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Health Information Orientation, Social Support, and Diabetes Self-Care Behavior among Indian Adults: The Roles of Education and Self-Efficacy

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This study examines the direct and indirect influences of health information orientation and social support on diabetes self-care behavior through self-efficacy and the moderating role of education on such indirect effects. Data were collected from Indian adults with type 2 diabetes using a self-administered questionnaire. Results suggest that self-efficacy fully mediates the link between health information orientation and diabetes self-care behaviors. In addition, social support is directly related to self-care behaviors and indirectly through self-efficacy. This indirect association was stronger among patients with higher education compared with those with a lower level of education. The results offer several public health education and promotion implications for promoting diabetes self-care behaviors and developing self-care interventions. In particular, the findings provide evidence for explaining the mechanism through which health information orientation and social support influence diabetes self-care activities.

Keywords: health information orientation, social support, diabetes self-care behaviors, self-efficacy, education

In healthcare contexts, self-care behavior refers to a practice of maintaining one's health through treatment adherence and symptom monitoring that includes necessary human regulatory activities (Riegel et al., 2004; Segall & Goldstein, 1998). These day-to-day tasks are required to control

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or reduce the impact of disease on physical health status (Clark et al., 1991). In the case of type 2 diabetes, self-care (also known as self-management) activities include the routine tasks (e.g., eating healthy food and diet, engaging in physical activity, self-monitoring blood glucose level) that an individual performs to manage diabetes (Weinger, Butler, Welch, & La Greca, 2005). Self-care behavior is an essential function for managing diabetes.

Self-care behavior is a widely researched topic in diabetes management. Researchers have examined various antecedents of self-care behaviors across the globe. For example, diabetes knowledge had a significant direct effect on diabetes self-care activities among South Korean patients with type 2 diabetes (Kim, 2021). Higher levels of optimism, positive efficacy expectancies, and self-compassion were positively correlated with self-care behaviors, but depression and stress were negatively correlated with self-care behaviors in young adults with type 1 diabetes in New Zealand (Loseby et al., 2022). Izadi Avanji, Masoudi Alavi, Akbari, and Saroladan (2021) found that resilience (i.e., a person's capacity to overcome difficulties) was positively correlated with self-care management among hemodialysis patients in Iran. Prior research also found an important role of spiritual and religious beliefs and practices in diabetes self-care activities in African Americans with type 2 diabetes (Watkins, Quinn, Ruggiero, Quinn, & Choi, 2013).

However, the role of social capital (i.e., social networks and interpersonal relationships) as an antecedent of diabetes self-care behavior has received little attention. Furthermore, little is known about how and when patients' proactive behaviors (e.g., health information orientation), self-initiated and future-oriented actions that aim to change and improve the situation or oneself (Parker, Williams, & Turner, 2006), influence self-care behaviors. Therefore, this study aims to examine the extent to which health information orientation and social support influence diabetes self-care activities of adults with type 2 diabetes. In this study, health information orientation is defined as the extent to which individuals are willing to look for diabetes information and educate themselves about diabetes (Dutta-Bergman, 2004). Social support has been defined and measured differently. Extent literature offers diverse forms of social support, including informational (e.g., advice, suggestions, and information), emotional (e.g., expressions of empathy, love, trust, and caring), esteem (e.g., messages that help to promote one's skills, abilities, and intrinsic value), and instrumental support (e.g., providing goods, services, money, time, and labor to recipients; Cutrona & Suhr, 1992). The present study focuses on instrumental and emotional social support in understanding diabetes self-care behavior. Past research shows that instrumental and emotional social support from friends and family is essential in chronic disease management (Toljamo & Hentinen, 2001). In this study, social support refers to the extent to which an individual perceives receiving diabetes self-care–related tangible (e.g., helping in following a meal plan, testing sugar, exercising) and emotional (e.g., helping in handling one's feelings about diabetes) support from friends and family. Since understanding the impacts of health information orientation and social support on self-care activities are critical to maintaining and improving the health outcomes of diabetes patients, the findings of this investigation may provide critical insights to parties engaged in promoting diabetes self-care.

