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The effect of Autonomy-Supportive Patient-Centered Communication on Health Literacy: Exploring the Mediating Role of the Patient Health Engagement Model

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Abstract

Individuals with low health literacy (HL) are known to have poorer health outcomes and to have higher mortality rates compared to individuals with higher HL: hence, the improvement of HL is a key outcome in modern healthcare systems. Healthcare providers are therefore asked to support patients' literacy skills by encouraging the implementation of autonomy-supportive patient centered communication (PCC), which in turn requires the enhancement of patient engagement. Our main hypothesis is that the well-known relationship between autonomy-supportive PCC and HL is mediated by patient engagement which is known to play a role in HL promotion and that is related to PCC as well. The purpose of this study was to formulate a hypothetical structural equation model (SEM) linking PCC to patient engagement and HL. A cross-sectional survey design was employed involving 1007 Italian chronic patients. The hypothetical model was tested using SEM to verify the hypothesized mediation of patient engagement between PCC and HL. Results show that the theoretical model has a good fit indexes and that patient engagement fully mediates the relationship between PCC and HL. This finding suggests healthcare systems to implement a new paradigm where patients are supported to play an autonomous role in their own healthcare.

Keywords: health literacy; patient health engagement model; Health Care Climate Questionnaire; patient autonomy; PHE-s; Patient Health Engagement Scale; health communication; patient centered communication; patient engagement

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1. Introduction

Health literacy is becoming a focal issue for health providers and policy makers in many countries around the world. Health literacy is defined as "*the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions*" [1–3]. According to research, individuals with lower health literacy are more likely to have poor health outcomes, are less likely to understand their health problems and care management, and are at higher risk of hospitalizations and mortality rates [4, 5]. Finally, the healthcare costs associated with low heath literacy is estimated at $50 to $73 billion annually [6]. Therefore, improving patients' level of health literacy is a major goal of the World Health Organization. According to these premises, the identification of the factors that may affect patients' health literacy is crucial to answer to the question "*How do patients become health literate for about their health condition?*", and to develop interventions aimed at sustaining this skill.

2. Theory and Hypotheses

Research has shown that low health literacy is associated with low self-efficacy [7] and less interaction in doctor-patient encounters, which combined with health professionals' use of complex medical jargon may contribute to poor physician-patient communication [8]. Patients with low health literacy are more prone to a passive communication style with their physician, do not engage themselves in shared decision making, and report that interactions with their physician are not helpful nor empowering [9, 10].

To address the burden of patients' limited health literacy, health care systems should redesign their services to support patients' literacy skills to effectively navigate, understand, and use information to take care of their health [11–13]. This transformation can be accomplished by encouraging health care providers to implement a Patient Centered Communication (PCC) in the medical encounter which means to realize a healthcare climate oriented to a relational and communication style that is respectful of and responsive to patient preferences, needs, and values and that ensures that patient's values guide clinical decision making [14–16]. In particular a health provider communication that supports patient's autonomy has been associated with numerous positive patient outcomes [17]. Research demonstrated that a patient centered, autonomy-supportive communication by physicians of mutual understanding, trust, and shared decision-making has been found to facilitate patients' disclosure of disease-related concerns, increasing treatment adherence and facilitating patient engagement [18, 19]. In healthcare encounters, the concept of autonomy supportive communication behavior represents a relational climate whereby the health care professionals puts the patient at the center of the care experience, taking his/her expectations into account, providing relevant information and skills for enabling patients to give input and to make choices along the care journey [20, 21].

Therefore, the implementation of such model of care forces physicians to move back from a disease-centered approach to patients' care in order to adopt a patient centered one which embraces autonomy-supportive communication behaviors in the medical visit. This means building good interpersonal relationships among patients and their health providers by increasing trust, facilitating information exchange, and support patients' autonomy by recognizing and cultivating their own capabilities and self-management skills [22].

