting for approximately 75% of all deaths worldwide[14]. This burden is particularly disproportionately higher in low- and middle-income countries (LMICs)[15], where healthcare systems are often constrained by limited resources and economic and political instability[16]. Chronic conditions such as cardiovascular disease, diabetes, cancer, and chronic respiratory conditions lead to high rates of morbidity and mortality[17], overwhelming healthcare infrastructures. For instance, despite efforts by the Ministry of Public Health to improve health system performance through hospital autonomy, accreditation, and initiatives to enhance access to quality care, Lebanon continues to face persistent challenges related to resource constraints, service fragmentation, and inequitable access to care, particularly for patients with chronic diseases[18].

In response to this global crisis, patient empowerment has emerged as a key patient-centered strategy for improving chronic disease outcomes[13]. The WHO strongly advocates for patient and caregiver involvement in the care process[4,19,20], and many healthcare models now incorporate empowerment as a core element[21]. Initially introduced within health promotion frameworks[20], empowerment is now recognized as crucial for individuals living with chronic diseases, enabling sustained self-management, informed decision-making, and greater autonomy. Such approaches not only improve individual outcomes, but also support healthcare system resilience, particularly in resource-limited settings[22,23].

Lebanon, with a population of around six million, is heavily impacted by chronic diseases, with a high prevalence of non-communicable diseases and associated risk factors among adults[24,25]. In 2018, the WHO reported that non-communicable diseases (NCDs) accounted for 91% of deaths, primarily from cardiovascular diseases, cancers, diabetes, and chronic respiratory illnesses[26]. Key risk factors, including household air pollution, physical inactivity, smoking, and obesity, have significantly contributed to the increasing rates of NCDs, putting immense pressure on the healthcare system[27].

Lebanon's prolonged political and economic instability has further compromised its healthcare system, significantly affecting the management of chronic diseases[28]. The ongoing financial crisis has led to widespread shortages of essential medications for outpatient and inpatient care, leaving many patients without access to the drugs they need to manage their conditions[29]. At the same time, the soaring costs of healthcare services have rendered even basic medical care unaffordable for many, further exacerbating the challenges faced by patients with chronic illnesses[30]. This awful scenario has made it increasingly difficult for individuals to receive consistent treatment, worsening health outcomes and putting further strain on an already fragile system[16].

While patient empowerment is globally recognized as crucial for patient-centered chronic disease management[21], its implementation and evaluation are notably lacking in LMICs like Lebanon. While high-income countries, particularly in Europe[31], have made significant progress in applying empowerment strategies, Lebanon's constrained healthcare system, affected by financial instability and limited resources, has hindered similar progress[16]. Research on patient empowerment in chronic disease management in Lebanon remains scarce, creating a critical gap in understanding how empowerment can improve health outcomes in this context. Additionally, the diversity of existing empowerment measurement instruments, each focusing on different aspects[32,33], complicates consistent assessment. Lebanon currently lacks validated, context-specific tools capable of capturing empowerment within its unique healthcare and socioeconomic environment.

Therefore, this study aims to develop and validate a patient empowerment outcomes scale that will be used to assess the level of empowerment and self-efficacy in managing chronic conditions in Lebanon. Furthermore, it seeks to investigate the impact of sociodemographic characteristics, health behaviors, and patient-centered empowerment on health outcomes. By providing a culturally relevant and validated assessment tool, this study will support future research and initiatives designed to strengthen patient-centered care and chronic disease management in Lebanon.

Materials and methods

Study design and participants

This study used a cross-sectional design conducted between May and June 2024. Data were gathered from 640 adult Lebanese patients with chronic diseases. Participants were recruited using a consecutive sampling approach, whereby all eligible patients presenting to participating community pharmacy sites during the study period were invited to participate. The survey instrument was created using Google Forms, and data collection was carried out by pharmacy student volunteers who were in their professional year of study and lived in various Lebanese governorates to reach potential participants in Beirut, Mount Lebanon, North, South, and Beqaa.

Eligible participants were adults aged 18 years or older, Lebanese nationals, with at least one self-reported chronic disease. Exclusion criteria included individuals without a diagnosed chronic condition, non-Lebanese

residents, individuals younger than 18 years, and those unable to provide informed consent or complete the questionnaire.

These volunteers were selected based on their desire to gain research experience and contribute to community health initiatives. They were recruited from the professional year pharmacy cohort at the Lebanese International University's School of Pharmacy. Before starting data collection, they went through a briefing session to ensure they were familiar with the study protocol, informed consent process, and the study's objectives. This session was followed by training in data collection techniques, ethical considerations, and effective patient communication.

Data collection

The data collection process involved face-to-face interviews conducted at community pharmacy sites, during which student volunteers gathered information by completing the electronic questionnaire. Each student volunteer was supervised on-site by their adjunct preceptor, a licensed pharmacist practicing at the community pharmacy, who ensured adherence to the study protocol and ethical standards during data collection. Volunteers ensured that participants understood the study's nature, purpose, and the right to withdraw at any time without penalty. Participants received no incentives and provided written informed consent before the study. A total of 725 eligible patients were approached during the data collection period. Of these, 640 agreed to participate and completed the questionnaire, corresponding to a response rate of 88.3%. The main reasons for refusal included lack of time and lack of interest in participation.

Ethical considerations

This study followed the ethical principles outlined in the Helsinki Declaration and was approved by the Ethics and Research Committee at the Lebanese International University School of Pharmacy (2024ERC-041-LIUSOP).

Survey tool

The survey questionnaire was composed of five sections and was available in Arabic, the native language of Lebanon. The questionnaire was carefully translated using the forward and backward techniques to ensure linguistic and cultural appropriateness. First, the questionnaire was translated from English into Arabic (forward translation). Then, a language expert, blind to the original English version, translated the Arabic version back into English (backward translation). The two English versions—original and back-translated—were then compared for discrepancies, and any differences between the translated and original English versions were discussed and resolved by consensus. This ensured that the Arabic version accurately reflected the content and intent of the original questionnaire while being culturally relevant and understandable for the Lebanese population.

The first section focused on the participants' sociodemographic characteristics, such as age, educational background, occupation, and income. It also inquired about their medical condition, health coverage, and source of retrieval of health-related information.