From a theoretical perspective, the information-motivation-behavioral skills (IMB) model proposed by Fisher and Fisher (1992) suggests that in addition to information and motivation, patients' behavioral skills (e.g., self-efficacy) are needed for successful self-management or adherence among patients with chronic disease (Deakin, McShane, Cade, & Williams, 2005). Literature has established that self-efficacy,

defined as an individual's confidence in his or her ability to initiate behavior changes (Bandura, 1997), influences health behavior. For example, one study found that self-efficacy was a direct, positive predictor of diabetes self-care behavior (Ha, Hu, Petrini, & McCoy, 2014). Another study shows that diabetes self-efficacy can mediate the effect of diabetes knowledge on diabetes self-care activities (Tan et al., 2020). Therefore, this study, in line with the IMB model, examines the mediating effect of self-efficacy in explaining the mechanism of how health information orientation and social support influence diabetes self-care activities. Additionally, previous research has shown that patients' educational attainment can play a critical role in diabetes self-care management (Sacco, Bykowski, Mayhew, & White, 2012; Yang et al., 2015). We, therefore, *examine* whether the proposed mediating effects are moderated by patients' educational attainment (Figure 1).

From a practical perspective, the current investigation was carried out in India, an important context for diabetes communication research. The rationale for selecting Indian adults with type 2 diabetes is that India has the largest number of people with diabetes in the world, roughly 11.4% of the total population, with a higher prevalence of diabetes in urban areas than in rural areas (Anjana et al., 2023). There is a paucity of systematic studies in India examining the efficacy of self-management programs for diabetes. For example, there are no culturally adapted programs for diabetes prevention among Sikh Asian Indians (Abraham, Sudhir, Philip, & Bantwal, 2020; Lim et al., 2019). Therefore, the insights from this study will offer several implications for promoting diabetes self-care behaviors and developing self-care interventions in India.

Theoretical Background and Hypotheses

Drawing from social cognitive theory (SCT), a theoretical perspective applied frequently to various health communication issues, this study examines the direct effects of health information orientation and social support on diabetes self-care behaviors (see Figure 1). SCT offers conceptual explanations of how individuals manage chronic health issues. SCT describes how people acquire and maintain certain patterns of behavior and how they consider the social environment in which individuals behave. SCT holds that learning and behavioral change occur in a dynamic social context in which an individual, environment, and behavior interact (Bandura, 1986). Extant literature suggests that patients' health knowledge is positively associated with self-management (Bains & Egede, 2011; Jamal et al., 2015). Prior studies also found a positive relationship between social contexts, such as family understanding of diabetes (Albright, Parchman, & Burge, 2001) and family support, peer support, and professional support (Chen et al., 2022), and diabetes self-management. Consequently, within the current investigation context, *personal factors* (i.e., health information orientation) and *environmental* factors (i.e., social support) can influence a patient's *behavior* (self-care behaviors). Thus, drawing from the SCT perspective, this study hypothesizes that a patient's health information orientation and support received from his/her friends and family are positively associated with diabetes management self-efficacy.

H1: Health information orientation is positively associated with diabetes self-care behaviors.

H2: Social support is positively associated with diabetes self-care behaviors.