According to Self-Determination Theory, patients' sense of autonomy represents a critical component of their motivational profile for effective self-care [20, 23, 24]. In health care settings, autonomous motivation is of particular importance to improve health literacy levels [25–27] and autonomy-supportive communication behaviors by healthcare providers are, therefore, a crucial strategy for achieving such goal.

Based on the literature above, our first hypothesis posited that:

- H1: There is a significant positive relationship between patient perceptions of healthcare providers' autonomy supportive communication behaviors and health literacy levels.

Recently patients have been increasingly encouraged to play an active and autonomous role in their healthcare. This paradigm change in healthcare towards patients' autonomy fosters the idea of patient engagement. The concept of patient engagement refers to the patient's psychological readiness to play an active role in his/her own healthcare journey as an autonomous actor taking increased responsibility for decision making regarding his or her health. Patient engagement – according to the Patient Health Engagement Model – highlights the potential of individuals when becoming protagonists of their care management, promoting their knowledge, skill, and confidence and describe four increasing engagement profiles (i.e. blackout; arousal; adhesion; eudaimonic project) [28]. This model is rooted in the concept of patients' autonomy and thus it values the importance of supporting patients' interest in and desire to participate in healthcare decisions. In this vein, patient engagement is a motivational and psychological-rooted construct and doesn't involve the patient as a passive recipient of information, whose task is the mere comprehension and acceptance of information. It rather acknowledges the patient as an active processor of information and a proactive partner in the patient-doctor relationship. In these terms, patient engagement is a crucial factor for improving patients' health literacy in terms of collecting, understanding and using information about their health condition [1, 29, 30]. Research demonstrated that patients improve their health literacy to a point where they become more involved in healthcare processes (including shared decision-making) [31]. If patients are not psychologically ready to assume an active role in their healthcare and are not supported in playing an autonomous role in their healthcare, they cannot obtain, process, and understand basic health information, useful to take care of themselves well or make good decisions on health [32].

Based on the literature above, the second posited that:

- H2: There will be a significant positive relationship between patient engagement levels and health literacy

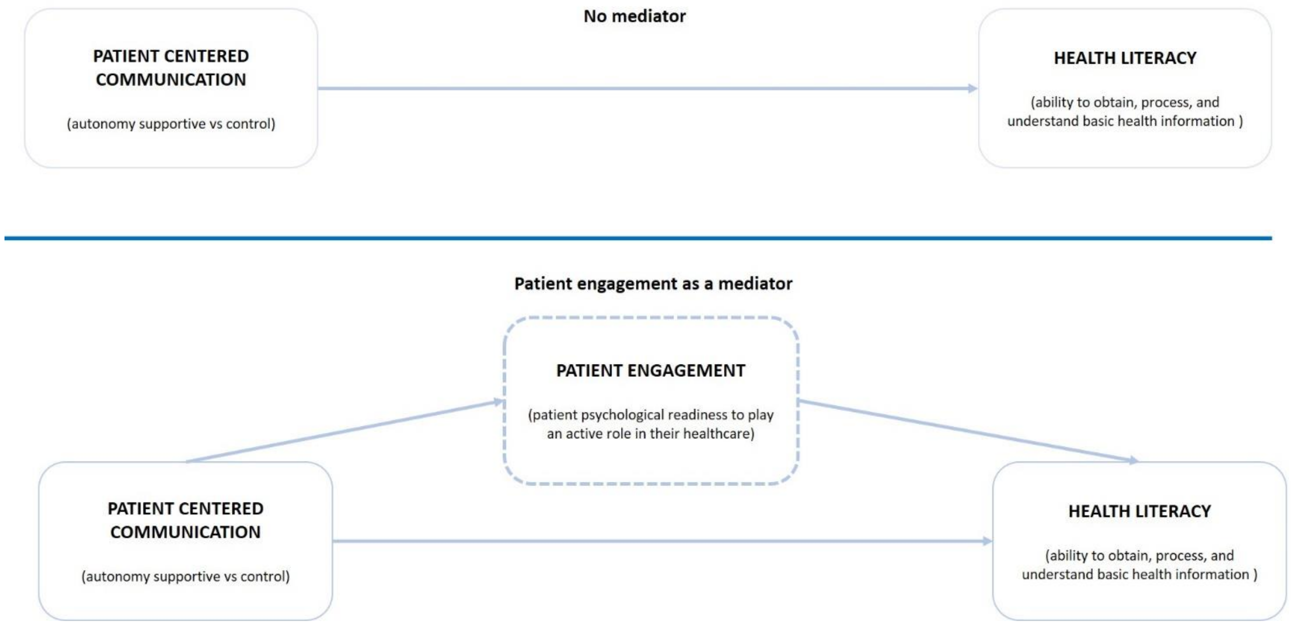
Moreover, research on patient engagement has demonstrated how PCC which is supportive of patient’s autonomy is related to increasing patient engagement levels [33, 34] . A patient-provider relationship oriented to promote the patient ability to take an active and autonomous role in the care management has been pointed out as a predictor of patient engagement levels [35–37]. The more a patient feels to be legitimized to be an autonomous actor in his/her care management, the more he/she increase its psychological readiness to be engaged in his/her own care.

