

The relationship between the quality of the shared decision-making process and hope in patients with multiple sclerosis: an analytical cross-sectional study

Ramin Nikboresh

Ardabil University of Medical Sciences

Mohammad Ail Mohamadi

Ardabil University of Medical Sciences

Behrouz Dadkhah

Behrouz.dadkhah@gmail.com

Ardabil University of Medical Sciences

Article

Keywords: Shared decision-making, hope, multiple Sclerosis

Posted Date: August 7th, 2026

DOI: <https://doi.org/10.21203/rs.3.rs-10185255/v1>

License:   This work is licensed under a Creative Commons Attribution 4.0 International License. [Read Full License](#)

Additional Declarations: No competing interests reported.

Version of Record: A version of this preprint was published at Scientific Reports on October 23rd, 2026. See the published version at <https://doi.org/10.1038/s41598-026-76278-2>.

Abstract

Background

Multiple sclerosis (MS) profoundly impacts patients' psychological and social well-being. This study investigated the relationship between the quality of the shared decision-making (SDM) process and hope among patients with MS in northwest Iran.

Method

This correlational study selected 300 patients with MS covered by the Ardabil MS Association via stratified random sampling. Data were collected using a sociodemographic questionnaire, the AGA-25 scale, and Snyder's Adult Hope Scale. Data were analyzed using descriptive statistics, independent t-tests, analysis of variance, and a linear regression model in SPSS 26.

Results

In this analytical cross-sectional study of 300 patients with multiple sclerosis (mean age = 32.20 ± 10.20 years; 66.3% women), most participants had a relapsing–remitting disease course (76%) and a moderate level of both hope (mean = 38.97 ± 6.33) and shared decision-making (SDM) quality (mean = 75.0 ± 9.72). The mean scores of hope and its subscales were significantly below the established criteria ($p < 0.01$), while the SDM total score exceeded its criterion ($p < 0.01$). The quality of SDM was significantly associated with patients' education, occupation, age, number of children, and disease duration ($p < 0.05$). A positive correlation was found between SDM quality and hope ($r = 0.37$, $p < 0.001$). Regression analysis identified satisfaction with information during SDM ($\beta = 2.85$, $p = 0.004$), DMT convenience ($p < 0.001$), and information reliability ($p = 0.047$) as significant predictors of hope, collectively explaining 12.2% of its variance.

Conclusion

The findings demonstrated a positive and significant relationship between the quality of the SDM process and hope in patients with MS. These results underscore the importance of enhancing patient participation in therapeutic decision-making to improve the psychological well-being of individuals with MS and develop targeted interventions.

Highlights

- Multiple sclerosis (MS) profoundly impacts patients' psychological and social well-being.
- The quality of the participatory decision-making process has a positive and significant relationship with hope in patients with multiple sclerosis
- The better the quality of participatory decision-making in the treatment process, the higher the level of hope in patients
- There are gaps in patient-physician interactions and treatment information that need to be improved
- Participation in decision-making not only improves hope but also their quality of life and treatment outcomes.

Introduction

MS is a chronic, autoimmune, inflammatory, and progressive disease [1] that significantly reduces the quality of life for many young adults, often disrupting their social and professional lives. It carries a heavy burden of physical, psychological, and social consequences [2]. Globally, an estimated 2.5 million people were living with MS as of 2020 [3]. In Iran, the prevalence is reported at 29.3 per 100,000 people, with a higher rate among women (44.8 per 100,000) than among men (16.5 per 100,000) [4]. In Ardabil province, a retrospective study showed a much higher prevalence of 59.37 per 100,000, with women experiencing a far greater impact (85.14 per 100,000) than men (34.71 per 100,000) [5].

MS can manifest with a wide range of debilitating symptoms such as muscle weakness, fatigue, disturbances in balance and gait, visual impairment (e.g., double vision), bladder dysfunction, muscle spasms, sexual dysfunction, and cognitive decline, all of which substantially affect 1patients' daily functioning and quality of life [6]. These limitations hinder not only social and occupational participation but also emotional well-being and family relationships. Beyond these common global challenges, Iranian patients with MS face additional difficulties, including limited access to essential medications, insufficient rehabilitation services, and high

treatment expenses, which underscores the need for targeted health system interventions to improve disease management and quality of life [7].

Satisfaction is a cornerstone of high-quality healthcare, with SDM recognized as a central aspect of patient-centered practice [8]. During the SDM process, healthcare professionals (HCPs) and patients collaborate to determine the most appropriate therapeutic course [9]. This collaborative approach involves a balanced exchange of information about possible options, discussion of their potential benefits and drawbacks, and the joint selection of a plan aligned with patient preferences, values, and individual circumstances [10].

For patients with multiple sclerosis, the uncertainties and emotional burden of the disease—including fear, anxiety, and unpredictability—can contribute to a significant decline in hope [11]. Hope, strongly linked to well-being and psychological resilience, is a key coping mechanism that facilitates adaptation and enhances recovery in chronic conditions such as MS [12]. As the condition progresses, hope plays an essential role in promoting adherence, self-management, and secondary prevention strategies. However, similar to other chronic diseases, hope often diminishes among individuals with MS [13], eventually reaching levels comparable to the psychological aging effects described in other chronic illness contexts [14].

