

Reliability and validity of Family Disease Management (FDM) Scale in families of patients with Covid-19

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October 11, 2022

Abstract

This study aimed to examine the management of family disease in Covid 19 patients. 204 families with patients recovered from Covid-19 were selected based on purposive and voluntary sampling and responded to family disease management (FDM) scale. The CFA results showed that the 30-items scale provided a good fit. Cronbach alpha test indicated 0.95 for the total scale and higher 0.89 in three subscales. Three factors were showed family support, family normalization, and family participation. The FDM scale could be a valid and reliable scale for determining the function of the family in the management of Covid-19 for this population.

Introduction

The family goes through events that require change and readjustment during its developmental stages (formation, middle, and final stages). An unexpected event can do a lot of damage to the family and disrupts the family growth sequence (Goldenberg & Goldenberg, 2012, p.29-40) Meanwhile, illness is a phenomenon which affects the family's health by making structural, procedural, and emotional changes, and members try to adapt to it (K. A. Knafl & Gilliss, 2002). The members' relationships impact the patient behavior, health, and well-being. Further, marital relationships and family stress affect the patient's self-care behavior (Fisher et al., 2000). In this regard, the concept of disease management is related to the efforts for developing the standard of patient care (Faxon et al., 2004). Further, it refers to the cooperation of members in managing and adapting the daily routines to the disease (Zhang, Wei, Shen, & Zhang, 2015). Family as a system reacts to the condition positively and negatively. Emphasis on behaviors like autonomy and personal success, family integrity, careful reactions to symptoms, and expressiveness of emotions were related to the positive outcomes. On the other hand, judging and excessively protected actions were related to negative consequences for patients (Rosland, Heisler, & Piette, 2012). In recent years, covid-19 as a pandemic illness affects the family. It limited communication with relatives. Therefore, people spend more times in their family. Advantages and disadvantages of being together in including members can benefit from each other's support, they can share their concerns, and help each other solve the problems and endure hardships. After all, tensions may increase. The lack of entertainment and financial problems in this period causes people to be in a bad mood (Shahyad & Mohammadi, 2020). Summarily, some studies indicated that families experience higher mental distress and pressure during disease (Ones, 2020; Tanoue et al., 2020) can help the patient to improve self-care (Fisher et al., 2000; Tramonti, 2021; Zhang et al., 2015). Thus, the study of family disease management is essential. Researchers have developed different instruments which examine family health focused on family managing strategies and functioning (Lima-Rodríguez, Lima-Serrano, & Domínguez-Sánchez, 2015). Knafl et al. (2011) studied the psychometric properties of family management tools, addressed families with diabetic children. Knafl and Deatrick (2003) focused on family response styles to illness, which helps understand family life in the context of disease. Previous tools have examined family

disease management for chronic illness. A general means is needed to compare family management in different contexts can give a good perception of the difficulties faced by the family. In this regard, Rodriguez et al. (2013) created a self-perceptions of family health scale. Based on the previous research, Rodriguez et al. (2015) developed the Family Disease Management (FDM) Scale for assessing disease management in family members. A three-dimensional scale consisted of family support, normalization, and participation. Family support includes the activities related to care, disease monitoring, decision-making, and proper actions. Normalization is the awareness of the new condition and potential changes to manage this situation. Involvement is the decision of whom to consult, when, and where to seek treatment. For the overall scale, Cronbach's alpha coefficient was 0.93, and 0.80 for the three subscales (Lima-Rodríguez et al., 2015).

Purpose

The present paper aimed to assess the validity and reliability FDM scale in the families of patients with Coronavirus (COVID-19) with the following research questions.

- 1) Is the family disease management scale reliable?
- 2) Does the family disease management scale have appropriate validity?
- 3) How many factors does the family disease management scale have?

Methods

Sample and data collection

This study is a psychometric study. A sample of 204 people were selected based on a purposive and voluntary sampling method from families with improved members of Covid 19 living in Sirjan. A list of coronary heart disease patients was received from the relevant hospital and their families were contacted, and a questionnaire prepared online was provided to a family member who was the patient's primary caregiver. The term caregivers refer to the family members such as Spouse, Father/Mother, Son/daughter, son/daughter in law, sibling, grandson/granddaughter, and everyone who provides care to the patient and lives in the same house.

Criteria for inclusion in the study were adult caregivers whose family member received a diagnosis of acute coronary syndrome and improved. The caregivers were over 18 years old and had the minimum literacy to respond to the questionnaire. They participated in the study voluntarily with satisfaction and cooperation. Criteria for exclusion were the patients who lived alone and used a nurse for home care, and participants who did not complete the questionnaire and did not wish to participate in the study. After informing and explaining how to respond to the measuring tools and the confidentiality of personal information, the scale was filled out online and through online sources and was returned to the researcher to ensure their completeness and accuracy after completion. First, some questions were asked about gender, age, education, and relations to the patients.