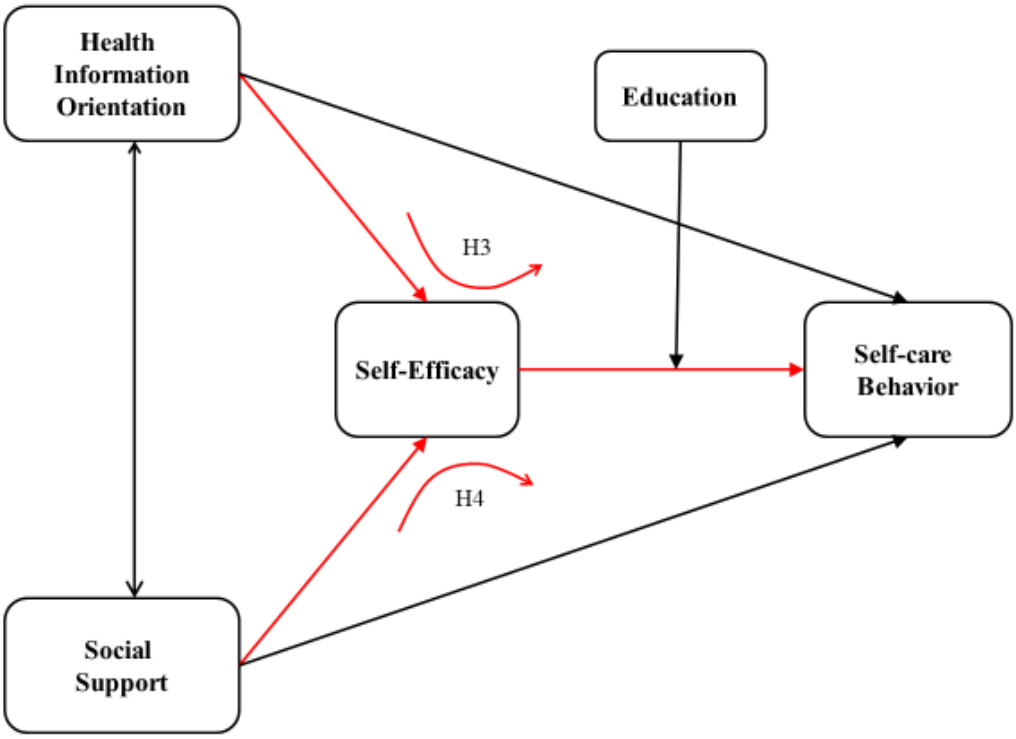

Figure 1. Conceptual framework.

Self-Efficacy as a Mediator

Defined as the perceived ability to execute behaviors necessary to achieve specific goals (Bandura, 1997), self-efficacy has consistently been found to predict health behaviors (see Bandura, 2004), including diabetes self-care (Tan et al., 2020; Yang et al., 2010). However, the literature suggests that knowledge of illnesses and motivation alone may not necessarily predict health outcomes (Coates & Boore, 1996). In addition, past research indicates that the influence of social support on self-care behavior can be elucidated by the underlying mechanisms (Gallant, 2003; McKinley, 2009). Furthermore, Tan and colleagues (2020) conducted an experiment to show that diabetes self-efficacy plays an intervening role between diabetes knowledge and diabetes self-care behavior. They demonstrated that increased diabetes knowledge increased self-confidence in diabetes self-care skills, resulting in increased diabetes self-care activities. Thus, the current study posits that health information orientation and social support influence self-care behaviors indirectly through self-efficacy. Overall, if individuals are well-informed, motivated to act, and possess appropriate behavioral skills to engage in a targeted behavior, a target behavior is more likely to occur (Fisher, Fisher, Amico, & Harman, 2006). Therefore, we hypothesize that individuals with high levels of health information orientation and social support are more likely to be confident in their ability to engage

in diabetes self-care behaviors, which in turn influence their diabetes self-behaviors. This leads to the following predictions:

H3: Health information orientation is related to diabetes self-care behaviors indirectly through self-efficacy.

H4: Social support is related to diabetes self-care behaviors indirectly through self-efficacy.

Education as a Moderator

Educational attainment can play a critical role in diabetes self-care management. People with higher educational attainment may benefit more from self-care interventions for diabetes (Sacco et al., 2012). Another study indicates that educational level is positively related to long-term glucose control (Yang et al., 2015). They found that patients with a higher educational level had better glucose control than those with a lower level of educational attainment. These studies indicate that patients with higher and lower levels of educational attainment may demonstrate different magnitudes of diabetes self-care behavior. In addition, prior research shows that educational attainment can moderate the relationships between constructs in the model (Limbu, Giovannetti, & Cardinali, 2020). However, the literature remains relatively silent about what role patient education plays in influencing the mediating effect of self-efficacy on associations between proactive behaviors and diabetes self-care behaviors. The authors are interested, therefore, in examining the moderating role of education in the aforementioned hypothesized mediating effects. Thus, the following hypotheses are advanced:

H5: Education moderates the mediation effect of self-efficacy between health information orientation and diabetes self-care behavior. Specifically, the mediating effect would be much stronger (weaker) among patients with a higher level of education (a lower level of education).

H6: Education moderates the mediation effect of self-efficacy between social support and diabetes self-care behavior. Specifically, the mediating effect would be much stronger (weaker) among patients with a higher level of education (a lower level of education).