Although previous studies have suggested that SDM may reduce patients' emotional and psychological distress [15, 16], evidence on its specific association with hope remains limited and inconsistent, especially among individuals with MS. Furthermore, cultural and healthcare system factors that shape patient–physician interactions have been underexplored in this context. To address this gap, the present study examined the relationship between the quality of the SDM process and levels of hope among patients with MS. It was hypothesized that higher SDM quality would be positively correlated with greater levels of hope.

Method

The target population of this analytical cross-sectional study included 1,100 patients with MS registered at the Ardabil MS Association. Ardabil is one of the largest provinces in northwestern Iran.

The required sample size was calculated based on a correlation study design, assuming a significance level of $\alpha = 0.05$, a statistical power of 90%, and an anticipated effect size of $r = 0.15$. Accordingly, the minimum required sample size was estimated at 300 participants. This correlational study used stratified random sampling to select participants.

A total of 320 patients were initially approached using proportionate stratified random sampling. Of these, 300 patients completed the questionnaires fully and were included in the final analysis, resulting in a response rate of 93.7%. Participants with incomplete questionnaires were excluded.

Participants were selected using stratified random sampling by age and sex to ensure the representativeness of the source population. Recruitment continued until 300 complete responses were obtained. This process minimized the risk of selection bias and ensured that the final sample accurately reflected the characteristics of the registered MS population in Ardabil. In this study, the questionnaires were completed in person and in the researcher's presence. The researcher provided clear explanations of the study objectives and response procedures, ensuring that participants understood all questions and answered them independently and without external influence. This approach was selected to enhance response accuracy, minimize potential misinterpretations, and provide a high rate of complete participation.

Inclusion criteria

Participants were required to have a confirmed diagnosis of MS, be over 18 years of age, be able to read and write in Persian, and have no communication difficulties (such as hearing or visual impairment).

Exclusion criteria

Participants were excluded if they had any other significant medical conditions—such as epilepsy, cancer, cardiovascular disease, or other neurological disorders—that could potentially confound the level of hope. Those who failed to complete the questionnaires fully or were unwilling to participate at any stage of the study were also excluded.

Data collection instruments

Data were collected using a three-part questionnaire:

Individual-social information form of patient

The demographic questionnaire used in this study included the following variables: sex, marital status, duration of marriage, patient's level of education, and spouse's level of education.

The AGA-25 scale

Developed by Rodriguez et al. (2022), it is a 25-item questionnaire designed to evaluate the quality of the SDM process. Responses are rated on a 4-point Likert scale, ranging from strongly disagree to strongly agree, with total scores ranging from 25 to 100. The tool comprises four subscales: satisfaction with the information during the SDM (9 questions with a score range of 9 to 36), the adverse events during the selected treatment (5 questions, with scores ranging from 5 to 20), DMT convenience (6 questions, with scores from 6 to 24), and information reliability (5 questions, with scores ranging from 5 to 20).

Rodriguez et al. (2022) established the AGA-25's validity and reliability, reporting a Cronbach's alpha of 0.88 [8]. For the current study, after obtaining formal permission from the original developer of the Adult Hope Scale (AGA-25), the instrument underwent a rigorous cross-cultural adaptation process to ensure conceptual and linguistic equivalence in Persian. Initially, two bilingual experts independently translated the English version into Persian. The two forward translations were then reviewed and synthesized by the research team into a single reconciled version to preserve semantic accuracy and cultural appropriateness.

This reconciled Persian version was subsequently back-translated into English by an independent professional translator fluent in both languages and unfamiliar with the original tool. The back-translated version was compared with the original English scale and approved after confirming conceptual alignment and consistency in wording.

To validate the Persian version, 10 faculty members specializing in health psychology, nursing, and psychometrics evaluated each item's relevance, clarity, and simplicity using the Waltz and Bausell approach. Based on their judgments, the Content Validity Ratio (CVR) was calculated at 0.97, demonstrating that all items were essential according to Lawshe's criteria, and the Content Validity Index (CVI) was obtained at 0.93, indicating excellent content adequacy. Furthermore, the face validity of the instrument was examined both qualitatively and quantitatively by ten patients with MS to ensure comprehensibility and cultural appropriateness. Minor linguistic refinements were made based on their feedback. Finally, the reliability of the Persian AGA-25 was verified in a pilot test with 30 participants, yielding a Cronbach's alpha coefficient of 0.81, indicating good internal consistency for the target population. These results collectively confirm that the Persian version of the AGA-25 is both valid and reliable for assessing hope among Iranian patients with multiple sclerosis.

The Adult Hope Scale

Developed by Snyder et al. (1991), consists of 12 items with four items measuring agency (goal-directed energy), 4 measuring pathways (planning to meet goals), and four filler items. Participants respond to items using a 5-point Likert scale, ranging from strongly disagree (1) to agree (5) strongly. Total score ranges from 12 to 60, with higher scores indicating a greater sense of hope. Snyder et al. (1991) established the initial validity and reliability of this tool [17]. Furthermore, Nooripour et al. psychometrically evaluated and localized this tool for the Iranian cultural context, confirming its reliability with a Cronbach's alpha of 0.82 [11]. In the current study, the scale's internal consistency was 0.81, as measured by Cronbach's alpha. This study selected 300 patients via stratified random sampling from the patient list of the Ardabil MS Association. All participants completed the questionnaires after providing informed consent.

