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ORIGINAL RESEARCH

Predictors of Self-Care Self-Efficacy in Adults Familiar with Palliative Care: The Role of Patient-Centered Communication, Health, and Well-Being

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Background: Understanding the determinants of self-care self-efficacy (SS) is essential to improving health outcomes in patients facing advanced disease. This study contributes to the field by examining the direct and indirect effects of quality of care (QC), patient-centered communication (PCC), perceived health (PH), and emotional well-being (EW) on SS in American adults with knowledge of palliative care.

Methods: A predictive-crossover design study was conducted. Data from N = 1154 adult respondents to the 2018 Health Information National Trends Survey (HINTS) 5, cycle 2 were used. Structural Equation Modeling (SEM) was used to report the direct and indirect effects for the proposed mediation model.

Results: QC had a strong, significant association with PCC (β =0.930, p <0.001). PCC was significantly associated with PH (β =0.104, p <0.01) and EW (β =0.098, p <0.01), but not directly with SS (β =0.030, p >0.05). SS was significantly predicted by PH (β =0.659, p <0.001) and EW (β =0.178, p <0.001). Indirect effects of PCC on SS via PH and EW were confirmed.

Conclusion: These findings highlight the importance of promoting perceived health and emotional well-being as key mechanisms by which care quality and communication impact self-efficacy. This study underscores the need to prioritize patient perceptions in palliative care interventions aimed at enhancing self-care capacity.

Keywords: palliative care, self-care, quality of health care, self-efficacy, health status, patient-centered care

Introduction

Self-efficacy, a concept derived from Bandura´s social learning theory, refers to a person´s confidence in their ability to achieve desired outcomes after performing a behavior.[1] This belief is dependent on the context where it occurs and is domain-specific; in other words, a person can be very confident in a particular scenario but have low self-confidence in others.[2] In the context of healthcare, this issue is especially important, as self-efficacy has been widely studied and is a common component of interventions to foster adherence and self-care.[3–5] Self-efficacy promotes motivation and the ability to engage in self-care behaviors through a series of dynamic, ongoing processes that include personal cognitive and affective factors (such as beliefs and self-efficacy) and environmental factors (such as social support).[6]

Patients´ active involvement in their health care has become more relevant, particularly due to a shift away from paternalistic relationships in healthcare and towards an emphasis on self-management.[3] Self-care is currently defined as the ability of individuals, families, and communities to prevent and manage disease and maintain and promote health.[7] Optimal self-care positively impacts overall health and physical and emotional stability, reducing the burden on healthcare utilization; on the contrary, inadequate self-care behaviors are associated with poor patient outcomes when facing chronic

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illness.[8] However, despite the potential benefits, self-care interventions have shown only modest effectiveness in improving outcomes,[9] highlighting the need to identify modifiable psychological determinants such as self-efficacy.[10]

Building upon Bandura's Social Cognitive Theory (SCT), Lev and Owen (1996) introduced the construct of self-care self-efficacy (SS), defined as an individual's confidence in being able to perform essential self-care behaviors in a particular situation.[11] This concept operationalizes Bandura's idea of perceived self-efficacy within a health-specific context, emphasizing the individual's role in managing their condition. SS encompasses related terms such as general self-efficacy, self-care, and self-management, and is a critical mediating variable between chronic health conditions and positive health outcomes. According to Eller et al,[2] SS is associated with better physical functioning, improved mental health, and higher quality of life, along with reduced symptom distress and more adaptive coping in chronically ill populations. It is also linked to proactive health behaviors such as information seeking, decision-making, adherence to treatment, perseverance, resilience, and lower levels of stress and anxiety.[12–17]

Importantly, SS not only influences overall functioning but also plays a central role in psychological or emotional well-being and mental health outcomes.[2,17,18] For example, higher levels of SS in chronically ill individuals have been associated with lower levels of psychological distress and depression, better self-rated health, and enhanced quality of life.[2,19] Conversely, reduced confidence in one's ability to perform self-care tasks is linked to higher levels of depression, diminished well-being, limited social support, and a more negative perception of illness.[20] These findings support the SCT proposition that personal cognitive factors, such as self-efficacy, are essential determinants of health behavior and emotional adaptation.