Methodology

Sample and Data Collection Procedure

Individuals with type 2 diabetes and aged 18 years or older were recruited from diabetes management clinics in Andhra Pradesh and Telangana states of India. Trained field workers from a local research firm involved in data collection compiled a list of potential participants based on electronic clinic rosters who visited or scheduled appointments with the diabetes clinics. Most patients were approached in the waiting room, provided a description of the study, and asked to participate in the study. Those patients who were physically and cognitively impaired to participate were not included in the study. Before participation, the date of the diagnosis of type 2 diabetes mellitus (T2DM) was confirmed from medical records. Eligible and interested patients were taken to a private area in the clinic to complete the self-

administered questionnaire. Other patients completed the questionnaire in a quiet room at a facility of the research firm or in their homes. Three hundred eighty-three patients signed informed consent and completed the survey. Nine surveys were subsequently discarded for incomplete responses, resulting in 374 responses. It took about 30 minutes to complete the questionnaire. Respondents were given a monetary incentive in exchange for participating in this study.

The questionnaires included demographic information (e.g., gender, age, marital status, employment status, education, and income) and the measures of the proposed model. A questionnaire was initially prepared in English and was translated into Telugu. Then, a different translator translated it back into English to ensure both versions reflect the same content and meaning (Brislin, 1970). We repeated the process until the original and back-translated versions agreed. The questionnaire rendered in Telugu was pretested with eight people living with diabetes for ambiguity, content, and clarity. Given the nature of the instrument used in the study, care was taken to use the services of bilingual field staff to administer the survey who were familiar with the study area and population.

The respondents included 42% female and 58% male, with an average age of 53 (SD = 11.288). Of the respondents, 93.6% of them were married, and about 71.9% of the participants were employed. For education, 16.3% of respondents had no formal education, 8% attended primary school, 6.4% attended middle school, 24.1% attended high school, and 45.2% attended college/university; 32.6% of the respondents had an annual income between Rs. 100,001 and Rs. 500,000; another 19.5% had an annual income between Rs. 50,001 and Rs. 100,000.

Data were analyzed using structural equation modeling (SEM) with Analysis of Moment Structures (AMOS) 22.0 and Hayes's (2013) PROCESS macro for SPSS.

Measures

Participants were asked about their ages and the highest levels of education achieved, ranging from no formal schooling to college/university. In addition, respondents were asked to report their overall health status on a 5-point Likert-type scale, with 5 being excellent and 1 being poor. All other measures used in the study were adapted from previous studies that demonstrated satisfactory levels of reliability and validity.

To assess health information orientation, participants responded to five items on a 7-point scale ranging from 1 (strongly disagree) to 7 (strongly agree), and this measure was adapted from Dutta-Bergman (2004). Sample items included were "I make a point to read and watch stories about diabetes"; "When I take diabetes medicine, I try to get as much information as possible about its benefits and side effects"; and "I really enjoy learning about diabetes." Factor loadings ranged from .68 to .80, and Cronbach's alpha for the scale was .87.

A 6-item measure was adapted from Connell, Davis, Gallant, and Sharpe (1994) to assess social support from friends and family that included items such as "I receive help and support from my family and friends in following my meal plan" and "I receive help and support from my family and friends in testing my

sugar." Answer options ranged from 1 (totally disagree) to 7 (totally agree). Factor loadings ranged from .77 to .84. The scale had good reliability (α = .92).

Self-efficacy was measured with an 8-item scale adapted from Lorig, Ritter, Villa, and Armas (2009) and included items such as "How confident do you feel that you can follow your diet when you have to prepare or share food with others who do not have diabetes?" and "How confident do you feel that you can do something to prevent your blood sugar level from dropping when you exercise?" and "How confident do you feel that you can control your diabetes so that it does not interfere with the things you want to do?" The items were measured on a 7-point scale ranging from (1) not at all confident to (5) extremely confident. Factor loadings ranged from .55 to .78, and the scale's reliability was good (α =.87).

Diabetes self-care behavior was assessed with seven items adapted from Toobert, Hampson, and Glasgow (2000). Sample items included were: "How many of the last SEVEN DAYS have you followed a healthful eating plan?"; "On how many of the last SEVEN DAYS did you eat five or more servings of fruits and vegetables?"; and "On how many of the last SEVEN DAYS did you participate in at least 30 minutes of physical activity? (total minutes of continuous activity, including walking)" response choices range from zero to seven, representing the number of days in a week. Factor loadings ranged from .55 to .80, and Cronbach's alpha for the scale was .88.