Based on the literature above, the third hypothesis posited that:

- H3: There will be a significant positive relationship between patient perceptions of PCC which is supportive of patient’s autonomy and patient engagement levels.

Although research and clinical practice suggests that a PCC may be important to enhance patient engagement and health literacy, no prior study, to the best of our knowledge, has developed and tested comprehensive models for capturing the relationship between these variables that have been included in our proposed theoretical model (see Figure 1).

Figure 1. Conceptual model: the mediation effect of patient engagement on patient centered communication in health literacy



For these reasons we added a fourth hypothesis that posited that:

- H4: Patient engagement mediates the relationship between PCC which is supportive of patient's autonomy and health literacy.

To address this literature gap, our objectives were to (1) examine the association between PCC and health literacy levels; (2) examine the association between PCC and patient engagement; (3) examine the association between patient engagement and health literacy; and (4) use mediation analysis to explore whether PCC which is supportive of patient's autonomy – in the patient's perspective - might contribute to patients' health literacy by supporting patient engagement.

3. Methodology

3.1 Study design and participants

To answer the research questions, this study implied a multistage, stratified sampling method to obtain a national-representative sample of adult patients with chronic disease. Eligibility criteria for being involved in the study were purposefully kept minimal to make the results broadly applicable and included having a chronic physical condition, being 18 years old and older, and being able to read and understand Italian. Patients were recruited from an online panel of patients with chronic conditions provided by Toluna (http://www.toluna.com). People belonging to the online panel were carefully screened for authenticity and legitimacy via digital fingerprint and geo-IP-validation from the panel provider. All panelists are profiled on the basis of their sociodemographic, clinical, and lifestyle characteristics. The panel is certified to be statistically representative of all the covered populations. In our study, in order to guarantee data quality, respondents were asked to confirm their demographics and health condition.

Qualtrics web-based survey service [38] was used to design the questionnaire, manage the survey, and collect data. 2616 chronic patients accessed the questionnaire. Of these 2616 entries, 1609 were discarded because of uncomplete answers, resulting in 1007 complete entries which were kept for further analysis. The questionnaire took only a few minutes to be completed.

3.2 Measures

To invoke the constructs inserted in our theoretical model, validated scales were used in this study.

