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Role of educational level as moderator in health management information system (HMIS) adoption among healthcare professionals in the ESIC main hospital and dispensaries in the Tirunelveli sub-region

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***Abstract*---**Adoption of innovations by firms and workers is an important part of the process of technological change. Health Management Information System (HMIS) is an emerging technology that employs the internet and the typical health services infrastructure of hospitals. The adoption of a technology by users is vital if the organization wants to benefit from the technology advancements and synergies. Education is an important factor in predicting HMIS adoption by healthcare professionals in the Employees State Insurance Corporation (ESIC) main hospital and dispensaries. This study utilized two education levels (Under Graduation and Post Graduation in medical sciences) to moderate the research model that was proposed by the Technology Acceptance Model (TAM). Relying on data from the workplace and employee survey, this study assesses the causal effects of education on technology use and adoption by using instrumental variables for healthcare environment derived from the Technology Acceptance Model (TAM) and Extended Technology Acceptance Model (TAM2). The models concluded to five major predictors of HMIS adoption among ESIC healthcare professionals: Training, Social influence or Subjective norm , self-efficacy (SE), Perceived Usefulness (PU) and Perceived Ease of Use (PEOU). The statistical results show that education influences the use of computer-controlled and computer-assisted devices or other technological devices in the ESIC healthcare environment in the Tirunelveli sub-region. The results are consistent with the view that formal education increases the use of technologies that require or

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enable workers to carry out higher order tasks more efficiently, but not those that routinize workplace tasks.

***Keywords*---**technology acceptance model, extended technology acceptance model, health management information system, employees state insurance corporation, health services infrastructure.

Introduction

Innovations in health care account for some of the most dramatic improvements in population health outcomes in the developed world as well as the developing world. Currently, technology development has become one of the strategic elements in organizations. Provider organizations are the adopters of many innovations, and understanding the factors that inhibit or facilitate their diffusion to and possible disengagement from these organizations is important in addressing cost, quality, and access issues. In this paper, the researcher discusses the most important educational level factor affecting the acceptance of the Health Management Information System (HMIS) adoption among the healthcare professionals in the ESIC main hospital and dispensaries in the Tirunelveli sub-region. Given the importance of these issues, the purpose of this research paper is to (1) create a comprehensive study examining the adoption of and disengagement from HMIS in ESIC healthcare environment; (2) organize these results into a statistically derived classification scheme; (3) assess the studies' strengths and weaknesses; and (4) reflect on the implications and scope for future research. Moreover, health care provider organizations are significant investors in medical innovations; so understanding the factors that inhibit or facilitate adoption and disengagement in any organization is important to enhance the appropriate system-level diffusion of innovations.

Review of Literature

The quality of data played an all important role in setting up global standards. Firstly, the standards should be locally assigned and then there should be sound network facilities to support the local adaptation of standards. The health system of an entire country could be addressed through standardization. Such standardization should take place at the data production and collection levels (Jacucci, Shaw, & Braa, 2006). The set of essential data and its hierarchy constitutes the standard. Once the standard was implemented, the data quality in the entire system should be guaranteed to ensure its sustainability. The available data should be used at the level of collection and only then "local" sustainability of a local system could be a reality. Global standard-based health Information system in developing countries relied heavily on the 'sustainability' factor. Local use, local capacity building and local appropriation of the standard should also be taken into account while planning a sustainable information system. In a sustainable information environment, the responsibilities should reach the bottom of the hierarchy and only then standards could be proactively reinvented.

There was a remarkable increase in Op registration, Clinical Op and Pharmacy. The data generated by HMIS could be used for decision making (Natarajan.S,

Panchanathan.V, & Bansal, 2013). Further, recommendations aimed at health care development could also be made to the government. The main objective of the project is to use ICT in improving the ability to collect, store and analyze accurate health data across the state. The AMC (Application Maintenance Cost) reports were generated periodically. These reports were found to be very useful in estimating the cost and longevity of each set up. With the help of these reports, the monetary allocation for each district was proficiently made.

