

Empowerment and Knowledge Sharing in Health Infomediary: Empirical Evidence from Reconstructive Surgery Patients

Full Paper

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Abstract

Health infomediaries have become an important avenue for patients to seek health-related information. Despite the importance of health infomediaries, only a few can sustain in the long run and the rest are still struggling to gain more engagement from patients. This study provides an approach for health infomediaries to gain more engagement and boost knowledge contribution through patient empowerment and provides important evidence that may refute the belief that self-efficacy alone can lead to higher knowledge contribution on health infomediaries, at least for reconstructive surgery patients. The study investigates the archival data from reconstructive surgery patients to gain insight on knowledge sharing behavior on health infomediaries. The results suggest that self-efficacy can influence knowledge sharing on health infomediaries through the mediation of patient empowerment, and that self-efficacy alone does not lead to knowledge sharing on health infomediaries.

Keywords (Required)

Self-efficacy, knowledge sharing, health infomediary, reconstructive surgery.

Introduction

Patient empowerment is a process that helps individuals to gain control over their own lives and increases their capacity to act on issues that they themselves define as important. Arguably, patient empowerment is a key to improve health outcomes, specifically for patients who suffer from chronic diseases and need to manage their own health in a long run (Deng et al., 2013). Chronic diseases need long-term self-health management, and patients need to be disciplined and highly motivated in order not to miss the treatment or medication schedule (Khuntia et al, 2016).

Patient empowerment is a fine-tuned skill (Chiauzzi et al 2016). It involves a variety of components, like problem solving, communication, ability to seek out resources, an understanding of disease, and associated medical treatment. While most of them can easily be obtained during a patient's treatment process in a hospital or clinic (Yalom and Leszcz, 2005), it is difficult to extend the facilitating factors of patient empowerment beyond the walls of traditional healthcare system. For example, motivating a diabetes patient to follow an exercise regime remains a challenge. In this context, it is argued that providers may make some resources available to patients through the internet-enabled mediums, such as portals, websites, discussion forums, blogs, and similar online platforms.

While some the IT-enabled health information platforms mainly facilitate dissemination of information (Yim et al., 2015), a number of recent portals and websites put a lot effort on getting patient participation (Zahedi and Song, 2008). The latter set of mediums are broadly called health infomediaries. The objective

of the health infomediaries is to connect patients to other patients or health providers in order to provide information and facilitate knowledge sharing (Khuntia et al., 2016; Song and Zahedi, 2007). Health infomediary has gained its importance because the care delivery in current healthcare systems are limited to the institutional boundary (Currie, 2009; Mays et al., 2009). For example, patients need to visit the doctors or care providers to get treatment, suggestions, or diagnosis. Thus, health infomediary becomes an alternative for patient's own health management, allowing patients to get help and advice without visiting a doctor or hospital.

Prior studies note that it is important to understand the factors related to knowledge sharing on health infomediaries (Wimble, 2016) and social media in health care (Eschenbrenner and Nah, 2015); it would help manage the infomediary effectively from the initiation to development (Iriberry and Leroy, 2009). Some suggest that health infomediaries can use automated design schemas that can lead patients to ask questions, seek answers or solutions, and in turn be able to self-manage a disease (Deng et al., 2013). To achieve this end, patients need to feel empowered that asking such question in the infomediary is helpful to him or her (Leroy et al., 2014), or sharing such knowledge is valuable. Empirical investigation of this role of empowerment on knowledge sharing in health infomediary remains a gap that the current study tries to fulfil.