Patient Centered, autonomy-supportive Communication (PCC) was assessed by the *Health-Care Climate Questionnaire* (HCCQ) developed by Williams and colleagues [39]. This is a questionnaire aimed to capture the patient perception of the degree of centeredness featuring the patient-doctor communication defined as taking the patient's perspective, encouraging and answering their questions, supporting their initiatives, offering choice about treatment options, and minimizing control. In this study we adopted the 6-item version [40] that includes items 1, 2, 4, 7, 10 and 14 from the original 15-item version. Sample items include 'I feel that my doctor has provided me choices

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and options', 'My doctor tries to understand how I see things before suggesting a new way to do things' and 'My doctor encourages me to ask questions'. Each item was rated on a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). The language of the scale is devoid of jargon, double negative statements, and advanced vocabulary to optimize accessibility for individuals across education levels. Similarly to the original 15-item scale, the short version used in the current study showed an high internal consistency (Cronbach's α = .96) and a 1-factor structure in the validation sample.

Health literacy was measured through the *Brief Health Literacy Screener (BHLS)* a brief scale composed of three items that, according to the findings from Chew and colleagues [41], are effective in detecting the patients' health literacy level. The BHLS has largely been validated in research and outpatient settings, as a verbally administered 3-item tool. Research has previously examined its utility in the inpatient setting compared to the REALM-R and demonstrated that the two tools did not find a similar prevalence of low HL among our inpatient study population [42] The three BHLS items assess literacy, interaction, comprehension and confidence (self-efficacy) skills [43]. Answers are given using a 5-points Likert scale (0=Never; 4=Always).

Finally, the *Patient Health Engagement scale* (PHE-s®) [44] was used to assess the patient psychological readiness to take an active role in their healthcare. This scale was developed according to the *Patient Health Engagement Model* (Graffigna & Barello, 2018) which features four "positions" along a continuum of patient engagement (i.e. blackout; arousal; adhesion; eudaimonic project). PHE-s® was specifically designed to assess the level of patients' engagement and it consists of 5 items surveying the patient's experience of engagement in the care pathway. Answers are collected on a 7-points scale (lower scores meaning a patient engagement level closer to the "blackout" position, higher scores a patient engagement level closer to "eudaimonic project"). The peculiarity of this scale is that it allows not only to assess the patient's attitude towards his/her health condition, but also to forecast the patient's risk for disengagement in disease management. Scoring is available upon request to the authors.

3.3 Data analysis

Descriptive statistics were performed using JASP v0.11.1 [45]. Means, standard deviations, skewness and kurtosis were calculated to check variables distribution.

As suggested by Anderson and Gerbing [46] in order to check the adequacy of the items to the identified dimensions, a Cronbach's alphas was calculated and a confirmatory factor analysis (CFA) was run. In order to determine goodness of fit, factor loadings should be at least 0.4 [47], composite reliability (CR) should be above .70 and average variance extracted (AVE) above .50 [48].

Structural Equation Modeling (SEM) was then performed to examine the relationships between the variables described above and, in particular, to check hypothesis 4. SEM is a second-generation statistical method that, in contrast to regression, allows for the simultaneous assessment of multiple independent and dependent constructs, including multi-step paths and mediating effects. With SEM the fit of the hypothesized model with data is generally evaluated by a series of indices, usually an acceptable fit is indicated by relative χ^2 (namely, χ^2/df) below 5 [49]; Root Mean Square Error of Approximation (RMSEA) and its confidence interval inferior to .80 [50]; Standardized Root Mean squared Residuals (SRMR) lower than .08, Comparative Fit Index (CFI), Normed Fit Index (NFI) and Tucker-Lewis index (TLI) major than .95 [51].

We used Partial Least Squares to assess model parameters. We used 10.000 bootstrapping samples to estimate standard errors [52]. CFA and SEM calculations have been carried out using Amos [53].

3.4 Ethics

At inclusion, all participants received a web-based questionnaire and a covering letter (including a request for informed consent) providing information about the purpose and the voluntary character of participation in the study. Anonymous ID were used for each participant and the completed questionnaires received by the researchers could never be linked to the identifying information and anonymity was preserved at all times. the Ethical Review Board of the Department of Psychology at the Catholic University of Milan (Italy) approved the research protocol (protocol number: 10-2019).