Data analysis

Data were analyzed using SPSS 26. We employed descriptive statistics, including frequencies and percentages (No(%)) to report qualitative data and mean and standard deviation (SD) to report quantitative data. The Shapiro–Wilk test was performed to assess the normality of the variables. The results indicated that both Hope ($p = 0.0821$) and SDM ($p = 0.308$) were normally distributed. Subsequently, parametric statistical tests, including the one-sample t-test, independent t-test, analysis of variance (ANOVA), and

Spearman's rank correlation, were used for univariate analysis. Variables with P values < 0.2 were included in the multivariable linear regression. A Variance Inflation Factor (VIF) greater than 5 indicates the presence of multicollinearity among the independent variables. To test for autocorrelation in the regression residuals, the Durbin–Watson statistic was used, with values close to 2 indicating no autocorrelation. The mean scores for questions related to the quality of the SDM process and life expectancy were compared against a criterion score. This criterion score was calculated as follows: (Maximum possible score - minimum possible score) / 2 + the minimum possible score. [18].

Ethics approval and consent to participate

Before data collection, ethical approval was obtained from the Ardabil MS Association and from the Ethics Committee of the Faculty of Nursing, Ardabil University of Medical Sciences (IR.ARUMS. REC.1402.084). All procedures were performed in accordance with the ethical standards of the institutional research committee and with the Declaration of Helsinki. Participation was voluntary; all participants received a full explanation of the study aims and procedures, were informed of their right to withdraw at any time without penalty, and provided written, informed consent. All data remained anonymous and confidential, stored in a locked facility, and accessible only to the research team.

Results

The study revealed that the participants had a mean age of 32.20 ± 10.20 years, with the majority being women (66.3%). Most patients (76.0%) had a relapsing–remitting course of multiple sclerosis, and 11.7% reported a family history of MS.

Comparative analyses showed that hope and the quality of the shared decision-making (SDM) process did not differ significantly across most sociodemographic and clinical variables, including age, sex, marital status, disease duration, disease course, and family history (p > 0.05). Detailed sociodemographic and clinical characteristics, along with their associations with study variables, are presented in Table 1.

Table 1: Frequency distribution of individual social characteristics of the studied samples and relationship with hope and Quality of the SDM process

Variable		No. (%)	Hope/ P- Value	Quality of the SDM process/ P-Value	Variable		No. (%)	Hope/ P- Value	Quality of the SDM process/ P-Value		
Sex	Male	101 (33.7)	0.269	0.608	History of other diseases	Yes	29 (9.7)	0.329	0.945		
	Female	199 (66.3)				No	271 (90.3)				
Marital status	Single	154 (51.3)	0.505	0.181	Using specific medications other than those related to MS	Yes	20 (6.7)	0.593	0.468		
	Married	98 (32.7)				No	280 (93.3)				
	Widowed	14 (4.7)			Family history of MS	Yes	35 (11.7)			0.325	0.425
	Divorced	34 (11.3)				No	265 (88.3)				
Marriage time	Before the disease	95 (65.1)	0.406	0.942	Patient's job	Employed	28 (9.4)	0.147	0.034		
	After the disease	51 (34.9)				Self- employed	54 (18.1)				
Patient's education	Elementary	17 (5.7)	0.798	0.026		Housewife	176 (58.5)				
	Lower secondary	44 (14.7)				Unemployed	29 (9.7)				
	Diploma	121 (40.3)				Disabled	13 (4.3)				
	Associate degree/bachelor's	103 (34.3)			Spouse's job	Employed	19 (6.4)	0.736	0.886		
	Master's or higher	15 (5.0)				Self- employed	75 (25)				
Spouse's education	Elementary	21 (7.0)	0.892	0.014	Monthly income	Housewife	48 (16)				
	Lower secondary	23 (7.7)				Unemployed no Spouse	4 (1.3)				
						154 (51.3)					
	Diploma	50 (16.7)			Monthly income	None	213 (71)	0.397	0.819		
	Associate degree/bachelor's	49 (16.3)				11-54 \$	11 (7.3)				
	Master's or higher	5 (1.7)				65- 108 \$	59 (19.7)				
						119-162 \$	15 (5.0)				
						> 162 \$	2 (0.7)				
	*No response	152 (50.7)			Disease course	Relapsing- remitting	228 (76)	0.223	0.079		

		Gradual worsening of symptoms	50 (16.7)		
		Attacks with progression	22 (7.3)		
	Disease duration	<2 (Years)	95 (31.6)	0.436	0.942
		2-10 (Years)	50 (16.6)		
		10< (Years)	155 (51.8)		

* Unresponsive for unknown reasons

The study results revealed that the mean (SD) hope score among patients was 38.97 ± 6.33 , with a substantial majority (83.3%) of disease courses indicating moderate hope. Similarly, the mean score for the quality of the SDM process was 75.0 ± 9.72 , with most of the patients (79.3%) assessing it as moderate. A statistically significant finding was that the mean scores of hope and its subscales were lower than the established criterion value ($p < 0.01$). Conversely, the mean score for the SDM process was significantly higher than its criterion value ($p < 0.01$) (Table 2).