To reflect on the concept that a health infomediary can be helpful in a patient's empowering process, we rely on the existing literature on health belief model. We posit that four components are fundamental to the process of patient empowerment: (1) patient's understanding of their role, (2) patient's acquisition of sufficient knowledge to be able to engage with their healthcare provider, (3) patient's skills, and (4) the presence of the facilitating environment (Angelmar and Berman, 2007). The first is in essence be related to the patient's self-efficacy regarding his or her health management. The second and third elements need to be acquired during the empowering process, and indeed are related to the attributes of gaining autonomy and control over health (Deng et al., 2013). We anchor our study to the existing management literature to suggest that the autonomy and control aspects of empowering process are 'psychological' and measure it using the already established items. Finally, the facilitating environment is enabled by the health infomediary, albeit through the outcome of the knowledge sharing process. Based on this framing, we seek to explore the research question in this study: *how psychological empowerment mediates the relationship between patient's self-efficacy and knowledge sharing in a health infomediary.*

The empirical analysis for this study uses an archival dataset of a sample of 210 reconstructive surgery¹ patients participating in a health infomediary. We use partial least square or component-based structural equation modeling approach to test our hypotheses. We discuss the results of our analysis from the health infomediary growth and sustenance perspectives, and provide managerial implication and theoretical contributions that can be extended to other studies in the future.

Prior Work and Theoretical Background

This study focuses on how empowerment mediated the relationship between self-efficacy and knowledge sharing in a health infomediary. To establish the relationships between these concepts, we first review the literature streams on health infomediaries, empowerment, self-efficacy, and knowledge sharing behavior. We then anchor the existing work to the health belief model to propose a conceptual model, and develop testable hypotheses.

Prior work on health infomediaries include establishing definitions for health infomediaries or some attributes of health infomediaries (Vega et al., 2011), qualitatively exploring inhibitors and motivators

¹ Reconstructive surgery is performed to treat structures of the body affected aesthetically or functionally by congenital defects, developmental abnormalities, trauma, infection, tumors or disease. The common feature is that the operation attempts to restore the anatomy or the function of the body part to normal. It is generally done to improve function and ability, but may also be performed to achieve a more typical appearance of the affected structure. It is reported that the current reconstructive surgery market is more than \$20 billion and is expected to reach to over \$27 billion by 2019 (Global Cosmetic Surgery and Service Market Report 2015-2019: http://www.researchandmarkets.com/research/ddgf6q/global_cosmetic). In addition, many patients avail such services out of their host country, to save money, for privacy and/or faster service availability. In this context, prior- and post-information and knowledge associated with the surgery plays a great role to reduce information asymmetry, patient's decision making and post-operative management process. Thus, the reconstructive surgery context is a rich and appropriate one for this study.

(Ambrose and Basu, 2012), classification of user categories (Yim et al., 2015), and trust, privacy and information use issues with infomediaries (Bansal and Gefen, 2010; Lim and Kim, 2012; Zahedi and Song, 2008). Existing studies allude to the need of knowledge sharing and the role of user empowerment in this process (Khuntia et al., 2016).

Self-efficacy refers to the confidence in one's ability to complete a task within a particular context (Bandura, 1997). Self-efficacy plays an important role in health infomediaries. Studies suggest that building a strong online community requires the understanding of how self-related factors that motivate users to share knowledge (Iriberry and Leroy, 2009).

Empowerment refers to, and is theorized as, a process by which individuals, groups, or organizations gain control over matters that are of interest to them (Zimmerman, 1995). In health infomediary, empowerment may be extended to the context of the users managing and monitoring their own health, and feeling that they might be able to help others through the infomediary (Khuntia et al., 2016; Grando et al., 2015). Prior studies also note that empowerment, as a form of intervention, might vary in different work contexts compared to other factors such as cultural or societal values, power distance, and organizational hierarchies (Robert et al., 2000). Patient empowerment, a relatively new concept, includes support in developing treatment strategies and exchanging knowledge, as well as encouraging patients to take responsibility for their own health (Salmon and Hall, 2003). Empowerment can have multiple dimensions, however, psychological empowerment (as used in this study) is defined as the patient's internal motivation derived through the cognitive assessment of knowledge sharing on health infomediary including meaningfulness, autonomy, self-efficacy, and impact (Deng et al., 2013).

Empowerment is an individual level concept (Doll and Deng 2010; Spreitzer 1995), which exemplifies a motivational facet of self-competence and includes a perception of personal control (Zimmerman 1995). Psychologically empowering individuals entails creating conditions or providing opportunities so that people gain control over their actions, acquire skills to achieve their goals, and influence decisions that affect their lives.