Results

Measurement Model

Structural equation modeling (SEM) with AMOS 22.0 was used to analyze the data. Before assessing the proposed structural relationships, we evaluated the measurement model to assess the validity and reliability of the constructs in the proposed model using confirmatory factor analysis (Hair, Back, Babin, Anderson, & Tatham, 2010). The measurement model shows an acceptable fit to the data: NFI = .91; TLI = .94; CFI = .95; RMSEA = .055; and $\chi^2(293) = 618.23$; $p < .01$. The Normed Fit Index (NFI) value exceeds .90 recommended by Byrne (1994). The Tucker-Lewis index values (TLI) and comparative fit index (CFI) are close to the cutoff value of .95 recommended by Hu and Bentler (1999). The root mean square error of approximation (RMSEA) is below the suggested cutoff value of .08 and indicates an acceptable fit (MacCallum, Browne, & Sugawara, 1996). The normed chi-square value (the ratio of the chi-square to the degree of freedom) is 2.11, which falls within the recommended range from two to three (Fornell & Larcker, 1981). Based on the above, it is inferred that the overall model fit is acceptable.

All factor loadings ranged from .55 to .84, exceeding the necessary threshold alpha value of .5 (Gerbing & Anderson, 1988). The construct reliabilities are higher than the recommended level of .7, and average variance extracted (AVE) estimates for two hypothesized constructs are higher than the recommended level of .5 (Bagozzi & Yi, 1988; Fornell & Larcker, 1981). However, the AVE for self-efficacy is .48, which falls just below that rule of thumb, providing a limitation. These results reveal that the measures achieved an acceptable convergent validity. Discriminant validity was also achieved, as the AVE by each latent variable's measure was larger than the squared interconstruct correlation (Fornell

& Larcker, 1981). Table 1 summarizes the *descriptive statistics for* all constructs and the *interconstruct correlations.*

Table 1. Descriptive Statistics and Interconstruct Correlations.

N = 374		Mean	Standard deviation	1	2	3	4
1.	Health information orientation	5.524	1.221	1.00			
2.	Social support	5.239	1.540	.560	1.00		
3.	Self-care behaviors	4.026	1.693	.396	.554	1.00	
4.	Self-efficacy	4.896	1.085	.492	.603	.608	1.00

Note. All correlations are significant at the .01 level (two-tailed).

Hypotheses Testing

Direct Effects

First, we estimated a structural model based on SCT theory (Model 1) and examined the direct effects of health information orientation and social support on diabetes self-care behaviors. The fit indices for the structural model are acceptable and in line with the guidelines from Hair et al. (2010): NFI = .94; TLI = .96; CFI = .97; RMSEA = .07; $\chi^2(122) = 249.59$; $p < .01$; and normed chi-square = 2.05. The values of fit indices were close to or above recommended levels.

Hypothesis 1 predicted that health information orientation would be directly associated with diabetes self-care behaviors. Contrary to expectations, health information orientation was not significantly associated with self-care behaviors ($\beta = .04$, S.E. = .04, $t = .56$, $p < .05$), suggesting that a higher level of health information orientation was not associated with a higher level of self-care activities (see Table 2). However, consistent with H2, social support was directly associated with diabetes self-care behaviors ($\beta = .54$, S.E. = .06, $t = 5.73$, $p > .01$), suggesting that the higher level of social support from friends and family leads to a higher level of self-care behaviors.

Testing Mediation Effects

Next, we estimated the structural model. The fit indices for the structural model were deemed acceptable: NFI = .91; TLI = .94; CFI = .95; RMSEA = .06; $\chi^2(293) = 624.10$; $p < .01$; and normed chi-square = 2.13. The values of fit indices were close to or above recommended levels.