The second section explored participants' health-related behaviors and beliefs, encompassing general health practices, disease-specific behaviors, consumeristic behaviors, and beliefs related to health fatalism. Items in this section were initially identified through a targeted review of previously published instruments and empirical studies addressing health behaviors and beliefs in chronic disease populations. These questions were inspired from previous research[34]. An expert review was then conducted by the research team to assess content relevance, clarity, and cultural appropriateness for the Lebanese context. Based on this review, minor wording adjustments were made. Prior to full-scale data collection, the section was pilot-tested on a small group of adults with chronic diseases ($n \approx 20$) to evaluate comprehensibility, completion time, and face validity. Feedback from the pilot testing was used to refine item wording and structure before final administration.

The third part consisted of several validated measures. An expert panel composed of clinical pharmacy faculty members and public health researchers reviewed all adapted and selected items from validated instruments. The review focused on content relevance, conceptual consistency with the original scales, cultural appropriateness for the Lebanese context, and clarity of wording. Minor adaptations were made when necessary to ensure contextual suitability while preserving the original constructs measured by the validated tools.

The focused Patient Assessment of Chronic Illness Care (fPACIC) scale

The Patient Assessment of Chronic Illness Care (PACIC) scale, developed by Glasgow et al.[35], is a widely used tool designed to assess patient perceptions of chronic care management based on the Chronic Care Model (CCM). The PACIC scale, which was initially composed of 20 items across five domains—Patient Activation, Delivery System Design/Decision Support, Goal Setting/Tailoring, Problem-Solving/Contextual, and Follow-up/Coordination—evaluates the behavior of healthcare professionals and practice teams from the patient's perspective. Participants rate their experience using a 5-point Likert scale, with 1 representing "almost never" and 5 representing "almost always." Total scores range between 20 and 100, with higher scores indicating more frequent instances of effective chronic care delivery.

The PACIC scale was adapted to create the fPACIC, which includes ten items for this study's purposes. Specifically, we kept three items from the Patient Activation domain: Delivery System Design/Decision Support, Goal Setting/Tailoring, Problem-Solving/Contextual, and Follow-Up/Coordination. This fPACIC scale enabled a more focused assessment while capturing essential patient care elements in chronic illness management. The Cronbach's alpha of this scale was 0.912.

General practice interpersonal care (GPIC) scale

In this study, a GPIC scale was inspired by the General Practice Patient Survey (GPPS), a postal survey traditionally used to assess patient experiences in general practice[36]. To reduce respondent burden, only one component of the GPPS was used. The GP-interpersonal care scale comprised seven items, including "involving

you in decisions," "giving you enough time," and "listening to you." A 5-point rating system, ranging from "very poor" to "very good", was used to record the responses. These modifications reduced the questionnaire length to seven items while enabling a targeted evaluation of essential elements of the patient experience of general practice. The Cronbach's alpha of this scale was 0.949.

Health empowerment and self-management (HESM) scale
This study utilized the HESM scale to assess patients' abilities to comprehend and care for their health after seeing a doctor. The HESM highlights the patient's self-management capabilities and confidence in handling their condition. This scale was inspired by the Patient Enablement Instrument (PEI), which assesses a patient's perceived ability to manage life following a visit with a healthcare provider, maintain their health, and cope with their condition[37]. There are six items total, and each is rated on a 3-point scale from "same or less" to "much better", in addition to a "does not apply" option for items that are not pertinent to the patient. This instrument offers valuable information about how empowered and confident patients feel to manage their health after consultation. The Cronbach's alpha of this scale was 0.934.

Patient empowerment outcomes (PEO) scale
The Self-Efficacy in Long-Term Conditions Scale inspired the PEO scale, a comprehensive 33-item instrument measuring a person's confidence in performing various health-related activities[38]. Many shorter-scale versions have been created to speed up the assessment and focus on specific self-management behaviors. For this study, we focused on managing diseases in general to develop a 5-item version that assesses participants' confidence in managing their chronic condition. Each item is scored on a 10-point scale ranging from "not at all confident" to "confident". The scale is scored by averaging the responses of all five items, with higher scores indicating more significant empowerment outcomes and self-efficacy in managing the condition. The Cronbach's alpha of this scale was 0.875.

Sample size calculation

The minimum sample size was calculated using the Centers for Disease Control and Prevention CDC's Epi-Info for population surveys[39]. The population was 5.8 million, corresponding to Lebanon's[24]. The expected frequency was set at 52.4%, which represents the prevalence of chronic diseases in Lebanon[25]. As a result, a minimum sample of 383 patients was required to achieve a 95% confidence level and an acceptable margin of error of 5%. For the PEO validation, a participant-to-item ratio of 10:1 was maintained[40], requiring at least 50 participants to validate the scale. A larger sample size was targeted to allow for additional analyses and to account for any missing data.

Statistical analysis

The collected data were analyzed using the Statistical Package for Social Sciences (SPSS) software, version 26.0. For categorical variables in the descriptive analysis, frequency, and percentage were used, while mean and standard deviation were utilized for quantitative variables. The Cronbach's alpha was first calculated to confirm the scale reliability in the current sample.

Because the dependent variable was continuous, the Shapiro–Wilk test and Histogram analysis confirmed the variables' normal distribution. These conditions are consistent with normality in a sample size of more than 300.

A factor analysis using the principal component analysis (PCA) technique was conducted to validate the PEO subscale. The Kaiser–Meyer–Olkin (KMO) coefficient, Bartlett's test for sphericity, and the total percentage of variance explained were confirmed to be adequate. Factors with Eigenvalues higher than one were retained. For structural validity measures, Pearson correlation coefficients were calculated to assess the correlation of each item within the scale with the entire score of the scale. Cronbach's alpha values were also calculated to determine the scale's internal consistency and reliability.

In the bivariate analysis, the Student's T-test was used to compare the means of two groups. ANOVA was used to compare the means of three or more groups after checking for homogeneity of variances using Levene's test. The corrected T-test and Kruskal–Wallis test are applied if the variances are not homogeneous. Following ANOVA and Kruskal–Wallis significant testing, post-hoc analyses were performed with Bonferroni or Tukey HSD adjustments. A Pearson correlation coefficient was used to compare continuous variables. In all cases, a p-value of less than 0.05 was considered significant.