Moreover, Social Cognitive Theory emphasizes the role of environmental influences in shaping self-efficacy beliefs, particularly through interpersonal interactions and social feedback. In the healthcare setting, this implies that patient-provider communication and care quality can serve as environmental sources of efficacy information. Evidence supports this view: nurse-led interventions and motivational interviewing have been shown to increase self-efficacy in individuals with chronic illnesses, such as heart failure.[8,21] Moreover, Chen et al[22] found that SS mediated the relationship between provider-patient communication and psychological distress in cancer patients, indicating that communication effectiveness can indirectly reduce emotional burden by strengthening patients' confidence in self-care. These mechanisms align with SCT's core idea of "reciprocal determinism", where behavioral, environmental, and cognitive-affective factors interact continuously.

Despite growing interest in SS, current literature has primarily focused on its associations with clinical outcomes in specific chronic diseases, such as diabetes, heart failure, and cancer. However, limited attention has been given to how broader psychosocial and communicative factors—such as emotional well-being, patient-centered communication, and perceived quality of care—interact to shape SS, particularly among adults knowledgeable in palliative care. Additionally, few studies have examined these relationships using a structural equation modeling (SEM) approach to explore both direct and indirect effects simultaneously. By addressing these gaps, the present study contributes to a more comprehensive understanding of the psychosocial and communicative mechanisms that influence SS, offering insights that can inform person-centered strategies and policy efforts in palliative care settings.

Therefore, this study examined the effects of Perceived Health (PH), Patient-Centered Communication (PCC), Quality of Care (QC), and Emotional Well-being (EW) on SS in adults familiar with palliative care. The following hypotheses were proposed:

- O1: Perceived health has a significant indirect effect on the relationship of patient-centered communication to self-care self-efficacy.
- O2: Emotional well-being has a significant indirect effect on the relationship of patient-centered communication to self-care self-efficacy.
- O3: Patient-centered communication and perceived health have a significant indirect effect on the relationship between quality of care and self-efficacy in self-care.
- O4: Patient-centered communication and emotional well-being have a significant indirect effect on the relationship between quality of care and self-efficacy in self-care.

Materials and Methods

Participants

A cross-sectional predictive study[23] was performed with secondary analyses of the Health Information National Trends Survey-5 (HINTS-5) data reported by the National Cancer Institute.[24] This is a nationally representative survey, the purpose of which is to analyze the knowledge, attitudes, and information management about cancer and health on an annual basis among adults in the United States.

We used data from the 2018 HINTS-5 Cycle 2, collected between January and May 2018. The survey employed a two-stage stratified sampling method: in the first stage, a random sample of residential addresses was selected from a master address file; in the second stage, one adult was randomly selected per household using predefined protocols. Surveys were administered by mail in English and Spanish. The full methodology and sampling design have been documented in detail elsewhere.[25,26]

The HINTS-5 cycle 2 was collected from January to May 2018 and consists of 3,504 subjects.[27] For this study, we included only participants who answered "yes" to the question "Have you ever heard of palliative care?", yielding a subsample of 1,162 adults. This inclusion criterion was applied to ensure that the analysis focused on individuals with at least basic awareness of the subject matter. Exclusion criteria included participants who: (a) did not respond to the palliative care awareness item; (b) had missing data in any of the study variables; or (c) had inconsistent or incomplete responses on key constructs. The final sample exceeded the minimum sample size (n = 559) required for structural equation modeling (SEM) with a power of.95, an anticipated effect size of.20, and a model structure including 5 latent and 8 observed variables, consistent with prior mediation modeling standards.[27]

Instruments

Quality of Care (QC)