Table 2 Comparison of the mean scores of hope and quality of the SDM process with the criterion score

Variable	Dimensions	Mean $\pm$ SD	Criterion score	P-value†
Hope	Agency (goal-directed energy)	13.97 ± 3.25	12	< 0.001
	Pathways (planning to meet goals)	13.57 ± 3.19	12	< 0.001
	Total	38.97 ± 6.33	36	< 0.001
Quality of the SDM process	Satisfaction with the information during the SDM	24.15 ± 4.84	22.5	0.001
	Adverse events during the selected treatment	13.82 ± 3.03	12.5	0.001
	DMT convenience	12.58 ± 3.32	12.5	0.462
	Information reliability	24.49 ± 4.03	24.5	0.897
	Total	75.0 ± 9.72	72	0.001

†One sample t-test

Due to the high collinearity between the total SDM score and its dimensions, the relationship between the total SDM score and hope was analyzed using a simple linear regression model, complemented by Pearson's correlation. As illustrated in Fig. 1, a positive correlation was observed between SDM quality and hope among patients with multiple sclerosis, indicating that higher SDM quality was associated with greater levels of hope ($r = 0.37$, $p < 0.001$)(Fig.).

Moreover, a multivariable linear regression model identified satisfaction with the information during the SDM ($P = 0.004$), DMT convenience ($P < 0.001$), and reliability of information ($P = 0.047$) as significant predictors of hope. Notably, **satisfaction with the information during the SDM** emerged as the strongest predictor ($\beta = 2.85$). These variables in this model explained 12.2% of the variance in hope among patients with MS.

Furthermore, the VIFs are close to 1 (less than 5), indicating no multicollinearity among predictors. The Dorbin-Watson statistic (1.975) is close to 2, indicating that the model errors are independent and there is no serial autocorrelation. Therefore, the regression coefficients are reliable. (Table 3).

Table3. Univariate and multiple linear regression predict the predictors of hope in patients with MS

Variable		Univariate analysis		Multivariable linear regression			
		Mean $\pm$ SD	P-value	β (SE)	t	P-value	VIF
Sex	Female	36.69 $\pm$ 5.76	0.26 †	-	-	-	-
	Male	39.55 $\pm$ 7.32					
Marital status	Single	39.43 $\pm$ 7.25	0.47 ‡	-	-	-	-
	Married	38.88 $\pm$ 4.73					
	Widowed	37.64 $\pm$ 4.57					
	Divorced	37.85 $\pm$ 6.53					
Disease onset	Before marriage	38.93 $\pm$ 4.33	0.18†	0.004(0.005)	0.676	0.50	1.034
	After marriage	37.74 $\pm$ 6.45					
Patient education	Elementary	37.94 $\pm$ 4.66	0.79 ‡	-	-	-	-
	Lower secondary	39.07 $\pm$ 9.09					
	Diploma	38.76 $\pm$ 5.96					
	Associate degree/bachelor's	39.16 $\pm$ 5.58					
	Master's or higher	40.60 $\pm$ 6.46					
Patient's job	Employed	40.96 $\pm$ 4.21	0.141†	0.046(0.032)	1.425	0.155	1.018
	Self-employed	39.52 $\pm$ 5.14					
	Housewife	38.47 $\pm$ 5.85					
	Unemployed	40.24 $\pm$ 11.23					
	Disabled	36.92 $\pm$ 5.36					
Age		r= - 0.002	0.97	-	-	-	-
Marriage duration		r= 0.02	0.76	-	-	-	-
Number of children		r= - 0.030	0.72	-	-	-	-
Onset of the first symptoms		r= - 0.003	0.95	-	-	-	-
Disease duration		r= - 0.006	0.92	-	-	-	-
Dimension of SDM	Satisfaction with information during the SDM	r=0.242	<0.001	0.172(0.059)	2.941	0.004	1.206
	The adverse events during the selected treatment	r=0.082	0.194	0.039(0.046)	0.859	0.901	1.110

DMT convenience	r=0.276	<0.001	0.198(0.045)	4.421	<0.001	1.089
Reliability of information	r=0.210	<0.001	0.103(0.52)	1.992	0.047	1.168
-						
R=0.374, Adjusted R Square=0.122, Durbin-Watson=1.975						

“-“It does not need to be entered into multiple regression testing †Independent sample t-test ,‡One-way ANOVA test, r= Pearson’s correlation coefficient, β=Unstandardized coefficients, SE=Standard error of β

Discussion

This study aimed to examine the relationship between the quality of the SDM process and patients' level of hope with MS. The results of this study showed that, overall, both the level of hope and the quality of the SDM process were rated as moderate. While the scores for hope and its subscales were lower than the established criterion values, the mean SDM score was higher. The quality of SDM was significantly associated with education, occupation, age, number of children, and disease duration. A positive relationship was observed between hope and SDM quality, indicating that a higher-quality shared decision-making was associated with greater levels of hope among patients.

Regression analysis identified satisfaction with the information received during the SDM process, the convenience of disease-modifying therapy, and the reliability of the information as significant predictors of hope, explaining a modest but statistically significant proportion of its variance (approximately 10%). This finding indicates that although SDM contributes meaningfully to hope, most of the variance is likely explained by other psychological, social, and clinical factors.

At first glance, the findings of the present study can be interpreted as follows: when patients experience a sense of participation and mutual understanding with the healthcare team during the treatment process, and when they receive the necessary information accurately, reliably, and in accordance with their cognitive capacity, their sense of personal control and direction in coping with the disease is strengthened—two components that, according to Snyder’s theory, constitute the core elements of “agency thinking” and “pathway thinking” within the concept of hope, conversely, when patients are deprived of adequate information or supportive communication, feelings of helplessness, uncertainty, and frustration increase, leading to a decline in hope. Therefore, higher quality shared decision-making, by improving understanding, fostering mutual trust, and reducing anxiety caused by treatment ambiguity, creates a fertile ground for the development of hope. Furthermore, the reported components—such as the convenience of disease-modifying therapy and the reliability of information—are directly linked to patients’ daily experiences and satisfaction, thereby shaping a stronger sense of control and hope in coping with a chronic condition[6,8,11,13].