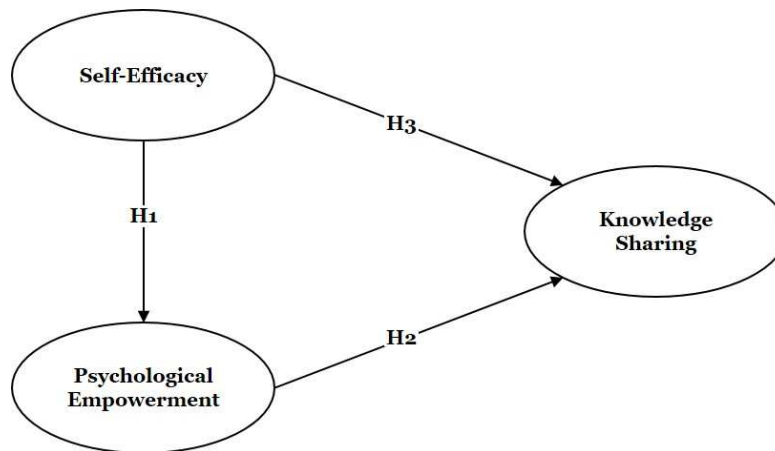


Figure 1. Conceptual Model

The *conceptual model* in Figure 1 anchors to the health belief model, which suggests that people's beliefs about health problems determine the health related behaviors, which is triggered by 'cue to action' (Janz and Becker, 1984). Individuals will do something about their health or act regarding health outcomes when they believe that such action can lead to better outcomes. We posit that self-efficacy and empowerment are two enablers or the 'cue to actions'. First, we hypothesize that self-efficacy (belief factor) impacts psychological empowerment, which in turn will influence the patient's knowledge sharing on the health infomediary. We propose that self-efficacy influences psychological empowerment. The self-efficacy concept notes that as a person feels skillful in managing a task, he or she feels enabled, empowered and less inhibited (Bandura, 1997). Higher self-efficacy or confidence in managing health involves a person's overriding of inhibitions related to the disease management process (Bong and Clark, 1999). The individual then understands and engages with the required behavioral changes to manage health and disease such as adhering to medication regimes, seeking and following treatment procedure,

and health-related behavior adjustments or lifestyle changes. Lack of self-belief or self-control can lead to a sense of powerlessness and subsequent health conditions (Graffigna et al., 2013; Tengland, 2008). Similarly, feeling a sense of empowerment could lead to the execution of actions required in care treatment or management (Aujoulat et al., 2007). The outcomes in health-focused motivation include a goal-directed approach and willingness to engage in behaviors to reach these goals (Janz and Becker, 1984; Moorman and Matulich, 1993). Thus, we argue that with higher self-efficacy, a patient feels more power in managing his or her health (Deng et al. 2013), thereby leading to higher empowerment. Based on these arguments, we hypothesize that:

Hypothesis H1: Self-efficacy of reconstructive surgery patients participating in the health infomediary is positively associated with psychological empowerment.

We also propose that empowerment influences knowledge sharing behavior. While some systems like business intelligence can automatically generate knowledge from a pool of existing data (Chen and Siau, 2012), health infomediaries rely on users to share their knowledge and some motivations are essential in stimulating knowledge sharing (Doll and Deng, 2010). Indeed, this is a striking feature as per the empowerment theory. In health infomediary context, empowered patients possess internal motivation that is driven by multiple aspects of cognitive assessment of knowledge sharing (Deng et al., 2013). Emotional and psychological empowerments are somewhat related concepts in that they reflect on the emotional state of an individual. While research on emotional empowerment is sparse, a relevant area in management has explored psychological empowerment. For example, Doll and Deng (2010) suggest that empowerment has four aspects: meaningfulness, autonomy, control, and impact. Relating to these concepts, we argue that patients need to understand the meaningfulness of the action related to treatment or management of disease. Patients must have autonomy to choose their own actions, and should choose to share their knowledge willingly. The knowledge sharing can be deemed as driven by psychological empowerment. The patients recognize that their knowledge can be helpful to other people, and thus contribute to the infomediary. Moreover, when sharing their knowledge on a health infomediary, the knowledge can reach a large number of people in shorter time; thereby amplifying the impact of knowledge sharing. Lastly, when the patients are confident and believe in their ability to deal with their own health management, they are more likely to share their knowledge to other (Bandura, 1997; Deng et al., 2013). If the patients are not confident in their own knowledge or they are unclear whether their knowledge is right, they may be less likely to share it to others, knowing that if it is wrong, it may not be helpful or even be harmful to other patients. Hence, we hypothesize that:

Hypothesis H2: Emotional empowerment is positively associated with knowledge sharing behavior in health infomediary.

Self-efficacy as the belief in one's ability to do something, by itself suggests that it may also influence some action, in this case knowledge sharing (Bandura, 1997). It is reasonable to argue that when people are confident in their ability to perform a task, they are more likely to actually perform that particular task. Similarly, studies suggest that people with high knowledge self-efficacy are more likely to be contributor in electronic knowledge sharing platform (Kankanhalli et al., 2005). The study shows that people who share knowledge frequently are more confident in their ability or have higher self-efficacy than those who share knowledge occasionally. Some scholars extend their studies to a virtual community where it requires higher skills in knowledge sharing (i.e. need to learn how to share knowledge on specific platforms). The study presents an empirical evidence showing that as people become more confident and believe in their ability to share knowledge in a specific virtual community, they are more likely to share knowledge (Hsu et al., 2007). Evidence from various literature leads to the same direction, guiding us to believe that self-efficacy alone would also be positively associated with knowledge sharing. Hence, we posit that:

Hypothesis H3: Self-efficacy of reconstructive surgery patients participating in the health infomediary is positively associated with knowledge sharing in a health infomediary.

Empirical Analysis and Results

This study uses the secondary archival survey data of 210 patients from a reconstructive surgery focused health infomediary collected by a consulting firm. The firm tracks the patients in the infomediary to develop insights and help in the portal business. The firm hires some professors from well-known colleges

as academic consultants to ensure the rigor of their data collection and methodologies. The firm provides us with a large number of questions and responses; all of them are in 7-point Likert scale. We only selected the questions relevant to our study. Variables were reflectively coded from the survey, anchoring to existing instruments in prior literature.

Table 1 shows the description and operationalization of variables, along with cross-loadings of measurement items and the associated latent variables. Table 2 provides the descriptive statistics and pairwise correlation amongst variable.

Variable	Description	Items (<i>measured in a 7-point scale: 1=highly disagree to 7=highly agree</i>)	EFF	EMP	KSB	References
Self-Efficacy (EFF)	The confidence in one's ability to complete a task within a particular context.	I am confident that I could deal efficiently with unexpected events (EFF1).	0.82	0.32	-0.11	(Luszczynska et al., 2005; Tambs & Røysamb, 2014)
		I can always manage to solve difficult problems if I try hard enough (EFF2).	0.83	0.28	-0.10	
		If I am in trouble, I can usually think of a solution (EFF3).	0.83	0.34	-0.07	
		I can solve most problems if I invest the necessary effort. (EFF4)	0.87	0.25	-0.10	
Emotional Empowerment (EMO)	The process through which people and groups gain greater control over their lives.	I would prefer to be a leader rather than a follower in a conversation (EMP1).	0.27	0.88	0.20	(Speer & Peterson, 2000; Vauth et al., 2007)
		I would prefer having someone else as a leader when I'm involved in a conversation. (reverse coded)(EMP2).	0.27	0.79	0.06	
		I am often a leader in a conversation(EMP3).	0.36	0.84	0.18	
Knowledge Sharing Behavior (KSB)	The behavior when a person disseminates his/her knowledge to other members within the community.	I frequently participate in knowledge-sharing activities on health websites (KSB1).	-0.02	0.25	0.91	(Oliveira et al., 2015; Xue et al., 2011)
		I usually spend a lot of time conducting knowledge sharing activities on health websites (KSB2)	-0.10	0.12	0.89	
		I usually share my knowledge with the other on health websites (KSB3).	-0.18	0.14	0.91	