It was assessed by a single item of the HINTS-5, where patients are asked: " In general, how would you rate the quality of health care you have received during the past 12 months?"; the answers are Likert-type with five options ranging from 1 (Excellent) to 5 (Poor). Scores were inverted to consider higher values to represent higher quality of medical care, eg 1 for "Poor" and 5 for "Excellent". This measure has been used in different studies, where they reported adequate evidence of internal consistency reliability.[28,29]

Patient-Centered Communication (PCC)

The Patient-Centered Communication Scale, developed by Epstein and Street, was used.[30] The initial premise states, "The following questions are about your communication with all doctors, nurses, or other health care professionals you saw during the past 12 months. How often did they do the following?" The instrument has seven questions (eg, Were you given the opportunity to ask all the questions you had about your health? or Did they give the necessary attention to their emotions and feelings?), which had a Likert response of four alternatives ranging from 1 (Always) to 4 (Never). These scores were inverted so that higher values represent better communication with the health professional, eg 1 for "never" and 4 for "always". In the present study, an acceptable internal consistency reliability was identified for the instrument (ω =0.979).

Emotional Well-Being (EW)

It was identified through the inverse scores of the Patient-Health Questionnaire 4 (PHQ-4), developed by Kroenke et al[31] in order to evaluate anxiety and depression.Initially describe, "In the past 2 weeks, how often have you been affected by any of the following problems?", then develop four questions such as: 1) Little interest or pleasure in doing things; 2) You have been feeling down, depressed, or hopeless; 3) You have felt nervous, anxious, or on edge; and 4) He has not been able to control or stop the worry. Responses were Likert-type and ranged from 1 (almost every day) to 4 (no days). For the present study, an acceptable internal consistency reliability was recognized (ω =0.915).

Perceived Health (PH)

It was measured through a single HINT-5 item: "In general, would you say your health is.", with Likert-type responses with five options: 1 = Excellent, 2 = Very good, 3 = Good, 4 = Acceptable and 5 = Poor. Scores were inverted to consider

that higher values represent a higher perception of health, eg 1 for "Poor" and 5 for "Excellent". This measure has been used in different studies to assess perceived health and has reported acceptable evidence of internal consistency.[32,33]

Self-Care Self-Efficacy (SS)

It was assessed by means of a single item of the HINT-5: "In general, how confident are you in your ability to take care of your health?". Responses were Likert-type and ranged from 1 (I trust completely) to 5 (I do not trust). These scores were inverted so that higher values represent higher self-efficacy, eg 1 for "I do not trust" and 5 for "I trust completely". Other studies using this measure recognized adequate values for internal consistency.[15]

Data Analysis

We began with the presentation of the descriptive data (mean and standard deviation), the normality test to determine the distribution of the data[34] and the correlations of the variables investigated. Then, through Structural Equation Analysis (SEM) the direct and indirect effects for the proposed mediation model were reported. This procedure was performed with the *Unweighted Least Squares (ULS)* estimator because it is the most recommended when multivariate normality is not available and when using Likert-type scales.[35] Mediating models consider a third variable that intervenes in the relationship between the independent and dependent variable (direct effect); this mediating variable allows another causal path (indirect effect) that goes from the independent variable to the mediator and from the mediator to the dependent variable.[36]

Mediation models with significant direct and indirect effects are partial, but if the direct effect is reduced and becomes non-significant, the model shows full mediation in the relationship of the variables. In partial models, the third (mediating) variable has a significant impact on the relationship between the independent and dependent variable. In contrast, in fully mediated models, the third variable fully explains the relationship between the independent and dependent variable, and the direct effect is no longer relevant. All statistical analyses, both descriptive and direct and indirect effects, were performed with the open access program Jamovi (v. 2.3.26). Jamovi was chosen for its support of ULS estimation in SEM models and its accessible interface for applied health research.