Subsequently, three multivariable linear regression models were constructed after verifying the residuals' normality, relationships' linearity, absence of multicollinearity, and homoscedasticity assumptions. The PEO was used as the dependent variable, and the "Enter" method was applied in all models.

- Model 1 included sociodemographic variables as independent variables.
- Model 2 incorporated the fPACIC, GPIC, and HESM scales as independent variables.
- Model 3 included the independent variables from Models 1 and 2 that showed significant *p*-values (≤ 0.05).

The beta coefficient, 95% confidence interval, and p-value were reported for each model. Independent variables with a *p*-value below 0.2 in the bivariate analysis were considered for inclusion in the models while ensuring that the maximum number of variables included did not exceed the limits set by the sample size. Sociodemographic and other relevant variables were added as appropriate.

Results

Sociodemographic characteristics

The study included 640 participants with a mean age of 43.93 years (SD ± 18.00). The majority were female (62.0%). Most participants resided in Beirut (30.3%). More than half of the respondents were married (56.1%) and had a university-level education (62.3%). Regarding employment, 51.4% were not working or retired. The most common household monthly income bracket was between $501 and $1000 (34.5%).

A large proportion of participants (76.7%) reported having chronic medical conditions, with an average of 3.01 ± 1.98 comorbidities. Additionally, 76.9% of participants stated they had easy access to healthcare, with 40.0% identifying as self-payers for their health coverage. The primary source of health-related information was chronic condition specialists (40.9%). The detailed sociodemographic characteristics of the participants are shown in Table 1.

Health-related behaviors and beliefs

Most participants (64.5%) reported that they sometimes or never followed a low-fat diet. Similarly, 69.8% indicated they did not exercise regularly, and 65.8% consumed fruits or vegetables three days per week or less. For disease-specific behaviors, 73.9% of participants stated that they did not regularly monitor their glucose levels, and 89.1% reported rarely performing arthritis-specific exercises. Regarding consumeristic behaviors, 90.9% agreed they researched healthcare providers' qualifications before consulting them. Shockingly, 71.4% of participants believed it was likely or very likely that they would develop a new or additional health condition requiring ongoing medical care in the next five years. Detailed health-related behaviors and beliefs of the participants are shown in Table 1.

Evaluation of patient-centered care and empowerment

The study assessed patient-centered care and empowerment using fPACIC, GPIC, and HESM scales. Table 2 provides a detailed assessment of the results from each scale, highlighting key aspects of patient experiences and perceived empowerment.

The mean total score for the fPACIC was 30.77 ± 8.33, with a Cronbach's alpha of 0.912, indicating high internal consistency. Participants reported moderate levels of patient-centered care, with lower scores observed in items related to receiving follow-up care and being referred to dietitians or health educators.

The GPIC scale revealed a mean total score of 26.64 ± 6.07 and a Cronbach's alpha of 0.949, reflecting excellent reliability. Participants rated their general practitioners highly, especially when asked about their symptoms and when taking their problems seriously.

The HESM scale showed a mean total score of 11.82 ± 3.34 with a Cronbach's alpha of 0.934, suggesting strong internal consistency. While participants felt relatively empowered in coping with their illness and understanding their health, confidence in maintaining their health remained comparatively lower.

Validation of the PEO scale

Factor analysis of the PEO scale

The factor analysis of the scale assessing patient empowerment outcomes revealed a single dominant factor with an Eigenvalue greater than one. This factor explained 66.995% of the total variance. No variables were over-correlated ($r \geq 0.8$), had low factor loadings (< 0.3), or had low communalities (< 0.3). The KMO measure of sampling adequacy was 0.873, and Bartlett's test of sphericity was highly significant ($p < 0.001$), indicating that the sampling of the variables was adequate. The PEO scale showed a mean total score of 31.950 ± 9.991.

Internal consistency and reliability

The PEO scale had a high Cronbach's alpha of 0.875, demonstrating excellent internal consistency. All items of the PEO showed significant Pearson correlation coefficients with the total scale, all with p-values < 0.001. Table 3 shows the factor analysis of the PEO scale and correlations of the items with the full scale.

Bivariate analysis

The bivariate analysis revealed significant associations between the PEO scale and various sociodemographic characteristics, health-related behaviors, and patient-centered care scales (Table 4). There was a significant association between PEO and education level ($p = 0.003$), as well as household monthly income ($p < 0.0001$). Ease of access to healthcare and primary sources of information were also significantly associated with PEO ($p < 0.0001$).

In terms of health-related behaviors, significant associations were found between PEO and following a low-fat diet ($p = 0.003$), consuming fruits or vegetables at least four days per week ($p < 0.0001$), and adherence to a low-fat diet for managing high cholesterol ($p = 0.006$).

For consumeristic behaviors, PEO was significantly associated with researching healthcare providers' qualifications ($p < 0.0001$), persisting in asking for explanations ($p < 0.0001$), and awareness of medical guidelines ($p < 0.0001$). A significant negative association was observed between health fatalism and PEO ($p < 0.0001$).

Additionally, the number of comorbidities was negatively associated with PEO ($p = 0.003$). Positive associations were found between PEO and scores on the fPACIC ($p < 0.001$), GPIC ($p < 0.001$), and HESM ($p < 0.001$) scales.

Multivariable analysis

Three multivariable linear regression models were conducted to assess the association between PEO as a dependent variable and sociodemographic factors, health-related behaviors, and patient-reported measures as independent variables, respectively while adjusting for potential confounders. The full results of the analysis are available in Table 5.