Every action had to be planned, organized, coordinated and controlled in an information management system. Management information system enabled more comprehensive use of information and thereby helped in the decision making process. Information management processes greatly helped in knowledge creation, sharing and use. They also helped to meet the future challenges of effectiveness, increasing needs and demands of patients and decreasing availability of staff resources (Kivinen & Lammintakanen, 2013). There were four sub-categories in the "usage of management information system". They were system quality, information quality, use and user satisfaction and development. Most of the generated information was used for the human resource management. Automatically generated patient satisfaction and feedback information assisted in evaluating the quality of daily work.

Information technology advances and their adoption into healthcare industry are likely to improve healthcare provision quality, reduce healthcare cost, and advance the medical science. Technology alone could not meet the ulterior goals of high quality care; Instead a balanced approach of investment in technology, processes, people, and knowledge base must be considered to improve health care services. Information security failures could lead to financial losses to various stakeholders including patients, providers, and payers. Due to the multitude of roles, interdependent information systems, and dynamic nature of role assignment, it is very difficult to establish and revise access control policies in hospital environments (Appari & Johnson, 2010). Understanding the operational effectiveness of data disclosure technology from the field was indeed considered as an important task. Such an endeavor would help hospital administration in refining disclosure policies, as well choosing appropriate data disclosure technology solutions.

The use of a unique national Medical Record Number (MRN) is a critical issue for any Health Information System (HIS). It provides accurate and efficient access to the patient medical information whenever and wherever it is needed. The system had been designed with compliance of the main elements of e-security: confidentiality, integrity, and availability. The system was isolated physically from the internet and it did not allow the use of removable storage such as USB memory and CDs within the Health Net. Medical Audit was found to be vital for the measurement of the quality of care given to the practice population (Elhadi, et al., 2007). Medical audit required standard setting, data collection, comparison with standards, review of data and standards. There has always been a need for a unified referral information system in which patient care records can be shared among hospitals over the internet.

Methodology

Data were collected in the ESIC hospital and dispensaries in Tirunelveli sub-region (Tirunelveli, Tuticorin and Kanyakumari districts). Survey questionnaire was distributed to 171 healthcare professionals to collect their responses regarding the adoption of Health Management Information System (HMIS). Appropriate statistical tool was used to test the hypothesis and the statistical tool used in this study was T-test. Throughout this research, all independent variables for this quantitative article were classified according to the connection between measure and construct intended by the researcher. The findings of this study will be reliably based on intended meaning of constructs and practical cause-effect relationship in the ESIC healthcare environment.

Data and Analysis

A null hypothesis is formulated and the T-test is carried out to statistically analyze the survey data.

H01: There is no significant difference among ESIC healthcare professionals on the basis of their education in adopting health management information system.

Table 1
Results of 't' test for respondents' (healthcare professionals') education and HMIS adoption in ESIC

Adoption factors	Educational qualification	N	Mean	S.D	't' value	'p' value
System Quality	Bachelor degree	137	22.88	4.23	3.972	0.003**
	Master degree	34	19.32	6.18		
Computer Self-Efficacy	Bachelor degree	137	23.27	5.56	4.540	0.000**
	Master degree	34	18.18	6.93		
Facilitating Conditions	Bachelor degree	137	33.43	6.01	5.434	0.000**
	Master degree	34	26.24	9.78		
Perceived Usefulness	Bachelor degree	137	31.66	6.36	3.924	0.002**
	Master degree	34	26.53	8.49		
Perceived Ease of Use	Bachelor degree	137	13.84	3.05	3.819	0.002**
	Master degree	34	11.47	3.93		
Perceived Behavioral Control	Bachelor degree	137	36.74	6.83	4.960	0.000**
	Master degree	34	29.47	10.3		
Attitude	Bachelor degree	137	27.94	7.09	3.380	0.001**
	Master degree	34	23.24	7.94		
Subjective	Bachelor	137	14.90	3.43	3.591	0.000**