Results

Table 1 shows the sociodemographic results of the HINTS-5 participants with knowledge of palliative care, who represented a total of 1,162 subjects. Most of those evaluated were women (69.8%) and over 45 years of age (77.6%). Also considered were data on educational level (61.1% with a university or higher education), ethnicity (73.8% non-Hispanic whites), whether they have a partner (54.6% with a partner) or if they are working (57.1% with a job).

Table 2 shows the descriptive results of the variables investigated, such as the mean and standard deviation. The Shapiro–Wilk normality test showed that the data had a non-normal distribution.[34] Regarding correlations, significant values with direct trend and a strong effect size were recognized for only two outcomes: QC - PCC ($r = 0.917$, $p < 0.001$) and PH - SS ($r = 0.663$, $p < 0.001$). While the other relationships had a weak effect size ($r = 0.10$ to.30) and insignificant ($r < 0.10$),[37] but with statistical significance; however, the relationship between PCC and PH did not have significant results ($p > 0.05$).

Figure 1 shows the regressions between the variables, where QC had a significant and stronger effect with PCC ($\beta = 0.930$, $p < 0.001$). This last measure also had a significant effect for the variables PH ($\beta = 0.104$, $p < 0.01$) and EW ($\beta = 0.098$, $p < 0.01$) in contrast to SS where there was no significant relationship ($\beta = 0.030$, $p > 0.05$). Whereas SS was explained to a greater extent by PH ($\beta = 0.659$, $p < 0.001$) than EW ($\beta = 0.178$, $p < 0.001$). The regression coefficient (R2) allowed us to recognize that the model presented explained 47.4% of the occurrence of self-efficacy in self-care; this value was moderate because it was above the minimum recommended criterion ($0.25 \geq R2 \leq .64$).[38]

Table 3 shows that the indirect effects were significant for the mediating variables. Specifically, four indirect pathways were found to predict self-care self-efficacy: PCC - EW - SS ($\beta = 0.018$, $p < 0.05$), PCC - PH - SS ($\beta = 0.063$, $p < 0.05$), QC - PCC - EW–SS ($\beta = 0.017$, $p < 0.05$) and QC - PCC - PH - SS ($\beta = 0.059$, $p < 0.001$). This allows us to recognize that the predictive models in which the mediating effect of health perception was included explained self-care self-efficacy better than when including the mediator of emotional well-being.

Table 1 Sociodemographic Data of Patients with Palliative Care Expertise

Variable	Characteristics	n	%
Gender	Male	348	30.2
	Woman	806	69.8
Age	18–34	111	9.8
	35–39	67	5.9
	40–44	76	6.7
	45+	882	77.6
Level of education	Lower school grade	23	2.0
	High school graduate	112	9.7
	Some higher education	312	27.2
	University or higher	702	61.1
Ethnicity	Non-Hispanic White	796	73.8
	Non-Hispanic Black	104	9.6
	Hispanic	97	9.0
	Other	82	7.6
With partner	Yes	625	54.6
	No	520	45.4
Employment Status	Employee	647	57.1
	Unemployed	487	42.9
Health care utilization	≤ 1 time a year	299	31.4
	2 times or more a year	654	68.6

Table 2 Descriptive Data and Relationships of the Variables Studied

Variables	1	2	3	4	5
1. PCC	—				
2. EW	0.070*	—			
3. PH	0.026	0.224***	—		
4. SS	0.084**	0.179***	0.663***	—	
5. QC	0.917***	0.101***	0.095**	0.135***	—
M	21.1	14.01	3.56	3.97	3.67
SD	8.61	3.21	1.21	1.06	1.56
S-W	0.746	0.670	0.685	0.615	0.760
p	<0.001	<0.001	<0.001	<0.001	<0.001

Note: p <0.05*, p <0.01**, p <0.001***. The values in the upper triangle of the matrix represent Pearson correlation coefficients (r) between the variables.
Abbreviations: *M*, Mean; *SD*, Standard deviation; *S-W*, Shapiro–Wilk test statistic for normality; *p* (bottom row), significance of the Shapiro–Wilk test; PCC, Patient-centered communication; EW, Emotional wellbeing; PH, Perceived health; SS, Self-care self-efficacy; QC, Quality of care.