Variable	N (%)	Mean ± SD Min—Max
Age (years)		43.93 ± 18.00 18–87
Gender		
Male	243 (38.0)	
Female	397 (62.0)	
Household crowding index		4.47 ± 1.747
Area of residence		
Beirut	194 (30.3)	
Beqaa	68 (10.6)	
Mount Lebanon	90 (14.1)	
North	159 (24.8)	
South	129 (20.2)	
Marital status		
Single/Divorced/Widowed	281 (43.9)	
Married	359 (56.1)	
Education level		
No formal education	42 (6.6)	
School level	199 (31.1)	
University level	399 (62.3)	
Occupation		
I do not work/Retired	329 (51.4)	
Employed/Self-employed	311 (48.6)	
Household monthly income		
Less than 500$	204 (31.9)	
501$–1000$	221 (34.5)	
1001$–2000$	131 (20.5)	
More than 2000$	84 (13.1)	
Current health status perception		
No sickness	149 (23.3)	
Chronic medical conditions	491 (76.7)	
Number of comorbidities		3.01 ± 1.98
Number of prescribed medications		2.86 ± 2.542
Easy access to healthcare		
No	148 (23.1)	
Yes	492 (76.9)	
Health Coverage*		
Private insurance	177 (27.7)	
National Social Security Fund	167 (26.1)	
Ministry of Public Health	55 (8.6)	
Self-payer	256 (40.0)	
Public insurance (Army, COOP, Internal Security Forces)	95 (14.8)	
Other insurance	40 (6.3)	
Retrieval source of health-related information*		
Community Pharmacist	483 (75.5)	
General Practitioner	482 (75.3)	
Chronic Condition Specialist	444 (69.4)	
TV/Radio/Magazine/Newsletter	140 (21.9)	
Internet/Social Media	269 (42.0)	
The primary source of information		
Community Pharmacist	135 (21.1)	
General Practitioner	186 (29.1)	
Chronic Condition Specialist	262 (40.9)	
TV/Radio/Magazine/Newsletter/Internet/Social Media	57 (8.9)	
Participants' health-related behaviors and beliefs: General Preventive Behaviors		
Following a low-fat diet		
Sometimes or never	413 (64.5)	
Continued		

Variable	N (%)	Mean ± SD Min—Max
Always or almost always	227 (35.5)	
Following a regular exercise schedule		
No	447 (69.8)	
Yes	193 (30.2)	
Consumption of five servings of fruits or vegetables per day		
Three days per week or less	421 (65.8)	
At least four days per week	219 (34.2)	
Participants' health-related behaviors and beliefs: Disease-Specific Behaviors		
Diabetes: Recording glucose level		
Sometimes or never	473 (73.9)	
Always or almost always	167 (26.1)	
Arthritis: Performing arthritis exercise		
Sometimes or never	570 (89.1)	
Always or almost always	70 (10.9)	
High cholesterol: Following a low-fat diet		
Sometimes or never	427 (66.7)	
Always or almost always	213 (33.3)	
Participants' health-related behaviors and beliefs: Consumeristic Behaviors		
Before I visit a new healthcare provider, I research their qualifications		
Disagree or strongly disagree	47 (9.1)	
Agree or strongly agree	472 (90.9)	
When I do not understand something, I persist in asking my healthcare provider to explain it until I know it		
Disagree or strongly disagree	49 (9.5)	
Agree or strongly agree	465 (90.5)	
As far as I know, medical science has developed guidelines for treating my condition		
Disagree or strongly disagree	40 (7.9)	
Agree or strongly agree	467 (92.1)	
Participants' health-related behaviors and beliefs: Health Fatalism		
In the next 5 years, how likely to develop a new or additional health condition that requires ongoing medical care		
Unlikely or very unlikely	183 (28.6)	
Very likely or likely	457 (71.4)	

Table 1. Sociodemographic characteristics of the participants (N = 640). * Some respondents selected more than one answer. SD, standard deviation; min, minimum; max, maximum; COOP, Association of Consumption Production in Lebanon.

The first model used sociodemographic factors and health-related behaviors to predict the PEO score. Age was positively associated with PEO (B = 0.102, $p = 0.002$), indicating that older individuals had higher empowerment scores. The number of prescribed medications was inversely related to PEO (B = −0.577, $p = 0.010$), suggesting that taking more medications was associated with lower empowerment. Regarding sources of health information, obtaining information from a general practitioner (B = −2.856, $p = 0.006$) or media sources such as TV, radio, or social media (B = −5.173, $p = 0.002$) was negatively associated with empowerment, compared to those receiving information from a chronic condition specialist. Additionally, consuming five servings of fruits or vegetables at least four days per week was positively linked with empowerment (B = 2.234, $p = 0.013$). Those who sought information about their healthcare provider's qualifications before visiting (B = 5.133, $p = 0.010$) and individuals aware of medical guidelines for their condition (B = 8.564, $p = 0.001$) had significantly higher PEO scores. Health fatalism, measured by the likelihood of developing a new health condition, was negatively associated with empowerment (B = −3.240, $p = 0.001$).

In the second model, the independent variables included in the multivariable linear regression were the fPACIC, GPIC, and HESM, while the PEO score remained a dependent variable. All three measures were positively associated with patient empowerment. The HESM score showed a significant positive association with PEO (B = 0.807, $p < 0.0001$), as did the GPIC score (B = 0.547, $p < 0.0001$). Additionally, the fPACIC score demonstrated a significant positive relationship with PEO (B = 0.104, $p = 0.037$).

The third model combined significant variables from Models 1 and 2 to assess their joint effect on PEO. Both the number of prescribed medications remained negatively associated with PEO (B = −0.395, $p = 0.029$), as well as health fatalism retained its negative association (B = −1.406, $p = 0.008$). Among consumeristic behaviors, individuals who researched healthcare provider qualifications before their visits (B = 5.486, $p = 0.001$) and those who were aware of treatment guidelines for their condition (B = 6.550, $p = 0.002$) had significantly higher