4. Results

4.1 Socio-demographics and clinical characteristics

The sample had an average age of 46.28 years (SD=13.19) and were 67.1% females. Table 1 shows the distribution of the socio-demographical and clinical characteristics of the sample included in the study.

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Table 1. Sample characteristics

	n	%
Gender		
Female	676	67.1
Male	331	32.9
Age		
18-30	131	13.0
31-50	483	48.0
51-70	358	35.6
>70	35	3.4
Hospitalized last year		
Yes	188	18.7
No	819	81.3
Disease condition		
Cardiovascular disease	127	12.6
Thyroid disease	124	12.3
Autoimmune disease	117	11.6
Arthritis	100	9.9
Pulmonary disease	100	9.9
Cancer	98	9.8
Diabetes	75	7.4
Migraine	60	6.0
Multiple sclerosis	55	5.5
Gastrointestinal disease	20	2.0
Skin disease	17	1.7
Osteoporosis	13	1.3
Other diseases	101	10.0
Patient Health Engagement Score		
Blackout	61	6.1
Alert	380	37.7
Adherence	458	45.5
Eudaimonic Project	108	10.7

4.2 Descriptive characteristics

The values of the mean, standard deviation, skewness and kurtosis of every observed variable are showed in Table 2. No item shows excessive skewness or kurtosis (above 1 or below -1), hence normal distribution of data can be assumed. Correlation between study's measures has also been computed and is shown in Table 3.

Table 2. Mean, standard deviation, skewness and kurtosis of the study's measures

	Mean	Median	Std Dev	Skewness (S.E.)	Kurtosis (S.E.)
AUTONOMY-SUPPORTIVE PCC (HCCQ)					
Item 1	4.20	4	1.68	-0.33 (.08)	-0.55 (.15)
Item 2	4.88	5	1.63	-0.67 (.08)	-0.15 (.15)
Item 3	5.15	5	1.56	-0.80 (.08)	0.19 (.15)
Item 4	5.07	5	1.53	-0.77 (.08)	0.21 (.15)
Item 5	5.09	5	1.61	-0.81 (.08)	0.09 (.15)
Item 6	4.83	5	1.48	-0.54 (.08)	-0.02 (.15)
PATIENT ENGAGEMENT (PHE-S)					
Item 1	4.28	5	1.48	-0.29 (.08)	-0.31 (.15)
Item 2	4.46	5	1.38	-0.27 (.08)	-0.12 (.15)
Item 3	4.54	5	1.55	0.14 (.08)	-0.90 (.15)
Item 4	4.44	5	1.63	-0.20 (.08)	-0.53 (.15)
Item 5	4.60	5	1.56	-0.07 (.08)	-0.62 (.15)
HEALTH LITERACY (BHLS)					
Item 1	1.30	1	0.99	0.24 (.08)	-0.72 (.15)
Item 2	1.35	1	1.06	0.55 (.08)	-0.20 (.15)
Item 3	1.40	1	1.13	0.36 (.08)	-0.73 (.15)

Table 3. Correlation between study's measures

variables		HCCQ	PHE-S	BHLS
HCCQ	Spearman's rho	—		
	p-value	—		
PHE-S	Spearman's rho	0.198	—	
	p-value	< .001	—	
BHLS	Spearman's rho	-0.136	-0.404	—
	p-value	< .001	< .001	—

4.2 Measurement model

Measurement model reliability was evaluated calculating Cronbach's standardized α and performing a CFA including three latent variables using ML method. CR, AVE have been calculated for each construct and factor loadings have been calculated for each item. The measurement model is reported in Table 4.

Table 4. Measurement model.