H3 and H4 predicted mediating effects of perceived self-efficacy on the relationships between the two predictor variables (health information orientation and social support) and diabetes self-care behaviors. The results of hypothesized mediation relationships are shown in Table 2. Consistent with H3, health information orientation was indirectly related to self-care behaviors through self-efficacy (Indirect effect: $\beta = .16$, $p < .01$). The results also supported H4 (Indirect effect: $\beta = .32$, $p < .01$). While the magnitude of the direct effect of social support on self-care behaviors decreased ($\beta = .26$, S.E. = .07, $t = 3.34$, $p > .05$), the relationship remained statistically significant indicating evidence of partial mediation.

Table 2. Direct and Indirect Effects of Health Information Orientation and Social Support on Self-Care Behaviors Mediated Through Self-Efficacy.

	Hypotheses	Direct Effects	Indirect Effects	Results
Model 1				
H1:	Health information orientation is directly associated with self-care behaviors.	.041 (.558)	–	Not Supported
H2:	Social support is directly associated with self-care behaviors.	.543* (.001)	–	Supported
Model 2				
H3:	Health information orientation is related to self-care behaviors indirectly through self-efficacy.	–	.160* (.002)	Supported
H4:	Social support is related to self-care behaviors indirectly through self-efficacy.	–	.318* (.000)	Supported

Note. * $p < .01$. The coefficients are standardized (β) values. Values in parenthesis are probability of $|p| < z$.

Testing Moderated Mediation Effects

H5 predicted that education would moderate the mediation effect of self-efficacy between health information orientation and diabetes self-care behavior. The bootstrapping method of 5,000 resamples using Hayes's (2013) PROCESS macro for SPSS with Model 14 was employed to examine the hypothesis. Table 3 Model 1 shows that that health information orientation was a significant predictor of self-efficacy ($t = 21.71$, $p < 0.001$). The results also showed that health information orientation ($t = 2.65$, $p < 0.01$) and the interaction of self-efficacy and education ($t = 1.98$, $p < 0.05$), after controlling for age and health status, were significant predictors of self-care behavior. The conditional indirect effect test showed that self-efficacy was a significant mediator between health information orientation and self-care behavior regardless of the level of education, as zero was not included in the confidence intervals (see Table 4). Although the mediating effect was significant at all three education levels, the magnitude of this effect was stronger among subjects with a higher level of education than a lower level of education (one standard deviation less than the mean, 95% CI [0.20, 0.47] or equal to the mean, 95% CI [0.27, 0.52] or one standard deviation more than mean, 95% CI [0.32, 0.59]). Therefore, the data provide support for H5.

Table 3. Direct Effects and Interaction Effects.

	Self-efficacy (*V*)		Self-care behavior (*Y*)	
	B	95% CI [BLLCI, BULCI]	*B*	95% CI [BLLCI, BULCI]
Model 1				
Health information orientation (*X*)	.673*** (.031)	[.61, .73]	.194** (.073)	[.05, .34]
Self-efficacy (*M*)	–	–	.31* (.15)	[.006, .61]
Education (*V*)	–	–	–.156 (.18)	[–.50, .19]
Selfefficacy * Education (*M x V*)	–	–	.073* (.037)	[.001, .15]
Age	.018*** (.003)	[.01, .024]	.014** (.005)	[.004, .02]
Health status	.15*** (.045)	[.06, .24]	.314*** (.065)	[.19, .44]
	R^2 = .613 F(3, 362) = –191.041, p < .001		R^2 = .554 F(6, 359) = 74.316, p < .001	
Model 2				
Social support (*X*)	.52*** (.030)	[.46, .58]	.164** (.053)	[.06, .27]
Self-efficacy (*M*)	–	–	.32* (.15)	[.03, .62]
Education (*V*)	–	–	–.113 (.17)	[–.45, .23]
Self-efficacy * Education (*M x V*)	–	–	.070* (.037)	[.002, .14]
Age	.008 (.004)	[–.001, .015]	.010* (.005)	[.001, .02]
Health status	.062 (.052)	[–.04, .16]	.276*** (.066)	[.15, .41]
	R^2 = .511 F(3, 362) = 125.895, p < .001		R^2 = .557 F(6, 359) = 75.253, p < .001	

*p < .05, **p < .01, ***p < .001; Numbers in parentheses are standard errors; NS = Not significant; BLLCI = Boot lower level confidence interval; BULCI = Boot upper level confidence interval.