fPACIC Scale	
When I received care for my chronic condition over the past six months, I was…	**Mean ± SD**
Asked for my ideas when we made a treatment plan	2.85 ± 1.07
Given choices about treatment to think about	2.89 ± 1.08
I asked to talk about any problems with my medicines or their effects	3.25 ± 1.10
Given a written list of things I should do to improve my health	3.21 ± 1.13
Shown how what I did to take care of myself influenced my condition	3.25 ± 1.09
Helped to set specific goals to improve my condition as well as my eating and/or exercise	3.31 ± 1.10
Given a copy of my treatment plan	3.16 ± 1.13
Sure that my doctor or nurse thought about my values, beliefs, and traditions when they recommended treatments to me	3.22 ± 1.10
Contacted after a visit to see how things were going	2.78 ± 1.19
Referred to a dietitian, health educator, or counselor	2.85 ± 1.17
Total score of fPACIC	30.77 ± 8.33
Cronbach alpha = 0.912	
GPIC Scale	
The last time you saw a doctor, how good was the doctor at each of the following?	**Mean ± SD**
Doctor gave you enough time	3.83 ± 1.01
Doctor asked about your symptoms	3.89 ± 0.94
Doctor listened to you	3.85 ± 0.97
Doctor explained tests and treatments	3.72 ± 1.04
Doctor involved you in decisions about your care	3.62 ± 1.06
Doctor treated you with care and concern	3.85 ± 0.95
Doctor took your problems seriously	3.87 ± 0.97
Total Score of GPIC	26.64 ± 6.07
Cronbach alpha = 0.949	
HESM Scale	**Mean ± SD**
Feeling after Doctor Visit: Able to cope with life	1.92 ± 0.65
Feeling after Doctor Visit: Able to understand your illness	1.96 ± 0.66
Feeling after Doctor Visit: Able to cope with your illness	1.96 ± 0.64
Feeling after Doctor Visit: Able to keep yourself healthy	1.94 ± 0.65
Feeling after Doctor Visit: Confident about your health	1.88 ± 0.66
Feeling after Doctor Visit: Able to help yourself	1.97 ± 0.65
Total Score of HESM	11.82 ± 3.34
Cronbach alpha = 0.934	

Table 2. Evaluation of patient-centered care and empowerment using the fPACIC, GPIC, and HESM Scales. fPACIC, focused Patient Assessment of Chronic Illness Care; GPIC, General Practice Interpersonal Care; HESM, Health Empowerment and Self-Management.

Factor	Mean ± SD	Factor 1	Pearson Correlation coefficient of items with total	*P*-value
Do all the things necessary to manage your condition regularly	6.36 ± 2.445	0.815	0.813	< 0.001
Judge when the changes in your illness mean you should visit a doctor	6.69 ± 2.294	0.819	0.811	< 0.001
Do the different tasks and activities needed to manage your health condition to reduce your need to see a doctor	6.44 ± 2.397	0.868	0.862	< 0.001
Reduce the emotional distress caused by your health condition so that it does not affect your everyday life	6.06 ± 2.629	0.781	0.795	< 0.001
Do things other than just taking medication to reduce how much your illness affects your everyday life	6.40 ± 2.457	0.808	0.810	< 0.001
Total Score of PEO	31.950 ± 9.991			
Percentage variance explained = 66.995%				
Cronbach alpha = 0.875				
KMO = 0.873				
Bartlett's test of sphericity $p < 0.001$				

Table 3. Factor analysis of the assessment of the PEO scale and correlations of the items with the full-scale. KMO, Kaiser–Meyer–Olkin Measure; PEO, Patient Empowerment Outcomes; SD, standard deviation.

Variable	Mean ± SD
Gender	
Male	32.41 ± 9.58
Female	31.67 ± 10.24
P-value	0.365
Area of residence	
Beirut	32.12 ± 11.03
Beqaa	31.60 ± 9.27
Mount Lebanon	33.33 ± 8.79
North	30.86 ± 10.10
South	32.26 ± 9.34
P-value	0.495
Marital status	
Single/Divorced/Widowed	31.55 ± 10.59
Married	32.26 ± 9.50
P-value	0.368
Education level	
No formal education	27.86 ± 9.42
School level	31.06 ± 10.81
University level	32.82 ± 9.49
P-value	**0.003**[a]
Occupation	
I do not work/Retired	31.36 ± 10.14
Employed/Self-employed	32.58 ± 9.81
P-value	**0.124**
Household monthly income	
Less than 500$	29.50 ± 10.18
501$—1000$	33.14 ± 9.89
1001$—2000$	32.53 ± 9.60
More than 2000$	33.88 ± 9.42
P-value	< **0.0001**[b]
Current health status perception	
No sickness	31.23 ± 10.35
Chronic medical conditions	32.17 ± 9.88
P-value	0.319
Easy access to healthcare	
No	37.39 ± 9.61
Yes	33.32 ± 9.70
P-value	< **0.0001**
Health coverage[¥]	
Private insurance	31.89 ± 10.56
P-value	0.93
National Social Security Fund	32.49 ± 9.49
P-value	0.416
Ministry of Public Health	31.16 ± 10.07
P-value	0.542
Self-payer	32.69 ± 9.54
P-value	**0.125**
Public insurance (Army, COOP, Internal Security Forces)	33.07 ± 9.81
P-value	0.235
Other insurance	30.15 ± 12.54
P-value	0.35
Primary source of information	
Community Pharmacist	31.33 ± 9.29
General Practitioner	31.19 ± 9.37
Chronic Condition Specialist	33.77 ± 9.91
TV/Radio/Magazine/Newsletter/Internet/Social Media	27.53 ± 12.13
Continued	