Discussion

Our study sought to examine the relationship between QC, PCC, PH, EW, and SS and identify predictors of SS using data derived from the HINTS-5 database. SS is known to positively influence patient outcomes and functioning, among other variables,[2,16,18] thus, identifying factors that enhance SS is relevant to healthcare.

According to our results, QC had a significant and direct effect on PCC, which in turn had a significant effect on SS, through the mediation of EW and, more strongly, of PH. QC and PCC are intrinsically related: according to the Institute of Medicine (US), QC is defined as a care that is "safe, effective, timely, efficient, equitable and patient-centered";[39] patients

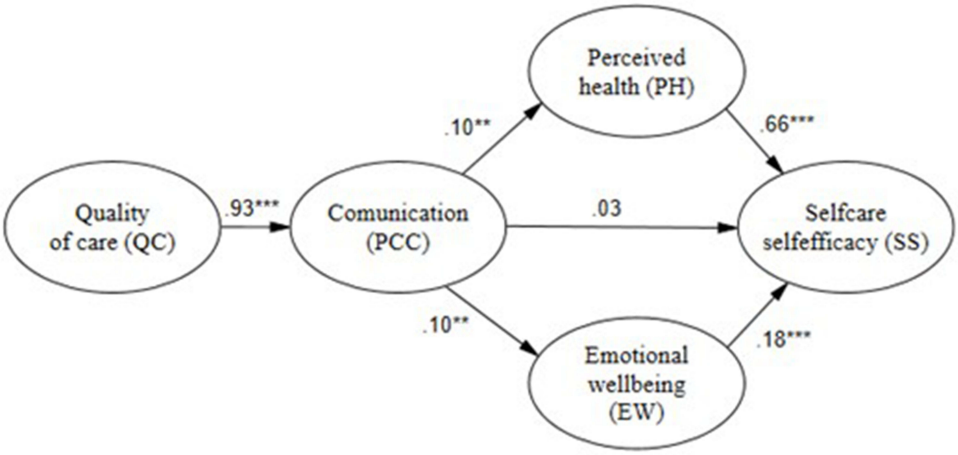

Figure 1 Analysis of the proposed mediational model.
Notes: The figure shows the direct effects of the variables. **p < 0.01 = **; p < 0.001 = ***.

are more satisfied and perceive being better cared for when having a good communication with their health care professionals, particularly when being gravely ill;[40,41] it has been long recognized that a better communication between staff and patients has an impact on diagnostic accuracy, understanding and recall of information regarding healthcare issues, and treatment adherence.[42,43] However, even when patients rate their physicians highly on communication, this does not always translate into improved adherence or perceived confidence in managing health, especially among older adults with complex conditions.[44] These discrepancies may be due to differences in population characteristics, illness severity, or how communication quality is operationalized across studies. Therefore, while our findings align with most of the existing literature, they also highlight the need to further explore contextual factors that may moderate this relationship.

As stated previously, perceived quality of care (as assessed in our study) is associated with many factors, including subjective ones that are not always directly related to quality itself or health outcomes. Moreover, quality has been considered as a social construct co-produced by different actors;[45] in other words, perceived quality of care occurs in a dynamic and bidirectional relationship between patients and providers, in which communication plays a relevant role. Although most of the literature indicates that PCC has an impact on perceived QC,[46,47] given the reciprocal nature of the relationship between both, it could be argued that perceived QC also influences the communication dynamics between patients and clinicians. A study conducted by Street et al[48] found that clinicians used more PCC with patients they perceived as more satisfied, displayed positive affect, and were more likely to adhere. Moreover, a systematic review of reviews found that health-care providers are influenced by different factors, including QC, probably supporting the reciprocal nature of these outcomes.[46]