	Factor loadings	Cronbach's α	CR	AVE
AUTONOMY-SUPPORTIVE PCC (HCCQ)		.927	.84	.48
Item 1	.599			
Item 2	.928			
Item 3	.916			
Item 4	.850			
Item 5	.899			
Item 6	.777			
PATIENT ENGAGEMENT (PHE-S)		.914	.89	.48
Item 1	.798			
Item 2	.839			
Item 3	.822			
Item 4	.828			
Item 5	.840			
HEALTH LITERACY (BHLS)		.636	.64	.39
Item 1	.848			
Item 2	.375			
Item 3	.642			

4.3 Structural Model and Hypotheses Testing

Estimated fit indices seem to show a good model fit, in particular: χ^2/df=4.827 (p<.001); SRMR=.0326; RMSEA=.062 (LO90=.055; HI90=.068); CFI=.969; NFI=.962; TLI=.962.

Total effects between constructs have been calculated to check hypotheses 1, 2 and 3. As shown in Table 5, results support the existence of the hypothesized relations between constructs. In particular, PCC has both a significant, positive effect on PE (β=.191; p<.001) and on HL (β=-.141; p<.001); finally, PHE-S has a positive and significant effect on BHLS (β=-.392; p<.001). Negative marks are due to the fact that BHLS scale has reverse scoring (higher scores mean lower literacy).

Table 5. Path estimates (β) for testing hypotheses 1–3.

Hypothesis	*Path*	*Std. beta*	*p-value*
H1	HCCQ -> BHLS	-.136	<.001
H2	PHE-S -> BHLS	-.393	<.001
H3	HCCQ -> PHE-S	.198	<.001

4.4 Mediating Effect and H4

Results described above show that the three assumptions required to demonstrate the mediating role of a variable between a predictor and an outcome are met: the predictor (HCCQ) has a significant effect on both the mediator (PHE-S) and the outcome (BHLS), while the mediator has a significant effect on the outcome as well.

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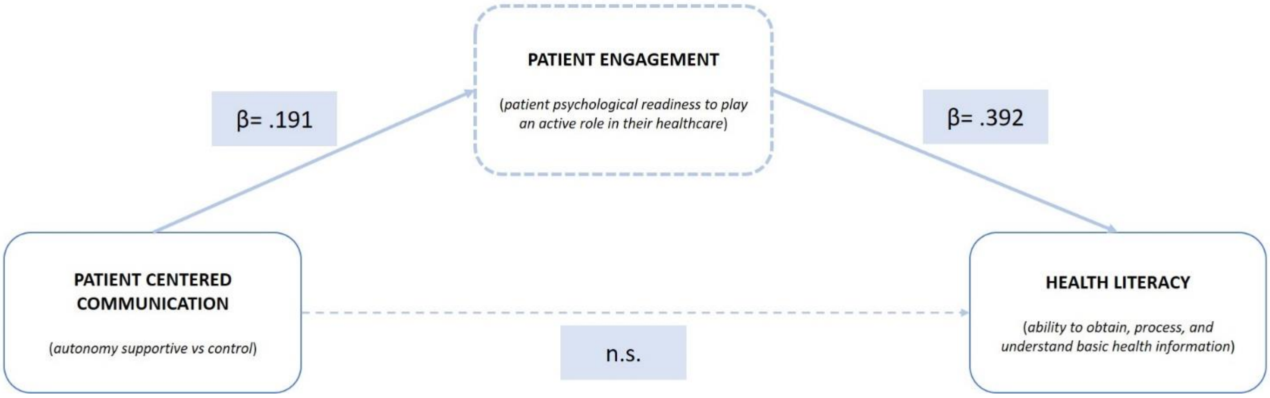
To check whether there actually is a mediating effect, direct and indirect effects of the predictor (PCC) on the outcome (HL) have been computed. Table 6 shows total, direct and indirect effect of PCC on HL. Figure 2 shows the model with standardized betas.

Path	*Std Beta*	*p-value*
Total (HCCQ -> BHLS)	-.136	p<.001
Direct (HCCQ-> BHLS)	-.058	p=.152
Indirect (HCCQ -> PHE-S -> BHLS)	-.078	p<.001

Results show that when taking into consideration the indirect pathway, the role of HCCQ on BHLS is fully mediated by PHE-S, since the direct path that goes between HCCQ and BHLS becomes non-significant. Hence, we found the mediating effect of PHE-S on the HCCQ–BHLS relationship. Then, H4 is confirmed by data.