Variable	Mean ± SD
P-value	**< 0.0001**[c]
General Preventive Behaviors: Following a low-fat diet	
Sometimes or never	31.09 ± 9.91
Always or almost always	33.51 ± 9.97
P-value	**0.003**
General Preventive Behaviors: Following a regular exercise schedule	
No	31.53 ± 9.28
Yes	32.92 ± 11.44
P-value	**0.137**
General Preventive Behaviors: Consumption of five servings of fruits or vegetables per day	
Three days per week or less	30.54 ± 9.77
At least four days per week	34.65 ± 9.88
P-value	**< 0.0001**
Disease-Specific Behaviors: Diabetes: Recording glucose level	
Sometimes or never	31.54 ± 10.35
Always or almost always	33.10 ± 8.83
P-value	**0.062**
Disease-Specific Behaviors: Arthritis: Performing arthritis exercise	
Sometimes or never	32.01 ± 9.67
Always or almost always	31.50 ± 12.38
P-value	0.743
Disease-Specific Behaviors: High cholesterol: Following a low-fat diet	
Sometimes or never	31.19 ± 9.98
Always or almost always	33.47 ± 9.86
P-value	**0.006**
Consumeristic Behaviors: Before I go to a new healthcare provider, I find out as much as I can about their qualifications	
Disagree or strongly disagree	23.66 ± 10.11
Agree or strongly agree	33.97 ± 9.29
P-value	**< 0.0001**
Consumeristic Behaviors: When I do not understand, I am persistent in asking my healthcare provider to explain something until I know it	
Disagree or strongly disagree	25.41 ± 9.87
Agree or strongly agree	33.86 ± 9.44
P-value	**< 0.0001**
Consumeristic Behaviors: As far as I know, medical science has developed guidelines for treating my condition	
Disagree or strongly disagree	22.75 ± 10.30
Agree or strongly agree	34.11 ± 8.97
P-value	**< 0.0001**
Health Fatalism: In the next 5 years, how likely to develop a new or additional health condition that requires ongoing medical care	
Unlikely or very unlikely	34.79 ± 9.68
Very likely or likely	30.81 ± 9.90
P-value	**< 0.0001**
Variable	**Correlation coefficient**
Age (in years)	0.057
P-value	**0.152**
Household crowding index	− 0.024
P-value	0.546
Number of comorbidities	− 0.116
P-value	**0.003**
Number of prescribed medications	− 0.064
P-value	**0.108**
fPACIC Score	0.381**
P-value	**< 0.001**
GPIC Score	0.480**
Continued	

Variable	Mean ± SD
P-value	**< 0.001**
HESM Score	0.450**
P-value	**< 0.001**

Table 4. Bivariate analysis of the PEO scale total score with the sociodemographic characteristics, health-related behaviors, and patient-centered care scales. Bolded *p*-values correspond to variables with $p < 0.20$ in the bivariate analysis that were subsequently included in the multivariable linear regression models SD, standard deviation; COOP, Association of Consumption Production in Lebanon; fPACIC, focused Patient Assessment of Chronic Illness Care; GPIC, General Practice Interpersonal Care; HESM, Health Empowerment and Self-Management ¥ some respondents selected more than one answer [a] Post hoc analysis showed significant difference between no formal education and university-level education ($P = 0.006$) [b] Post hoc analysis showed significant difference between less than 500$ and 501–1000$ ($P = 0.001$), less than 500$ and 1001–2000$ ($P = 0.032$), and between less than 500$ and > 2000$ ($P = 0.004$) [c] Post hoc analysis showed a significant difference between chronic condition specialists and general practitioners ($P = 0.039$) and between chronic condition specialists and TV/ Radio/ Magazine/ Newsletter/ Internet/ Social Media ($P < 0.0001$)

empowerment scores. Of the patient-reported scores, the GPIC (B = 0.319, $p < 0.0001$) and HESM (B = 0.681, $p < 0.0001$) remained strong positive predictors of empowerment.

Discussion

This study aimed to develop and validate a patient empowerment outcomes scale to assess empowerment and self-efficacy in managing chronic medical conditions. Using cross-sectional data from Lebanon, we first conducted exploratory factor analysis to identify the underlying structure of the scale, followed by reliability assessment. After confirming acceptable psychometric properties, we applied the scale to examine how key sociodemographic and health-related behaviors and patient-reported measures were associated with empowerment levels, ultimately aiming to inform chronic disease management strategies. In doing so, the study addresses an important gap in the literature by providing a context-specific, validated tool to measure patient empowerment in a low- and middle-income country setting where such instruments are scarce.

Factors influencing enhanced patient empowerment

The multivariable analysis revealed that age positively correlates with patient empowerment, as older people report higher empowerment levels. This can be attributed to their years of experience managing chronic conditions, developing self-management skills, and improving psychological stability and confidence in healthcare navigation[41,42]. Social engagement and support systems (family, friends, and healthcare providers) empower them even more by promoting a sense of belonging, autonomy, and alignment with personal goals, ultimately improving health outcomes and quality of life[43]. These findings highlight potential challenges for younger patients in developing empowerment skills, emphasizing the need for targeted interventions for this demographic. This finding highlights a practice gap in early empowerment support for younger patients with chronic diseases, suggesting the need for age-tailored empowerment and self-management programs.

Conversely, the study findings showed a negative association between the number of prescribed medications and patient empowerment, with patients who take more medications reporting lower empowerment scores. This is consistent with other research, which indicates that the complexity and burden of managing multiple medications can lead to feelings of dependency and loss of control over one's health[8]. Polypharmacy's challenges often increase the risk of adverse drug events, nonadherence, and treatment dissatisfaction[44], as patients may struggle to understand the purpose of each medication, increasing the perceived burden of both disease and therapy[45]. As a result, as the number of medications increases, so do the risks of side effects and complications, emphasizing the importance of healthcare providers addressing polypharmacy implications and incorporating shared decision-making to improve patient empowerment[46]. This finding addresses a key clinical gap by underscoring the importance of medication optimization strategies, including pharmacist-led medication reviews and deprescribing initiatives, as practical solutions to enhance empowerment.

The sources of health information have been shown to predict empowerment levels significantly. Notably, compared to patients who received information from chronic condition specialists, patients who got information from general practitioners or media outlets like TV, radio, or social media reported lower empowerment scores. This suggests that receiving condition-specific guidance from specialized experts is essential as patients feel more empowered when supported by those with extensive knowledge of their chronic conditions. In line with previous research, greater patient empowerment and involvement in healthcare decision-making are linked to having access to trustworthy and dependable health information[47]. Furthermore, patients who see their healthcare providers as valuable information sources report feeling more capable of participating in collaborative decision-making[48]. On the other hand, depending on non-specialized or general media sources could lead to misunderstandings or misinformation, which may reduce patients' trust in their ability to manage their health[49]. Therefore, to increase empowerment and improve health outcomes, it is crucial to establish closer relationships between patients and specialized healthcare providers. This result points to a gap in the consistency and quality of patient education in routine care and supports strengthening specialist–primary care collaboration and reliable information pathways.