According to our model, PCC indirectly influenced SS through the mediation of HP. PCC includes not only being empathic towards patients´ feelings but also delivering positive messages to help them cope with problematic issues. A recent systematic review and meta-analysis found that this type of interaction not only diminishes negative emotions such as anxiety but also improves health-related quality of life and even pain,[49] aspects closely related to health

Table 3 Indirect Effects of the Variables Studied

Variables	β	z	p
PCC ⇒ EW ⇒ SS	0.018	2.498	0.012
PCC ⇒ PH ⇒ SS	0.063	3.153	0.002
QC ⇒ PCC ⇒ EW ⇒ SS	0.017	2.512	0.012
QC ⇒ PCC ⇒ PH ⇒ QC	0.059	3.212	0.001

Abbreviations: PCC, Patient-centered communication; BE, Emotional well-being; SS, Self-efficacy of self-care; PH, Perceived health; QC, Quality of care.

perception. In patients with ovarian cancer, more use of PCC has been found to predict better health-related quality of life perceptions and lower symptom burden.[50] Furthermore, PCC has been previously found to influence patients´ perceptions of their health status.[2,19] For instance, a qualitative study conducted in ovarian cancer patients found that a PCC style in the clinician influenced participants' illness experiences and even decisions across the cancer continuum.[51]

As mentioned before, we also found that PCC had an indirect effect on SS through the mediation of EW. A higher SS in chronically ill patients has been linked to lower distress and depression, higher quality of life, and more positive health status,[2,19] while a diminished confidence in self-care and self-management is associated with depression, lower well-being, social support, and a more negative perception of illness.[20] In a study conducted in Chinese patients with gastrointestinal cancer, Chen et al[22] found that communication was significantly influenced by self-care efficacy, which, in turn, completely mediated the association between healthcare provider-patient communication and psychological distress. These results differ from ours as SS was found to mediate the relationship between PCC and distress, while our model showed that EW mediated the relationship between PCC and SS. Nonetheless, it is important to bear in mind the reciprocal relationship between most of the studied variables and the cross-sectional nature of the studies.

Previous studies have evidenced an association between clinician–patient communication and patient health outcomes; however, there might be different pathways to explain this relationship.[42] Interactions between clinician and patient in which patients feel listened to, validated, worthy, reassured, and comforted result in positive psychosocial outcomes, including psychological wellbeing and self-efficacy. Particularly, empathic and compassionate interactions diminish negative emotionality and promote positive emotions, including self-confidence. For instance, compassionate encounters with clinicians seem to activate the parasympathetic autonomous system and concomitant positive emotions, diminishing distress.[52] Also, empathic interactions result in patients feeling supported, which enables new coping strategies.[53]

Despite the well-established theoretical link between patient-centered communication and self-efficacy, it is important to note that in our study, PCC did not show a significant direct association with SS. This finding may reflect the complexity of how communication is perceived and processed by patients, or the influence of other mediating psychosocial variables—such as perceived health or emotional well-being—which may capture more proximal determinants of self-care confidence.[54] Additionally, it is possible that communication styles, although perceived as positive, do not always translate into immediate changes in self-efficacy beliefs, particularly in populations with chronic or life-limiting conditions.[55] This underscores the importance of exploring moderating and contextual factors (eg, patient health literacy, illness severity, cultural expectations) that may influence whether and how communication impacts patients' confidence in managing their care.

Finally, Self-efficacy is known to influence health perceptions[56] and, particularly, SS has been found to relate to better perceived health status and quality of life.[2,19] According to theory, people who are confident of their abilities engage in activities that promote health, while those with adjustment problems may have decreased quality of life.[57] While most of the research has focused on the effect of SS on perceived health, the other way around could also be accurate. Patients who perceive having better health may be more willing to engage in self-care behaviors and be more confident in their results. In this regard, according to Eller et al,[2] SS is associated with the performance of self-care activities and positive health outcomes in diverse populations. While this association has been observed in different studies, the directionality of this relationship is yet to be confirmed.