Similarly, H6 predicted that education would moderate the mediation effect of self-efficacy between social support and diabetes self-care behavior. The results showed that social support significantly predicted self-efficacy (t = 17.24, p < 0.001). The results also showed that social support (t = 3.10, p < 0.01) and the interaction of self-efficacy and education (t = 1.94, p < 0.05), after controlling for age and health status, were significant predictors of self-care behavior. The conditional indirect effect test showed that self-efficacy was a significant mediator between social support and self-care behavior regardless of the level of education, as zero was not included in the confidence intervals (see Table 4). The magnitude of the mediating effect was stronger among subjects with a higher level of education than those with a lower level of education (one standard deviation less than the mean, 95% CI [0.17, 0.35] or equal to the mean, 95% CI [0.21, 0.39] or one standard deviation more than mean, 95% CI [0.24, 0.45]), providing some support for H6.

Table 4. Conditional Indirect Effect of Health Information Orientation and Social Support at Different Levels of Education.

Variables	Moderator: Education		β	SE	95% CI [BLLCI, BULCI]
Independent variable: Health information orientation Mediator: Self-efficacy Dependent variable: Self-care behavior	Mean –1 SD	2.42	.327	.069	[.20, .47]
	Mean	3.72	.391	.062	[.27, .52]
	Mean +1 SD	5.00	.454	.069	[.32, .59]
Independent variable: Social support Mediator: Self-efficacy Dependent variable: Self-care behavior	Mean –1 SD	2.42	.254	.048	[.17, .35]
	Mean	3.72	.300	.045	[.21, .39]
	Mean +1 SD	5.00	.346	.053	[.24, .45]

Discussion

Theoretical Implications

The purpose of the study was to examine the mediating effect of self-efficacy and the moderating role of educational attainment in explaining the mechanism of how health information orientation and social support are associated with self-care activities of adults with type 2 diabetes. The result indicates that social support is positively associated with self-care behavior. This supports the SCT, which suggests that learning and behavioral change occur in a dynamic social context in which an individual, environment, and behavior interact (Bandura, 1986). This shows that diabetes patients can acquire knowledge and learn to maintain diabetes self-care behaviors from friends and family. In addition, the finding is consistent with previous studies (e.g., Albright et al., 2001; Chen et al., 2022) that reported a positive association between access to social contexts (e.g., support from family, friends, and healthcare providers) and diabetes self-management.

The result suggests that health information orientation is not directly related to self-care behavior, contrary to a previous study (Bains & Egede, 2011; Jamal et al., 2015). This may indicate that proactive behaviors (i.e., their willingness to seek diabetes information and educate themselves about diabetes) of patients with type 2 diabetes alone may not be sufficient to foster their self-care activities. Even the best-

informed patient struggles with adopting complex health behavior in the absence of solid behavioral skills to do so (Osborn, Rivet, Fisher, Egede, & Fisher, 2010).

The finding supports the notion that diabetes knowledge alone may not necessarily lead to good adherence to diabetes self-care (Nam, Chesla, Stotts, Kroon, & Janson, 2011). The insignificant direct relationship between health information orientation and self-care may provide a rationale for examining the potential role of intervening variables (e.g., self-efficacy). The findings of this study established mediating effects of self-efficacy in the influence of health information orientation and social support on self-care behaviors. Additionally, such mediating effects were moderated by educational attainment; this indirect association was stronger among patients with higher education compared with those with a lower education level.

Practical Implications

From a practical perspective, the results offer several health education and communication implications. Given that self-care for chronic diseases such as diabetes requires a deeper understanding of managing conditions and complex routine tasks to be followed by patients, self-initiated information-seeking behaviors may help diabetes patients improve their knowledge and skills, which in turn promote self-care and subsequently prevent diabetes-related complications (Samad, Samad, & Abdallah, 2018). Given the massive growth of online health information, today's diabetes patients have an immense opportunity to access and use diabetes information from various sources apart from their healthcare providers. Therefore, governments, NGOs, and INGOs engaged in promoting diabetes self-care actions should motivate patients to read and watch necessary information via various credible sources and encourage them to be responsible for knowing about their conditions to keep themselves healthy. Since the prevalence of diabetes patients receiving diabetes education is low, even in developed nations such as the United States (Mendez et al., 2022), educational interventions should focus on promoting diabetes patients' health information-seeking behavior and educating them about diabetes self-care activities, including the use of glucose-lowering drugs like insulin and employ the empowerment approaches that are designed to strengthen patients' self-efficacy and train them to perform self-care behavior.