Norm	degree					
	Master degree	34	12.47	3.89		
Behavioral Intention	Bachelor degree	137	14.23	3.89	3.231	0.001**
	Master degree	34	11.71	4.76		

Note : 1. ** denotes significant at 1% level
(At 5% level of significance the table value of 't' is 1.98)

Since P value is less than 0.01, the null hypothesis is rejected at 1% level with regard to dimensions of system quality, computer self-efficacy, facilitating conditions perceived usefulness, perceived ease of use, perceived behavioral control, attitude, subjective norm and behavioral intention. There is significant difference between bachelor degree completed healthcare professionals and master degree completed healthcare professionals working in ESIC hospital and dispensaries in Tirunelveli subregion in their system quality, computer self-efficacy, facilitating conditions, perceived usefulness, perceived ease of use, perceived behavioral control, attitude, subjective norm and behavioral intention.

Based on the mean score, it is found that the bachelor's degree completed (M=22.88) health care professionals are better than the master's degree completed (M=19.32) healthcare professionals in their system quality. Also, the bachelor's degree holders had better computer self-efficacy beliefs (M=23.27) than the master's degree holders (M=18.18). The bachelor's degree healthcare professionals agreed that better facilitating conditions was provided to them in the ESIC hospital environment (M=33.43). They also perceived the health management information system was very much useful in the daily routine at the ESIC hospital and dispensaries (M=31.66). The bachelor's degree holders in the ESIC hospital indeed acknowledged the user friendliness of the health management information system software (M=13.84). Further, the bachelor's degree healthcare professionals showed greater perceived behavioral control over the health management information system adoption process (M=36.74) and also reported greater intentions to engage in the system usage (M=14.23). According to the mean score, it is found that the bachelor's degree completed (M=27.94) health care professionals are better than the master's degree completed (M=23.24) healthcare professionals in their attitude. In addition, the bachelor's degree holders in the ESIC hospital are greatly influenced by social groups or subjective norms during the adoption process (M=14.90).

Discussion

This study found that young healthcare professionals who are bachelor degree holders efficiently used the health management information system, with all of them citing ease of use of the software as their primary motivation. Also, senior healthcare professionals who are master degree holders had a difficult time in adopting the health management information system that is easy to use for the younger professionals. The statistical results showed that perceived usefulness and perceived ease of use are the most important factors in technology adoption. Further, in an integrated model of adoption and use of technology, the most important factor is the simplicity of perceived usage and also social impacts have a greater role to play. The ESIC healthcare organization should address

expectations regarding ESIC healthcare professionals' technology adoption behavior. The organization should ensure that the senior medical staff and healthcare professionals reveal their problems regarding HMIS adoption to the Information Technology (IT) team. By this way, proper training can be given, especially to the senior ESIC healthcare professionals so that they become familiar with the perceived usage of the HMIS in the ESIC healthcare environment. Young ESIC healthcare professionals already learn about computers and gadgets in their college days so they are well versed with the advancing tech. Since, technology has become an important part of everyday life, they stay updated on the latest apps and technologies and hence HMIS adoption easily takes place among the young ESIC healthcare professionals in the ESIC main hospital and dispensaries in the Tirunelveli sub-region. The ESIC hospital management should regularly revise or expand technology related policies to keep the healthcare professionals up to date with industry best practices. Moreover, the ESIC healthcare professionals should understand the need to adhere to the technology adoption process and only then appropriate use of technology would take place in the ESIC healthcare environment.

Conclusion

The results show that TAM model based factors influence the technology adoption process and perceived usefulness and perceived ease of use are the factors that should be considered while implementing the health management information system in any hospital environment. This experience at the ESIC main hospital and dispensaries in the Tirunelveli sub-region shows that educational qualification of the ESIC healthcare professionals greatly influences the HMIS adoption process. Hence, maintaining a good HMIS is essential for an effective health system in a developing country like India.

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