This result is consistent with the findings of Heesen et al. (2018), who demonstrated that active patient participation in treatment decisions enhances perceived control, self-efficacy, and trust, thereby improving psychological outcomes such as hope, treatment satisfaction, and motivation for disease management[19]. Similarly, Freedman et al. (2020) emphasized that SDM promotes psychological health and fosters hope by ensuring transparent communication, reciprocal dialogue, and patient-centered care[20]. These consistencies are supported by Snyder’s Hope Theory (1991), which posits that SDM strengthens the two key components of hope—agency and pathways—by enabling goal-oriented planning and increasing motivation [21].

In contrast, Turner et al. (2016) reported a weaker association between SDM and hope, particularly among newly diagnosed patients[22]. This discrepancy may be explained by differences in disease duration and patient experience, as 76% of participants in the current study had a relapsing–remitting disease course with more extensive management experience. Newly diagnosed patients, as in Turner’s study, may experience initial emotional shock that limits their capacity to engage in shared decisions. Moreover, differences in measurement instruments (AGA_25 vs. more general tools) may also account for this variation.

Patients in the current study reported moderate levels of SDM, a finding consistent with Wilkie (2020) [23]. Likewise, the mean hope score was moderate, aligning with Madan and Pakenham (2014), who observed that MS patients typically maintain a realistic and moderate level of hope due to the chronic and unpredictable nature of the disease, particularly when supported by robust social and psychological resources[24]. The consistency between these studies may reflect shared sample characteristics and the use of the Snyder Hope Scale, which enhances comparability.

However, Azimian et al. (2021) reported lower levels of hope, especially among patients with progressive forms of MS [25]. This disparity may stem from differences in disease course, as progressive MS is associated with more severe physical limitations and lower adaptation capacity. At the same time, the relapsing–remitting group (76% in the present study) often demonstrates greater resilience and engagement in care decisions. Furthermore, the analysis of variance indicated no significant relationship between hope and demographic variables, which is consistent with Niazmand (2017), who found no association between demographic characteristics (e.g., age, marital status, occupation) and hope among MS patients [26].

Beyond these quantitative findings, interpreting the results within Iran's cultural, social, and healthcare context is essential. In Iranian society, physician–patient relationships are often characterized by high interpersonal trust, mutual respect, and family-centered values, creating a context that encourages dialogue and collaboration in clinical decisions. Moreover, deep-rooted religious and spiritual beliefs serve as mediating factors that strengthen hope through patience, acceptance, and meaning-making in the face of illness. Additionally, the growth of specialized MS centers and patient support associations in Iran facilitates patients' knowledge-based participation in care decisions. Together, these elements form a culturally adapted model of SDM that, while consistent with Western frameworks, accentuates the spiritual and collectivistic dimensions of hope. This context-specific interpretation not only reinforces international evidence [19–26] but also enriches scientific understanding of how cultural and systemic determinants shape the SDM–hope relationship in non-Western settings.

Furthermore, the findings of the present study indicated that the quality of the SDM process explained only about ten percent of the variance in hope levels among patients with multiple sclerosis. This proportion suggests that although SDM in therapeutic interactions can play an essential role in enhancing patients' hope through strengthening their sense of control, trust in the healthcare team, and informed participation, hope is a multifaceted phenomenon that is likely influenced by other psychological, social, and clinical factors such as depression, fatigue, social support, and disease course. Accordingly, emphasizing integrative approaches that simultaneously address the psychological and social dimensions of patients may provide a more comprehensive understanding of the mechanisms underlying the formation and maintenance of hope in the context of chronic illness and allow the role of SDM in this process to be interpreted within a more realistic framework [25,26].

However, studies by Buono (2023) and Reyes (2022) reported a positive and significant relationship between marriage and hope, and higher levels of hope among employed patients, respectively (27, 28). Other research similarly linked higher education and younger age to increased hope [29, 30]. These discrepancies likely stem from differences in participants' geographic, cultural, psychological, social, and economic conditions, sampling methods, hope measurement tools, or patient health status at the time of study.

Our analysis of variance showed a significant association between patients' education, occupation, and the quality of the SDM process. This aligns with Kopke et al. (2009), who found that higher education fosters active patient involvement due to improved understanding of medical information and higher health literacy [31]. Benbassat et al. (1998) and Kopke et al. (2009) further supported the idea that employment status directly relates to participation levels and to better communication skills in treatment [32]. However, Wieringa et al. (2017) observed a poor association between education and SDM, particularly in chronically ill patients [33]. This difference might be specific to MS, where complex decisions about disease-modifying therapies (DMTs) may uniquely encourage educated patients to participate. Differences between the present findings and those reported in Western contexts may be partly explained by cultural, social, and health system characteristics specific to Iran. The Iranian health care system remains physician-centered, with limited institutional structures for shared decision-making, which may constrain patients' active involvement in treatment decisions. In addition, cultural norms that emphasize respect for medical authority may reduce patients' tendency to question clinicians or to explicitly express preferences, potentially weakening the observable impact of SDM on psychosocial outcomes such as hope. At the same time, strong family involvement in medical decisions, a salient feature of Iranian culture, may both support patients emotionally and shift decision-making dynamics from an individual to a more collective process. In such contexts, hope may be shaped not only by patient–clinician interactions, but also by family expectations, spiritual beliefs, and social support networks. These contextual factors suggest that SDM may operate differently in Iran compared with Western settings, highlighting the added value of examining SDM–hope relationships within a culturally specific framework rather than merely replicating international evidence.