Another significant determinant that is positively related to diabetes self-care behavior is social support. The result indicates that the more an individual receives help and support from family and friends for her/his diabetes care, the more she/he is likely to engage in self-care behaviors. Social support can play a critical role in fostering diabetes self-management in India. From a cultural perspective, joint and extended families are common in India. Thus, social support is a part of the Indian culture as family, friends, and others often extend emotional, instrumental, informational, and economic support in times of crisis and illness (Sawant & Jethwani, 2010). Therefore, healthcare providers can encourage patients with type 2 diabetes to seek support from family and friends, especially for following a meal plan, taking medication, monitoring glucose levels, and involving in physical activities. In addition, diabetes self-management education campaigns designed to promote self-care activities can benefit from including social support by exemplifying one's well-being by engaging in instrumental support in following patients' meal plans, taking their medications, taking care of their feet, getting physical activity, and testing their blood sugar. Such campaigns can also promote emotional support by showing care and compassion for patients and handling their feelings about diabetes.

The result suggests that perceived self-efficacy is the key to diabetes self-care behaviors. Patient health information orientation alone does not improve diabetes self-care. Rather, it is critical to enrich the behavioral skills of patients required for performing routine tasks to manage their diabetes. Therefore, health promotion and marketing campaigns aimed at promoting type 2 diabetes self-care behaviors should not only enhance patients' health information orientation and social support but also promote the skills that help them build self-efficacy to perform self-care activities. Diabetes educators can incorporate the self-efficacy concept into teaching programs to help individuals develop strategies for the long-term management of their diabetes (Hurley & Shea, 1992). Healthcare providers such as primary physicians and nurses can play an important role in reinforcing patient's self-efficacy in living successfully with type 2 diabetes.

This study also examined how education moderated the mediating effects of self-efficacy in the associations between health information orientation and social support and diabetes self-care activities. The results show that the mediating effects depend on patients' education levels, confirming that the effects are stronger among highly educated patients. Thus, to design effective message strategies, it is important to consider patients' educational attainment as a segmentation variable in communication initiatives aimed at promoting diabetes self-care behaviors. Health education and promotion initiatives aimed at improving diabetes self-care behaviors can benefit from enhancing patients' health information orientation and social support of patients with lower education attainment. Healthcare professionals and diabetes management clinics can facilitate and encourage patients with lower levels of education to seek diabetes-specific support from family and friends.

Limitations and Future Research

This study has some limitations that offer opportunities for further research. First, future studies can replicate it in the context of chronic illnesses other than type 2 diabetes. Future research could also replicate it in the context of preventive health behaviors such as healthy eating, physical activity, and nonuse of alcohol and tobacco. Second, the current study employed a self-report measure of diabetes self-management. Thus, future studies should consider using objective measures to extract data through direct observations and glycated hemoglobin tests. Third, the current study is cross-sectional in nature. Future studies can conduct longitudinal studies to examine how other proactive behaviors influence self-care behaviors over time. Fourth, our study adopted Connell et al. (1994) general measure to access diabetes self-care–related instrumental and emotional support received from friends and family. Future research should use various social support measures to access other dimensions of social support, such as informational, esteem, appraisal, and network support. Finally, our study was carried out in Andhra Pradesh and Telangana, southern states of India with low literacy rates but high per capita income. People in Southern India differ from those in other regions in socioeconomic status, culture, language, and religion. Thus, the findings of this study should be interpreted cautiously. Further studies are needed to increase our understanding of regional differences in diabetes self-care behaviors.

Conclusion

This study examined factors predicting diabetes self-care behaviors among Indian adults. Results showed that self-efficacy fully mediated the relationship between patients' health information orientation

and self-care behaviors. In addition, results indicated that social support directly predicts diabetes self-care behaviors and indirectly is associated with these actions through self-efficacy. The results offer several public health education and promotion implications for promoting diabetes self-care behaviors and developing self-care interventions. This study shows how education moderated the mediating effects of self-efficacy in the influence of health information orientation and social support on diabetes self-care activities.

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