	Unstandardized Beta	Standardized Beta	*P*-value	95.0% Confidence Interval	
				Lower	Upper
Model 1: Taking the PEO score as the dependent variable and the sociodemographic and health-related behaviors as the independent variables					
Age (in years)	0.102	0.189	**0.002**	0.039	0.166
Education: School education vs no formal education*	0.542	0.027	0.800	−3.660	4.744
Education: University education vs no formal education*	1.939	0.098	0.371	−2.314	6.192
Occupation: Employed/Self-employed vs I do not work/Retired*	0.979	0.052	0.261	−0.733	2.690
Income: 501-1000 vs less than 500$*	1.146	0.058	0.294	−0.999	3.291
Income: 1001-2000 vs less than 500$*	0.753	0.034	0.538	−1.649	3.156
Income: more than 2000$ vs less than 500$*	−0.915	−0.032	0.543	−3.871	2.040
Number of comorbidities	−0.536	−0.104	0.064	−1.105	0.032
Number of prescribed medications	−0.577	−0.158	**0.010**	−1.018	−0.136
Easy access to healthcare: yes vs no*	1.793	0.071	0.133	−0.549	4.136
Health Coverage: Self-payer: yes vs no*	1.582	0.082	0.072	−0.141	3.305
Primary source of information: Community pharmacist vs chronic condition specialist*	0.089	0.004	0.940	−2.245	2.422
Primary source of information: General practitioner vs chronic condition specialist*	−2.856	−0.132	**0.006**	−4.907	−0.805
Primary source of information: TV/Radio/Magazine/Newsletter/Internet/Social Media vs chronic condition specialist*	−5.173	−0.149	**0.002**	−8.468	−1.879
General preventive Behavior: Following a low-fat diet: Always or almost always vs Sometimes or never	1.775	0.091	0.139	−0.580	4.130
General Preventive Behaviors: Following a regular exercise schedule: yes vs no*	0.884	0.043	0.375	−1.072	2.841
General Preventive Behaviors: Consumption of five servings of fruits or vegetables per day: At least four days per week vs Three days per week or less*	2.234	0.115	**0.013**	0.467	4.001
Disease Specific Behavior: Diabetes: Recording glucose level: Always or almost always vs Sometimes or never*	1.737	0.082	0.102	−0.348	3.822
Disease-Specific Behavior: High cholesterol: Following a low-fat diet: Always or almost always vs. Sometimes or never*	0.982	0.050	0.417	−1.397	3.360
Consumeristic Behaviors: Before I go to a new healthcare provider, I find out as much as I can about their qualifications: Agree or strongly agree vs. Disagree or strongly disagree*	5.133	0.140	**0.010**	1.236	9.029
Consumeristic Behaviors: When I do not understand, I am persistent in asking my health care provider to explain something until I know it: Agree or strongly agree vs. Disagree or strongly disagree*	3.613	0.092	0.089	−0.549	7.775
Consumeristic Behaviors: As far as I know, medical science has developed guidelines for treating my condition: Agree or strongly agree vs. Disagree or strongly disagree*	8.564	0.196	**0.001**	3.731	13.396
Health Fatalism: In the next 5 years, how likely develop a new or additional health condition that requires ongoing medical care: Very likely or likely vs Unlikely or very unlikely*	−3.240	−0.155	**0.001**	−5.123	−1.357
Model 2: Taking the PEO score as the dependent variable and the fPACIC, GPIC, and HESM scores as the independent variables					
fPACIC Score	0.104	0.087	**0.037**	0.006	0.202
GPIC Score	0.547	0.329	**< 0.0001**	0.406	0.688
HESM Score	0.807	0.283	**< 0.0001**	0.587	1.026
Model 3: Taking the PEO score as the dependent variable and the significant variables from models 1 and 2 as the independent variables					
Age (in years)	0.034	0.066	0.198	−0.018	0.086
Number of prescribed medications	−0.395	−0.110	**0.029**	−0.750	−0.041
Primary source of information: General practitioner vs chronic condition specialist*	−1.609	−0.079	0.061	−3.293	0.074
Primary source of information: TV/Radio/Magazine/Newsletter/Internet/Social Media vs chronic condition specialist*	−1.678	−0.050	0.250	−4.544	1.187
General Preventive Behaviors: Consumption of five servings of fruits or vegetables per day: At least four days per week vs Three days per week or less*	1.314	0.070	0.098	−0.246	2.874
Consumeristic Behaviors: Before I go to a new healthcare provider, I find out as much as I can about their qualifications: Agree or strongly agree vs. Disagree or strongly disagree*	5.486	0.159	**0.001**	2.188	8.785
Consumeristic Behaviors: As far as I know, medical science has developed guidelines for treating my condition: Agree or strongly agree vs. Disagree or strongly disagree*	6.550	0.160	**0.002**	2.420	10.681
Health Fatalism: In the next 5 years, how likely develop a new or additional health condition that requires ongoing medical care: Very likely or likely vs Unlikely or very unlikely*	−1.406	−0.113	**0.008**	−2.447	−0.366
fPACIC Score	0.059	0.053	0.286	−0.049	0.166
GPIC Score	0.319	0.190	**< 0.0001**	0.143	0.494
HESM Score	0.681	0.245	**< 0.0001**	0.429	0.933

Table 5. Multivariable linear regression of the PEO scale as the dependent variable, with sociodemographic factors, health-related behaviors, and patient-reported measures as independent variables across three models. *Reference group fPACIC, focused Patient Assessment of Chronic Illness Care; GPIC, General Practice Interpersonal Care; HESM, Health Empowerment and Self-Management; PEO, Patient Empowerment Outcomes

Health-related behaviors, particularly dietary habits, were significant contributors to patient empowerment. Our results support the idea that healthy behaviors can help people feel in control of their health by demonstrating a positive correlation between empowerment and eating five servings of fruits or vegetables at least four days a week. According to similar research, people who follow healthier eating habits report higher self-efficacy and empowerment because they feel more in control of their health[50]. Furthermore, it has been demonstrated that healthy eating interventions increase motivation and knowledge about dietary choices, further increasing empowerment[51]. This relationship between nutritional habits and empowerment emphasizes the importance of providing patients with resources to help them adopt healthier lifestyles, as informed dietary choices can improve health outcomes and give them more control over their well-being[52,53]. These findings suggest that empowerment-based lifestyle interventions may yield sustainable long-term benefits in chronic disease control.