Table 1. Variable Descriptions, Measurement, and Cross-loadings

Variables demonstrated reliability, convergence and divergence validity, through standard tests (details omitted due to page constraints). For example, we assessed the discriminant validity in two ways: (1) when the indicators load much higher on their underlying construct than on the others, and (2) when average variance extracted (AVE) is higher than 0.5 and the square root of AVE is higher than intercorrelations between the underlying construct and all other constructs (Chin, 1998; Pavlou, 2003; Karahanna et al., 2006). From table 1, these two conditions for AVEs for all constructs are satisfied. Hence, discriminant validity could be observed. Crossloadings from table 2 also shows that all indicators load highly on their underlying latent factors and not on other factors. This pattern also demonstrates high convergence validity and high discriminant validity.

	Mean	S.D.	Min	Max	Alpha	AVE	1	2	3	4	5	6
EFF	5.87	1.11	1.25	7.00	0.86	0.70	0.84					
EMP	4.67	1.45	1.00	7.00	0.78	0.70	0.36	0.84				

KSB	2.90	1.81	1.00	7.00	0.89	0.82	-0.11	0.19	0.90			
AGE	3.38	1.40	1.00	6.00	1.00	1.00	0.17	0.20	-0.05	1.00		
EDU	4.40	0.72	2.00	5.00	1.00	1.00	0.05	0.23	0.05	0.07	1.00	
INC	3.58	2.25	0.00	9.00	1.00	1.00	0.02	-0.18	-0.09	-0.06	0.03	1.00

Note: Correlations above 0.2 are significant at $p < 0.05$ level; the elements in the matrix diagonals represent the square root of AVEs.

Table 2. Descriptive Statistics and Pair Wise Correlation Amongst Variables

We test the model using partial least square (PLS), a *component-based structural equation modeling* (CB-SEM) technique, to validate the measurement model. We use PLS because it allows estimation of multiple interrelated dependence relationships simultaneously. PLS assesses the measurement model within the context of the theoretical model, and therefore is preferred over a multiple regression technique. Finally, PLS makes no prior assumptions about data normality (Garson, 2016).

The first hypothesis measures the influence of self-efficacy on emotional empowerment. We find that self-efficacy has a positive and significant effect on emotional empowerment ($\beta = 0.34, p < 0.01$), **supporting hypothesis H1**. The second hypothesis measures the influence of emotional empowerment on knowledge sharing behavior and we find that emotional empowerment also has a positive and significant effect on knowledge sharing behaviour ($\beta = 0.27, p < 0.01$), **supporting hypothesis H2**. Finally, the third hypothesis measures the direct effect of self-efficacy on knowledge sharing and surprisingly the result shows that self-efficacy has a negative and significant effect on knowledge sharing behaviour ($\beta = -0.20, p < 0.01$), **partially supporting hypothesis H3**.