Instruments

The Family disease Management Scale was used to collect data. The Scale was developed by Rodriguez, Serrano, and Sanchez in 2015 and consists of 30 items, each ranked in a Likert (rarely, sometimes, and always) range, focusing on three dimensions: family support, family normalization, and family involvement. Further, based on the opinion of experts in this field, it was used to check the clarity (use of simple and understandable words) and avoid using technical and specialized words.

The back-translation was used to translate the questionnaire from English to Persian. Then, we translated the questionnaire back into the original language, and finally compared the original version with translated text. The participants completed the questionnaire on social media from November 21, 2020 to April 19, 2021.

Data analysis

Smart-PLS was used for data analysis in three steps such as assessing inner and outer model (Henseler, Ringle, & Sinkovics, 2009), and Total model fit.

Results

The participants' characteristics are shown in Table 1.

Table 1. The participants' characteristics

Cumulative percentage	Frequency percentage	Frequency	Variable	Variable	Variable
43.1	43.1	88	Man	Man	Gender
100	56.9	116	Woman	Woman	
32.8	32.8	67	Ages 18 to 30	Age	Age
75	42.2	86	Ages 31 to 40		
89.7	14.7	30	Ages 41 to 50		
95.6	5.9	12	Ages 51 to 60		
98.5	2.9	6	Ages 61to 70		
100	1.5	3	Ages 71 to 80		
16.2	16.2	33	Lower diploma	Education	Education
44.6	28.4	58	Diploma		
55.4	10.8	22	Associate		
84.3	28.9	59	Bachelor		
96.1	11.8	24	Master		
100	3.9	8	Doctorate		
50.5	50.5	103	Spouse	Relation to patient	Relation to patient
56.4	5.9	12	Father/mother		
81.4	25	58	Son/daughter		
86.3	4.9	10	Son/daughter in law		
92.6	6.4	13	Sibling		
93.1	0.5	1	Grandson/granddaughter		
100	6.9	14	Others		
100	100	204	Total	Total	Total

The first question was whether the Family disease Management Scale has reliability or not. Reliability is obtained by examining Cronbach's alpha, composite reliability, and factor load coefficients.

Cutoffs for Cronbach's alpha include more than or equal to .80 for a suitable scale, .70 for an acceptable scale, and .60 for a scale for exploratory purposes (Garson, 2016). As presented in Table 2, Cronbach's alpha is 0.883 for support, 0.894 for normalization, and 0.931 for participation.

Cronbach's alpha may over or undervalue scale reliability. Thus, composite reliability may be preferred, which ranges from 0 to 1. In a confirmatory model, composite reliabilities should reach .70 or more than for an adequate model (Henseler, Ringle, & Sarstedt, 2012). Accordingly, the present study meets the composite reliability criterion including 0.906 for support, 0.915 for normalization, and 0.942 for participation (Table 2).

Cross-loadings mean each indicator variable has a higher correlation with its latent variable than another latent variable (Garson, 2016). As shown in Figure 1, structural path coefficients (loadings), which are the path weights connecting the factors, was presented. The present study could fulfill the criterion for discriminant validity.

The second question was whether the Family disease Management Scale is valid or not. To this aim, the AVE index was examined.

The AVE presents the correlation of a construct with its indicators (Henseler, Ringle, & Sarstedt, 2015). The average variance was 0.502 for support, 0.525 for normalization, and 0.62 for participation, which meets adequate model criteria (Table 2).

Table 2. Reliability and convergent validity

Variable		Factor loading	Cronbach's alpha	Composite reliability	AVE
support	F1	0.656	0.883	0.906	0.502
	F2	0.791			
	F3	0.734			
	F4	0.84			
	F5	0.764			
	F6	0.838			
	F7	0.774			
	F8	0.448			
	F9	0.444			
	F10	0.659			
Normalization	F11	0.71	0.894	0.915	0.525
	F12	0.433			
	F13	0.747			
	F14	0.781			
	F15	0.528			
	F16	0.719			
	F17	0.806			
	F18	0.807			
	F19	0.846			
	F20	0.762			
Participation	F21	0.774	0.931	0.942	0.62
	F22	0.648			
	F23	0.774			
	F24	0.772			
	F25	0.759			
	F26	0.849			
	F27	0.865			
	F28	0.829			
	F29	0.77			
	F30	0.81			

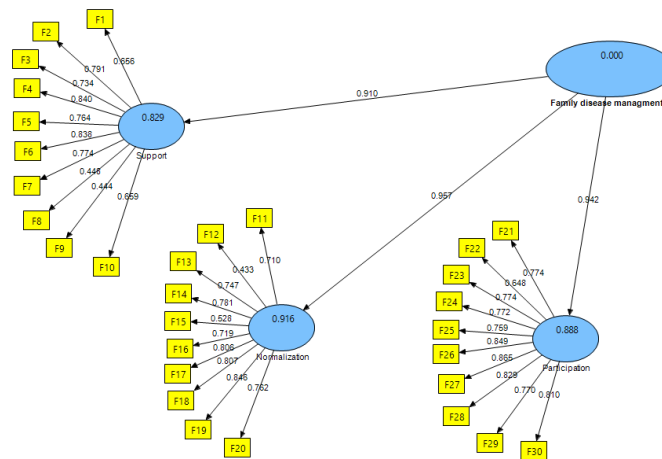


Figure 1. Standardized path loading coefficient

The third question is related to the number of factors the family disease management scale includes?