Consumeristic behaviors were also associated with increased empowerment, as patients who researched healthcare provider qualifications or were familiar with treatment guidelines for their conditions reported significantly higher empowerment scores. This aligns with findings from Jiang et al., which suggest that proactive information-seeking improves patients' understanding and control over their care, lowering anxiety and boosting confidence[49]. Our findings align with Hibbard's study, which underscores the role of patient activation in fostering empowerment; this connection reinforces that active engagement in health management enhances empowerment and informed decision-making, ultimately contributing to improved health outcomes[34].

In this study, health fatalism was found to be negatively associated with patient empowerment, as people who believed they were likely to develop new or additional health problems had lower empowerment scores. This is consistent with Hibbard et al.'s framework for patient activation, which proposes that fatalistic attitudes reduce patients' sense of control, resulting in lower activation and empowerment[34]. Similarly, Salazar-Collier et al. discovered that higher fatalistic beliefs among Mexican–American adults have been linked with lower proactive health behaviors and self-management[54]. These findings suggest that health fatalism promotes helplessness, making people believe that their health circumstances are beyond their control. Addressing fatalism through educational interventions and enhanced patient-provider communication may increase empowerment and promote active health management.

Lastly, patient-reported care quality and empowerment measures also influenced empowerment scores, whereby the fPACIC, GPIC, and HESM scales were positive predictors of empowerment. These findings underscore the importance of patient-provider communication and self-management support in fostering a sense of empowerment among patients. This supports the broader gap identified in the literature regarding the role of care quality and provider communication as modifiable drivers of empowerment.

The fPACIC scale was inspired by Glasgow et al.'s PACIC scale, which was developed to assess the implementation of the chronic care model from the patient's perspective[35]. The positive relationship between fPACIC scores and patient empowerment suggests that when healthcare providers involve patients in goal setting, decision support, and consistent follow-ups, patients gain more self-efficacy and control over their health management. Several studies have found that higher PACIC scores are associated with better self-management and patient engagement in chronic care, particularly diabetes[55–57]. This reinforces the idea that structured chronic care strategies improve patient outcomes and empower patients to take charge of their health.

Similarly, the correlation between empowerment and GPIC scores emphasizes the critical role of patient-provider relationships in fostering empowerment. Patients who feel supported, heard, and included in decision-making by their medical providers report higher levels of empowerment. Patient engagement is increased when there is trust and attentiveness between the patient and the provider. This encourages patients to ask questions and take an active role in managing their health[58]. According to these results, increasing patients' confidence and willingness to participate in their care requires solid, supportive relationships, which implies that patient empowerment extends beyond simply giving them information and resources[59,60].

The HESM scale used in this study, inspired by the PEI scale, showed positive associations with patient empowerment results. Higher PEI scores are associated with increased patient empowerment, highlighting the role of effective communication and supportive provider relationships in fostering patient self-efficacy and engagement[61]. Similarly, in our study, patients with higher HESM scores reported greater empowerment, consistent with evidence that better enablement can lead to better health outcomes and encourage patients to manage their chronic conditions actively[62,63].

Practical implications

This study offers relevant insights for public health efforts in Lebanon, particularly in supporting patients with chronic illnesses. By identifying factors that influence empowerment, the findings can help shape more focused interventions that promote patient-centered care, strengthen the relationship between patients and healthcare providers, and encourage active participation in managing long-term conditions. Over time, such interventions may improve treatment adherence, reduce complications, and decrease healthcare utilization, contributing to more sustainable chronic disease outcomes.

The validated PEO scale provides a practical means to identify patients at risk of low empowerment and to monitor the effectiveness of empowerment-focused interventions longitudinally. From an academic perspective, integrating topics related to patient empowerment and self-care into medical, nursing, and pharmacy curricula is important. Continuing education programs can also play a role in equipping healthcare professionals with effective communication skills and strategies to engage patients more meaningfully.

In addition, fostering collaboration among healthcare providers—such as physicians, pharmacists, and nurses—can help ensure more coordinated and consistent care, which in turn reinforces patient support. Open communication within the healthcare team is essential for delivering unified and holistic care. Finally, professional associations and regulatory bodies have a critical role in this process. By developing clear guidelines and supporting initiatives that promote patient-centered care and self-management, they can help build a more

empowerment-focused healthcare system. At the national level, the PEO scale can support policymakers by providing standardized data to inform chronic disease strategies, evaluate patient-centered reforms, and guide resource allocation. Incorporating empowerment measurement into national health programs may strengthen evidence-based policy development in Lebanon.

Strengths and limitations

One of this study's main strengths is its thorough approach to assessing patient empowerment across several aspects pertinent to managing chronic diseases. Furthermore, the large and varied sample size from different parts of Lebanon improves generalizability and lessens selection bias associated with socioeconomic diversity.

Several limitations are identified in this study. First, the absence of a standardized measure to evaluate criterion validity for patient empowerment in Lebanon prevents the calculation of sensitivity and specificity for empowerment outcomes. Second, while the use of consecutive sampling at community pharmacy sites may limit representativeness to pharmacy-attending populations, this approach enhanced transparency by allowing calculation of response rates. The reliance on self-reported questionnaires poses a risk of information bias; however, this was partially addressed by employing culturally appropriate, simple Arabic language tools that were validated in the pilot phase. Additionally, student volunteers assisted many participants who had difficulty completing the questionnaires independently. Finally, the cross-sectional design limits the ability to establish causality and temporality regarding the identified predictors of empowerment. Future prospective studies may provide further insights.

Conclusion

The development and validation of the PEO scale represent a significant advancement in assessing empowerment levels among patients with chronic diseases in Lebanon, a region where such tools have been previously lacking. This study contributes to understanding patient empowerment in chronic disease management within Lebanon's healthcare context, particularly in light of the ongoing political and economic crises affecting healthcare access. Findings emphasize the role of tailored patient-centered interventions in improving empowerment and highlight the need for policies fostering strong patient-provider relationships and accessible health information. These strategies are essential to empower patients to manage their health effectively, enhancing overall health outcomes in Lebanon.

Data availability

The datasets generated and/or analyzed during the current study are available from the corresponding author upon reasonable request.

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Author contributions
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Declarations

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Consent to participate
Informed written consent was obtained from all individual participants included in the study.

Additional information
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