Our results indicated a positive correlation between the number of children, disease duration, and SDM quality, while age was inversely correlated. The positive association with the number of children aligns with Bassi et al. (2020), who found that family responsibilities boost patients' motivation for disease management [34]. Patients with more children may be more driven to maintain their health to fulfill family roles. The inverse correlation with age is also consistent with Wieringa et al. (2017), who reported lower participation

rates among older patients [33]. However, Barelo et al. (2014) did not find a significant association between disease duration and participation [35]. This discrepancy might stem from differences in patients' access to the MS association's education and support. Our study's patients may have experienced increased participation due to greater disease experience, whereas Barelo's study did not mention such supports.

Contrary to studies like Turner et al. (2020), which reported an association between disease duration and decreased hope [22], our study found no significant effect of disease duration or occupation on hope. The lack of association between occupation and hope aligns with Wilski and Tasiemski (2016), who noted a limited effect of occupational status on psychological well-being in MS patients with strong social support [36]. In our sample, 58.5% of patients were homemakers and members of the MS association, likely mitigating the impact of occupation. The discrepancy with Turner's study may be attributable to our sample's disease course (76% relapsing-remitting) and to support from the Ardabil MS association, which mediates the negative impact of disease duration. Regression analysis identified satisfaction with the information during the SDM, the adverse events during the selected treatment, and DMT convenience as significant predictors of hope. This aligns with Rodriguez et al. (2022), who demonstrated that clear information and effective side effect management enhance patients' trust in treatment [8]. The high mean satisfaction with the information during the SDM and information reliability in our study further support this finding.

Implications for policy

From a policy perspective, the findings suggest that efforts to improve communication and patient involvement in treatment decisions may modestly support hope among patients with MS. However, given the multifactorial nature of hope, policy initiatives should consider SDM as one component within a broader, multidisciplinary approach to psychosocial care.

Limitations

This study had a few limitations. Our primary challenges included the reliance on self-report measures, participants' potentially unfavorable physical and mental conditions, and the limited time available for questionnaire completion. To minimize these issues, the research team carefully selected appropriate times for data collection, provided sufficient opportunities to complete the study, clearly explained the study's purpose, fostered trust and cooperation, and assured participants of confidentiality.

In addition, the cross-sectional design of the study restricts the ability to infer causality; thus, the observed association between shared decision-making and hope should be interpreted as correlational rather than causal. Furthermore, because data were collected from a single geographic location (Ardabil, Iran), the findings may not be fully generalizable to patients with MS across other regions of Iran or other countries. Future research should employ longitudinal or multi-center designs to examine these relationships more comprehensively.

Conclusion

This study revealed a significant positive relationship between the quality of SDM and hope among patients with multiple sclerosis. As the quality of SDM improved, patients' levels of hope also increased. Although the quality of SDM was moderate, suggesting room for improvement in communication and involvement between patients and healthcare providers, the findings highlight the vital role of engaging patients in decision-making to enhance their sense of hope and psychological well-being.

Declarations

Acknowledgements

The authors express their gratitude to all the patients who participated in the study, the Vice President of Research and Technology at Ardabil University of Medical Sciences, and the Ardabil MS Association.

Author contributions

B. D. conceptualized the study; B. D. and R. N. supervised data collection; MA. M. Database search strategy; R.N. and MA. M. collected the data and drafted the first version of the manuscript; B. D. reviewed and edited the manuscript; all authors read and revised the manuscript and approved the final version.

Funding

This work was supported by Ardabil University of Medical Sciences (IR. ARUMS. REC.1402 084).

Data availability

The database generated and/or analyzed during the current study is not publicly available but is available from the corresponding author on reasonable request.

Ethics approval and consent from participants

This study strictly followed the principles outlined in the Declaration of Helsinki. The present study was derived from a research project of Ardabil University of Medical Sciences with the code of ethics (IR. ARUMS. REC.1402.084), and it has been accepted and approved by the Ethics Committee of Ardabil University of Medical Sciences. All participants provided written informed consent before the commencement of the study. The consent form provided participants with a clear understanding of the study's purpose and methods. Participants were also informed of the researchers' commitment to address any questions or concerns and the confidentiality of their information.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