Figure 2. Results of structural equation modeling analysis: the full mediation effect of patient engagement on patient centered communication in health literacy



5. Discussion

Since health literacy plays a crucial role in chronic disease management, understanding the relationship between health literacy and the quality of patient-doctor relational climate may provide important insights for clinicians who care for such patient populations, and may have important implications for the reduction of inequalities in the care of chronic conditions. To date, potential solutions to enhance patients' health literacy skills have focused on improving the readability and understandability of medical documents or to adopt new technologies as a means to deliver information [54, 55]. Although these efforts will surely lead to helpful changes in supporting patient in the acquisition of skills to obtain, process, and understand basic health information, our study to consider other crucial variables and suggests that patients who are more engaged in their

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healthcare and are psychologically ready to be active players in the patient-doctor relationship are also more literate.

The major findings of this research are aligned with those of previous studies, highlighting the impacts of autonomy-supportive patient centered communication (PCC) on patient's health literacy and patient engagement in the care process [32, 33, 56]. This study showed that autonomy-supportive PCC has a positive correlation with the patient ability to obtain, understand, and use health information along their healthcare journey; These findings are consistent with the results of previous studies [9, 11, 57], proposing pathways of the effects of a patient centered communication on patient's health literacy. This means that patients who perceive that their HCP are likely to support their autonomy in managing their health have a better understanding of prescription labels, interpret effectively their health values or medication dosing schedules, and extract/criticize health information.

Among a diverse array of potential intervening variables in the relationship between PCC and health literacy, this study found out the mediating role of patient engagement in healthcare in this path. Our analysis demonstrated patient engagement to be a critical construct. While an indirect pathway between autonomy-supportive patient centered communication and health literacy via patient engagement has been mentioned in the literature [32, 58], empirical research has not reported on the subject. To our knowledge, the present study is the first to support the presence of an indirect relationship among those variables and to empirically demonstrate the role of patient engagement in this interaction. The study model suggests that patient engagement is crucial to the link between patient centered communication oriented to support patient autonomy and health literacy. This means that the patient's psychological readiness to play an active role during the patient-doctor interaction is a key factor in the influence of PCC on the patients' health literacy level.

In clinical practice, it is very important to stimulate and promote the patient ability to collect, understand and use health information. To achieve this, health care professionals should consider to adopt communication and relational strategies to support patients in adopting a partnership role in the care process through the psychological acceptance of their health condition. For example, empowering the patient's perceptions of his or her own ability to take control over his or her life unless the disease and to find a "new normality" may be a useful strategy for improving patients' health literacy [59]. For this reason, healthcare model merely oriented to train HCP in improving communication skills to foster patient health literacy might be not enough to reach this goal. Whereas, medical education program aimed to support HCP in adopting new models of care oriented to interpret the medical encounter as partnership setting where both HCP and patient share all parts of the health decision making process and play an active role in the care journey are warranted to effectively support individuals in becoming literate about their condition.

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Our study has a number of limitations. First, one of our main variable was patients' reports of their physician's relational and communication processes of care and not direct observations. This could be a source of bias related to social desirability effect. Second, while we did not control the model for important confounders that we hypothesized could impact health literacy skills such as age and educational level. For this reason it is possible that our findings are a result of residual confounding. Third, However, a limitation in this study is its use of a cross-sectional design, which means that, unlike a longitudinal design, causal relationships among study variables could not be determined.

6. Conclusions

The research points offer new insights into the science of health literacy and allow the healthcare provider to create new opportunities for promoting this crucial factor through the development of patient-doctor relationship aimed to sustain effective patient engagement. Therefore, this study offered new insight about health literacy and autonomy-supportive PCC in the healthcare literature, proving the key role of the patient active role in their useful for future researches.

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