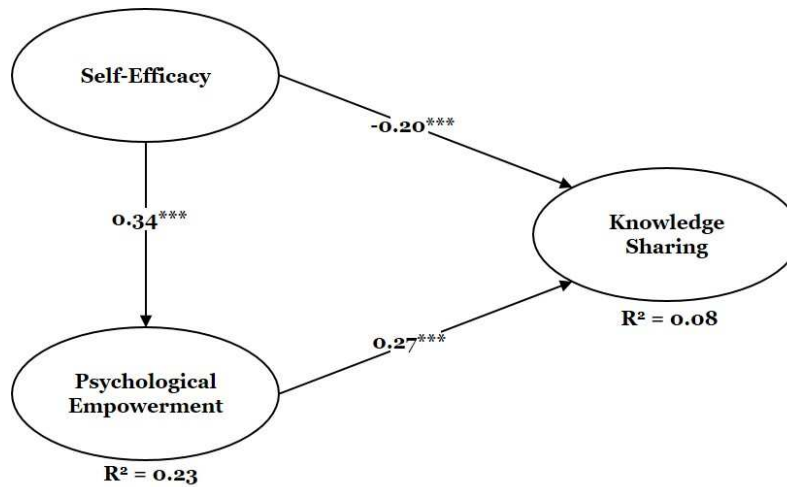


Figure 2. Results of Partial Least Square Estimation

Discussion

The objective of this study was to explore how self-efficacy and empowerment play a role in motivating patients to share and contribute knowledge in health infomediaries. We proposed a conceptual model demonstrating the relationship between self-efficacy and knowledge sharing behavior. Self-efficacy influences knowledge sharing on health infomediaries through the mediation of empowerment. On the other hand, self-efficacy also contributes directly to knowledge sharing on health infomediaries. We tested the hypotheses of the model using archival data of 210 patients in a reconstructive surgery health infomediary.

They find that although self-efficacy can influence knowledge sharing on health infomediaries through the mediation of patient empowerment, it alone does not lead to knowledge sharing on health infomediaries.

Thus, when people with higher self-efficacy are empowered, they are more likely to share their knowledge on health infomediaries. Although we expect to see the positive influence of self-efficacy on knowledge sharing, the resulting negative influence is completely understandable when we look at it from the perspective of social interdependence (Pee et al., 2010). Social interdependence theory suggests that the people in the society are somehow dependent on each other in many aspects and these interdependencies play a role in influencing people to share their knowledge. It is consistent to the concept of psychological empowerment that the internal motivation is derived from four components: meaningfulness, autonomy, control, and impact (Deng et al., 2013). People with high self-efficacy alone may not feel the need to share their knowledge with others, especially in the competitive environment (Pee et al., 2010). Without social interaction, people who are confident in their knowledge do not necessarily have a reason to disseminate their knowledge to others. On the other hand, when people live in a society, they interact and they are dependent on each other in some ways. The interaction and interdependency then triggers the need to share their knowledge. Similarly, psychological empowerment concept also suggests that people who are confident in their knowledge and realize the importance and the impact of knowledge sharing will be more likely to share their knowledge. The implications from the path comparisons are that for health infomediaries to design intervention systems, they need to focus on empowering the users rather than improving self-efficacy of the users.

This study contributes to theory by identifying and validating the effect of self-efficacy and empowerment on knowledge sharing, providing evidence that they can lead to patient engagement with health infomediaries. The study also provides evidence that may refute the direct effect of self-efficacy on knowledge sharing in health infomediaries, at least for reconstructive surgery patients. While knowledge-based empowerment plays a role in patient responsiveness within a healthcare system, the operationalization discussed in this study could lead to further discussion on the role of health infomediaries in a patient's management of their own health. This is especially critical in chronic disease management, as patients who live alone need constant motivation to manage their disease. The findings also demonstrate the need for an effective interface and appropriate incentive structure for knowledge interaction and community engagement within a health infomediary.

Just like other research, there are some limitations to this study. First, the observations were from reconstructive surgery patients, which are mostly female. Generalizability across gender and to patients with other diseases or conditions may be in question. Second, the sample size of 210 is not so large. This may also pose a threat to representativeness of the sample. Third, PLS is good for exploratory stage. Future studies employing more rigorous tools (i.e. SEM) will suit better for confirmatory stage. Further studies are also expected to extend the scope to other self-related factors and other perspectives of empowerment. Larger sample that represents various groups of patients are also expected.

In conclusion, this study provides a new perspective relevant to self-efficacy and mechanisms for patient empowerment and knowledge exchange on a health infomediary. self-efficacy mediated by empowerment leads to higher knowledge sharing. Data collected from a health infomediary designed for reconstructive surgery patients is used to validate several hypotheses. The findings highlight the role of self-efficacy and empowerment in the health infomediary context. Most importantly, self-efficacy alone does not encourage knowledge sharing. Only when self-efficacy is mediated by empowerment, it will lead to higher knowledge sharing on health infomediary.

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