References

1. McGinley, M. P., Goldschmidt, C. H. & Rae-Grant, A. D. Diagnosis and treatment of multiple sclerosis: a review. *Jama* **325** (8), 765–779 (2021).
2. Adibi, M., Taher, M. & Nahayati, M. A. The Comparison of Cognitive Fusion, Self-Compassion, and Flourishing in Patients with Multiple Sclerosis and Normal Individuals. *J. Health Care*. **23** (1), 55–65 (2021).
3. Walton, C. et al. Rising prevalence of multiple sclerosis worldwide: Insights from the Atlas of MS. *Multiple Scler. J.* **26** (14), 1816–1821 (2020).
4. Azami, M., YektaKooshali, M. H., Shohani, M., Khorshidi, A. & Mahmudi, L. Epidemiology of multiple sclerosis in Iran: A systematic review and meta-analysis. *PLoS One*. **14** (4), e0214738 (2019).
5. Molazadeh, N., Mohebi, F., Altafi, D. & Sahraian, M. A. Prevalence and incidence of multiple sclerosis in Ardabil, Northwest of Iran. *Multiple Scler. Relat. Disorders*. **47**, 102605 (2021).
6. Saadat, S., Kalantari, M., Kajbaf, M. B. & Hosseinihezad, M. Comparison of Psychological Symptoms in Multiple Sclerosis Patients and Normal People. *Razi J. Med. Sci.* **26** (6), 73–83 (2019).
7. Dehghani, A. Health Problems Questionnaire in Multiple Sclerosis Patients: Development and Validation. (2021).
8. Alvarez-Rodriguez, E. et al. Development of a scale for the evaluation of the quality of the shared decision process in multiple sclerosis patients. *PLoS One*. **17** (5), e0268125 (2022).
9. Wilkie, D. D., Solari, A. & Nicholas, R. Initiating disease-modifying treatments in multiple sclerosis: Measuring the decision process using decisional conflict and decisional regret scales. *Mult Scler. J. Exp. Transl Clin.* **5** (1), 2055217319833006 (2019).
10. Ryan, R. E. & Hill, S. Decision aids: Challenges for practice when we have confidence in effectiveness. *Cochrane Database Syst. Reviews* 2024(1).
11. Nooripour, R. et al. Psychometric Characteristics of Persian Version of Adult Hope Scale (AHS) in Iranian Females with Multiple Sclerosis (MS). *J. Kermanshah Univ. Med. Sci.* ;**26**. (2022).
12. Seyedeh, M. G., Mohammadi, M. A. & Behrouz Dadkhah. Parenting stress and social support in mothers of children with disability in Ardabil,2020.2023;**13**(1):105–110
13. Pouyanfard, S., Mohammadpour, M., ParviziFard, A. A. & Sadeghi, K. Effectiveness of mindfulness-integrated cognitive behavior therapy on anxiety, depression and hope in multiple sclerosis patients: a randomized clinical trial. *Trends Psychiatry Psychother.*

42 (1), 55–63 (2020).

14. Cayoun, B. A. *Mindfulness-integrated CBT: Principles and practice* (Wiley, 2011).
15. Moudi, Z., Jam, R., Ansari, H. & Montazer Zohour, M. Effect of Shared Decision-making on Anxiety of Women Recommended for Prenatal Screening Tests in Southeast of Iran. *J. family reproductive health*. **14** (3), 192–197 (2020).
16. Mohammadi, S., Mohammadi, M. A. & Dadkhah, B. Dental caries prevalence among elementary school students and its relationship with body mass index and oral hygiene in Ardabil in 2019. *J. Indian Soc. Pedod. Prev. Dentistry*. **39** (2), 147–153 (2021).
17. Snyder, C. R. et al. Development and validation of the State Hope Scale. *J. Personal. Soc. Psychol.* **70** (2), 321 (1996).
18. Sarmad, Z., Bazargan, A. & Hejazi, E. Research methods in behavioral sciences. *Tehran: Agah Publication*. **1**, 132–137 (2004).
19. Heesen, C. & Rahn, A. C. Guest Editorial: Shared Decision Making in Managing Multiple Sclerosis: Revisiting the Research Agenda. *Int. J. MS Care*. **20** (6), v–vi (2018).
20. Freedman, M. S. et al. Treatment optimization in multiple sclerosis: Canadian MS working group recommendations. *Can. J. Neurol. Sci.* **47** (4), 437–455 (2020).
21. Snyder, C. R. et al. The will and the ways: development and validation of an individual-differences measure of hope. *J. Personal. Soc. Psychol.* **60** (4), 570 (1991).
22. Turner, A. P. & Knowles, L. M. Behavioral interventions in multiple sclerosis. *Fed. Practitioner*. **37** (Suppl 1), S31 (2020).
23. Wilkie, D. D., Solari, A. & Nicholas, R. S. J. The impact of the face-to-face consultation on decisional conflict in complex decision-making in multiple sclerosis: A pilot study. *Multiple Scler. Journal–Experimental Translational Clin.* **6** (4), 2055217320959802 (2020).
24. Madan, S. & Pakenham, K. I. The stress-buffering effects of hope on adjustment to multiple sclerosis. *Int. J. Behav. Med.* **21**, 877–890 (2014).
25. Azimian, M. et al. The Effectiveness of Group Hope Therapy Training on the Quality of Life and Meaning of Life in Patients with Multiple Sclerosis and Their Family Caregivers. *Iran. J. Psychiatry*. **16** (3), 260 (2021).
26. Niyazmand, Z. A., Abbasszadeh, A., Borhani, F. & Sefidkar, R. The relationship between spiritual health and hope in multiple sclerosis patients: A descriptive-correlational study. *Electron. J. Gen. Med.* ;**15**(5). (2018).
27. Buono, V. L. et al. Psychological symptoms in Multiple Sclerosis and the role of marital status: Results from a retrospective single-center study. *Multiple Scler. Relat. Disorders*. **79**, 105051 (2023).
28. Lee, B., Rumrill, S., Reyes, A. & McDaniels, B. The association between hope and employment among individuals with multiple sclerosis: A hierarchical logistic regression model. *Work* **74** (2), 531–538 (2023).
29. de la Sainz, S. et al. Hopelessness in patients with early-stage relapsing-remitting multiple sclerosis. *Patient Prefer. Adherence* :1431–1439. (2023).
30. Lefort, M. et al. Association between education level and disability progression in patients with multiple sclerosis in France. *Multiple Scler. J.* **31** (1), 59–68 (2025).
31. Köpke eS, Kasper, J., Mühlhauser, I., Nübling, M. & Heesen, C. Patient education program to enhance decision autonomy in multiple sclerosis relapse management: a randomized-controlled trial. *Multiple Scler. J.* **15** (1), 96–104 (2009).
32. Benbassat, J., Pilpel, D. & Tidhar, M. Patients' preferences for participation in clinical decision making: a review of published surveys. *Behav. Med.* **24** (2), 81–88 (1998).
33. Wieringa, T. H. et al. Decision aids that facilitate elements of shared decision making in chronic illnesses: a systematic review. *Syst. Reviews*. **8**, 1–9 (2019).
34. Bassi, M. et al. Illness perceptions and psychological adjustment among persons with multiple sclerosis: the mediating role of coping strategies and social support. *Disabil. Rehabil.* **42** (26), 3780–3792 (2020).
35. Barello, S., Graffigna, G., Savarese, M., Donato, S. & Bertoni, A. M. M. Patient engagement in chronic disease management: The pivotal role of partners. In International conference on communication in healthcare; ; Amsterdam2014. (2014).
36. Wilski, M. & Tasiemski, T. Health-related quality of life in multiple sclerosis: role of cognitive appraisals of self, illness and treatment. *Qual. Life Res.* **25**, 1761–1770 (2016).