In this regard, the relationship between the variables was examined and the characteristics of R Square and Q2 and the general test of the model were examined.

As shown in Table 3, the significance of all t-values was confirmed at the 0.05 level. In fact, there is a significant relationship between "support", "normalization" and "participation" with the dependent variable "family disease management" since the value of t value for these relationships is more than 1.96.

Table 3 . Path coefficients

	T-Value	Standard Error
Support	34.765	0.026
Normalization	89.367	0.011
Participation	88.245	0.011

R-square is the total effect size. Q^2 value is a criterion of predictive accuracy. The cutoffs 0.67 are strong, 0.33 moderate, and 0.19 weak (Garson, 2016). Table 4 indicates the related data.

Table 4. R square and Q^2

Variable	R Square	Q^2
Support	0.829	0.409
Normalization	0.916	0.480
Participation	0.888	0.547

As shown, R -Square is higher than .80 for all components. In addition, the value of Q^2 is more than .35 for all terms which means that the model has a large size of predictive relevance considering the support, normalization, and participation factors.

The goodness of fit is a measure of model fit in PLS, which is a compound of effect size with convergent validity. It varies from 0 to 1. In the present study, Model fit was confirmed by the GoF index which was 0.694. Therefore, the Family Disease Management Questionnaire consists of supports: normalization and

participation.

Discussion

This study aimed to evaluate the reliability and validity of the Family Disease Management (FDM) Scale in families of patients with Covid-19. The reliability of the scale was confirmed by Cronbach's alpha, composite reliability and cross loadings. Validity was also confirmed through the AVE index, and the model was tested. In this model, the items 1-10 assessed family support, 11-20 evaluated family normalization, and 21-30 focused on family participation. The CFA results revealed that the 30-items scale provided a good fit, and three factors were obtained. Family support assists patients in self-care and decision-making. The family should have compassionate communication with the patient's expression of feeling, providing information, material, and satisfying the patient's essential needs. Some studies indicated that patients with fewer levels of family support show higher depression and anxiety (Reinares et al., 2016). In addition, family support is associated with adjustment to the disease (Arpin, Fitch, Browne, & Corey, 1990). Family normalization refers to the strategies which keep the family normal, which is a process and outcome. Attempts to develop a normal family life points to the process, and the perception of the result of this effort reflects the outcome (K. A. Knafl, Darney, Gallo, & Angst, 2010). The family should be flexible in the performance of roles, afford resources for the patient's comfort, and request for help (Avila-Jimenez, Cerón, Ramos-Hernández, & Velázquez, 2013). Families who emphasize the normality of the condition take an adaptable approach to follow the treatment (Bellack, Haas, Schooler, & Flory, 2018; K. Knafl, Breitmayer, Gallo, & Zoeller, 1996). Family participation refers to the responsibility of the family for helping in the management of a patient's life. Family's statement of patients with covid-19 revealed that caregivers had different experiences from their previous caring experience because of fluctuating symptoms, and unpredictable diseases, lack of knowledge, health facilities, and economic aid. However, social supports, offering food and necessities of life and guidance for care, as well as emotional support were accessible. Caregivers used defense mechanisms like positive self-talking, distracting, seeking information from various sources, and praying. Caring for these patients had some positive outcomes for caregivers such as promoting spirituality, improving relationships, and growth (Rahimi, Dastyar, & Rafati, 2021).

In conclusion, family is considered as one of the valuable dimensions in the research and treatment of diseases which have been emphasized in both the management of mental illness and physical illness (Fisher et al., 2000; K. A. Knafl & Gilliss, 2002; Reinares et al., 2016), and play an important role in promoting Patient health and well-being in the disease condition. In this way, family members can ensure that the patient's needs are met, provide staff with information about the patient, Members can also monitor the patient's health and report changes to prevent crisis, and finally, the family can help people with physical disabilities, and thus reduce personnel pressure (Kemp, 2021). The result of this study showed the empirical evidence for the reliability and validity of this scale. Thus, the FDM scale could be a valid and reliable scale for determining the role of the family in the management of the Covid-19 for this population.

Declaration of interest statement

Authors declare no conflict of interest.

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