Limitations and Future Research

Our study, while providing insightful findings, has certain limitations that should be considered. Firstly, the cross-sectional nature of the data derived from the HINTS database limits the ability to draw causal inferences. Although associations were found between care quality, patient-centered communication, perceived health, emotional well-being, and self-care self-efficacy, the directionality of these relationships remains uncertain. Secondly, some variables—such as SS, QC, and PH—were assessed using single-item measures. While this approach is supported in the literature for concrete, unidimensional constructs and helps reduce participant burden, it may imply limitations in measurement reliability and construct validity. Third, SS remains a relatively novel concept in the literature, and its theoretical foundations are still evolving. Lastly, the study relied entirely on self-reported data, which may introduce response bias or inaccuracies due to social desirability or recall limitations. Additionally, the sample included only participants who reported being aware of palliative care, which

may limit the generalizability of findings to the broader population of adults without such awareness or experience. Future studies should consider longitudinal designs and multi-item instruments to strengthen theoretical and psychometric robustness. Despite these limitations, our findings provide a valuable basis for further research into the psychosocial determinants of self-care self-efficacy in palliative care contexts.

Theoretical Implications

This study contributes to the theoretical understanding of self-care SS by applying Bandura's SCT to a complex health context—palliative care. The findings reinforce SCT's core principle of reciprocal determinism by demonstrating how environmental factors (eg, quality of care and patient-centered communication) indirectly influence individual behavior through personal cognitive-affective variables (eg, perceived health and emotional well-being). Furthermore, by identifying SS as a key mediating mechanism, the study extends the application of SCT to new pathways relevant to end-of-life care, where confidence in self-management is often undermined by psychological and health-related distress. The structural equation model used in this research provides empirical support for these theoretical relationships and underscores the importance of examining both direct and indirect influences in complex healthcare settings.

Practical Implications

The results of this study have direct implications for clinical practice and health policy, particularly in the design of person-centered interventions in palliative care. Enhancing patients' perceived health and emotional well-being may strengthen their self-efficacy in managing care-related tasks, even in the face of advanced illness. This suggests that improving care quality and communication strategies— through staff training in patient-centered approaches and empathy—may yield indirect yet meaningful benefits for self-care outcomes. Healthcare providers should be aware that fostering a supportive emotional environment and promoting positive health perceptions can empower patients and improve their engagement in self-management. Additionally, these findings support the integration of psychosocial components into standard care protocols for patients dealing with serious illnesses.

Conclusion

In conclusion, according to our model, SS is predicted by PCC with the mediation of PH, and less strongly, EW; PCC is, in turn, predicted by QC. The concept of SS is relatively new in the scientific literature and, consequently, few studies include this variable. However, it has shown to be associated to relevant outcomes in healthcare, justifying the focus on it. Our findings suggest that improving the quality of care and fostering effective, patient-centered communication can have a significant impact on patients' perceived health and emotional well-being, which, in turn, positively influences their self-efficacy in self-care. This chain of effects highlights the importance of comprehensively addressing aspects of health care to strengthen patients' ability to manage their own health, especially in advanced or chronic disease settings.

Data Sharing Statement

All data used in this study are publicly available data from the National Cancer Institute and are available at https://hints.cancer.gov/.

Ethics Approval

The current study involved secondary analysis of deidentified, publicly available data from the Health Information National Trends Survey (HINTS). The original administration of HINTS was approved by the Institutional Review Boards (IRBs) at Westat (Project #6048.14, approved March 28, 2016), and the data were deemed exempt from review by the Office of Human Subjects Research at the US National Institutes of Health (NIH) on April 25, 2016 (Exempt #13204). In accordance with institutional and national ethical policies, secondary analyses using anonymized public datasets do not require additional IRB approval. Written confirmation of this exemption has been requested from the local ethics committee.

Consent for Publication

All participants provided their written informed consent to participate in this study.

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Disclosure

The authors declare that they have no economic, institutional, labor, or personal conflict of interest in the preparation of this manuscript.

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