Figures

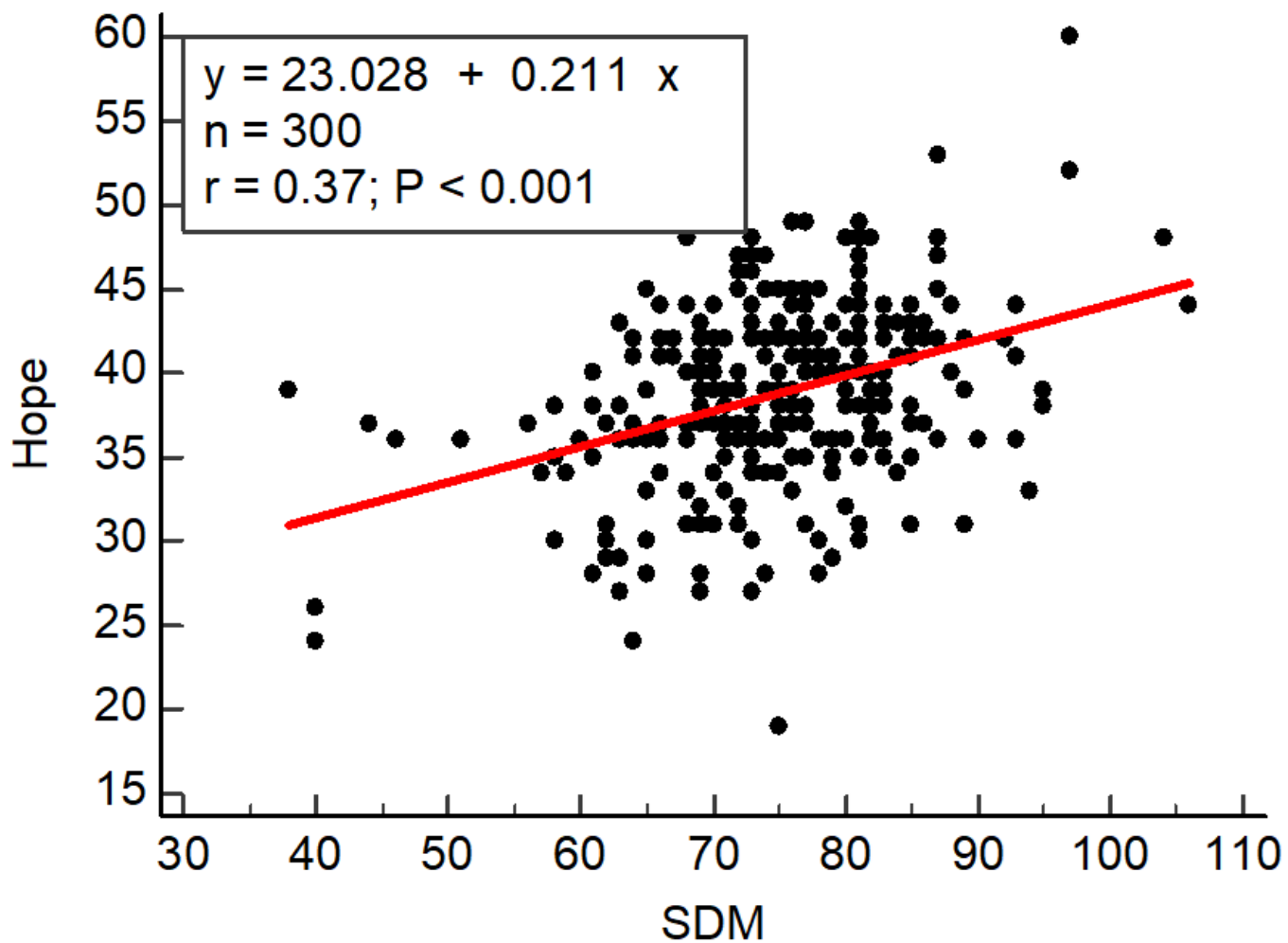


Figure 1

Relationship between the quality of the SDM process and hope in patients with MS