TO EXPLORE THE BENEFITS OF ANESTHESIA INFORMATION MANAGEMENT IN CLINICAL WORK

[1]CHIU-MEI TSAO, [2]NAN-YU WANG, [3]HSIU-JEN FU

Department of Business Administration, Overseas Chinese University, Taichung, Taiwan.
E-mail: annytsao118@gmail.com, nanyu@ocu.edu.tw, maxfu@ocu.edu.tw

Abstract - This study aims to explore the advantages, difficulties, and influencing factors of anesthesia professionals using the Anesthesia Information Management System (AIMS). In the healthcare industry, the use of information technology (IT) can address organizational management, financial pressures, and enhance the effectiveness, efficiency, quality, and relevance of healthcare delivery while reducing medication error rates and improving patient safety.

Keywords - Anesthesia Information Management System, Unified Theory of Acceptance and Use of Technology, Anesthesia Record.

I. INTRODUCTION

The utilization of AIMS offers several benefits for anesthesia professionals. Firstly, it provides electronic and automated anesthesia records, reducing errors and inconsistencies associated with handwritten documentation. Secondly, AIMS offers real-time anesthesia data and monitoring results, enabling better assessment of patient conditions and appropriate interventions by anesthesia physicians and nurses. Additionally, AIMS automatically extracts and analyzes anesthesia data, facilitating subsequent case analysis and research for anesthesia professionals. However, there are also challenges and influencing factors encountered during the use of AIMS. Anesthesia professionals need to undergo training and familiarization with the AIMS system, requiring time and resources. The system's interface and functionalities may not align with the habits and preferences of anesthesia professionals, necessitating adaptation and adjustment. Furthermore, system failures or technical issues with AIMS can disrupt or delay anesthesia work, affecting both patient safety and the efficiency of anesthesia professionals. In conclusion, the use of AIMS by anesthesia professionals can enhance the efficiency, accuracy, and safety of anesthesia work while providing a data foundation for subsequent research and analysis. However, the implementation of AIMS requires overcoming associated challenges and issues, including training costs, adaptation periods, and technical problems. Therefore, when promoting and implementing AIMS systems, a comprehensive consideration of these factors and provision of appropriate support and training is essential. In today's rapidly advancing healthcare technology, the work of anesthesia nurses has become increasingly diverse and complex. In the past, anesthesia nurses used handwritten anesthesia record forms to document patients' anesthesia conditions. However, this method was prone to errors and faced difficulties in data acquisition and record-keeping. Therefore, in recent years, many medical institutions have started using electronic anesthesia record forms, known as Anesthesia Information Management Systems (AIMS). AIMS is an abbreviation for Anesthesia Information Management Systems, which is an independent electronic medical record (EMR) system used to record anesthesia care provided to surgical patients (Williams, 2005). The benefits of AIMS are its ability to facilitate complete and easily accessible patient data recording. Compared to the earlier handwritten records, electronic anesthesia record forms offer greater convenience and accuracy. In a study by LaDage et al. in 2015, it was noted that the implementation of electronic anesthesia record forms still encountered many difficulties or non-executable aspects, particularly related to hardware equipment and design issues (33.53%). Examples include network hardware failures, connectivity issues, and automated data retrieval problems.

Therefore, the successful implementation of electronic anesthesia records requires coordination among the information technology department, anesthesia professionals, and other electronic medical record-related entities. In the current rapidly evolving healthcare technology landscape, with the proliferation of various medical monitoring systems, AIMS systems need regular updates to accommodate increased data flow and work requirements. Overall, this study aims to provide insights into the clinical use of AIMS by anesthesia nurses, serving as a reference for future AIMS implementation and offering better system usage experiences and recommendations for relevant healthcare institutions during the adoption of information systems.

II. DISCUSSION

1. Information systems intervene in the medical field to help

Since the 1970s, the adoption, acceptance, and use of information systems as a means of technological

exploitation and implementation in various software engineering domains have garnered attention. Understanding the reasons behind user acceptance or rejection of any new technology has become an essential task throughout the lifecycle of any information system (Silva et al., 2019). The advancements in Information and Communication Technology (ICT) have greatly transformed the way organizations conduct business, redefining communication both within and between organizations, streamlining business processes, and ensuring profitability (Ahmad et al., 2015).

Research findings indeed indicate that technology and organizational context influence implementation decisions (Borgman et al., 2013). The improvement of organizational performance is reliant on the utilization of information technology; however, resistance from management and professionals within organizations is a common issue. In order to better predict, explain, and enhance user acceptance, there is a need for a deeper understanding of the reasons people accept or reject information technology (Davis et al., 1989).

2. Information system to import anesthesia records

Since 2000, Taiwan has been promoting the adoption of Electronic Medical Records (EMR), and the digitization of hospitals serves as an important foundation for driving electronic medical records. Compared to handwritten anesthesia records, paper-based records are difficult to store and can easily result in the loss of clinical-related information. Importantly, electronic anesthesia records can generate detailed billing records, improve operating room management, and reduce anesthesia-related costs (Eden et al., 2006).

Currently, AIMS is not only used for anesthesia in traditional operating rooms but also for other types of patients, such as obstetric anesthesia, acute pain services for patients, and anesthesia in bedside surgeries and intensive care units. The components of AIMS include physiological monitors, anesthesia machines, ventilators, and other monitoring devices, which can provide comprehensive recording through the AIMS system. Successful implementation of AIMS requires not only suitable hardware and software but also individuals within the department who possess sufficient expertise to drive decision-making.

The core functionality of AIMS remains the generation of electronic anesthesia records, automatically recording data from patient monitors, anesthesia machines, and other devices, while also allowing manual recording of various data, providing flexibility in application.

Research results and analysis

A survey was conducted for the purpose of research, and 60 valid questionnaires were collected. Descriptive statistics and regression analysis were performed using SPSS. According to the data, the majority of the results fall between "Agree" and "Strongly Agree." This indicates that the introduction of an information system for anesthesia records is affirming and positive, as it proves to be helpful for work and improves patient safety. Table 1

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
VAR00001	60	3.00	5.00	4.3333	.62887
VAR00002	60	3.00	5.00	4.3333	.62887
VAR00003	60	3.00	5.00	4.3333	.62887
VAR00004	60	3.00	5.00	4.3333	.62887
VAR00005	60	4.00	5.00	4.9833	.12910
VAR00006	60	3.00	5.00	4.5000	.62436
VAR00007	60	3.00	5.00	4.5333	.56648
VAR00008	60	3.00	5.00	4.5167	.59636
VAR00009	60	2.00	5.00	3.7833	.76117
VAR00010	60	1.00	5.00	3.2833	1.04300
VAR00011	60	2.00	5.00	3.7333	.79972
VAR00012	60	3.00	5.00	4.0333	.71228
Valid N (listwise)	60				

Table 1

According to the data, the difficulty level of system learning has an impact on user behavior. If the system can be easily learned and used without the need for complex instructions, it will increase user confidence.

Furthermore, the majority of users believe that when encountering problems while using the information system, whether it is related to software or hardware, they can receive support from their supervisors and system implementers.

Table2-5

Regression

Table2

Variables Entered/Removed[a]

Variables Entered	Variables Removed	Method
VAR00003, VAR00002, VAR00001[b]	.	Enter

a. Dependent Variable: VAR00004

b. All requested variables entered.

Table3

Model Summary

R	R Square	Adjusted R Square
.061[a]	.004	-.050

a. Predictors: (Constant), VAR00003, VAR00002, VAR00001

Table4

ANOVA[a]

Sum of Squares	df	Mean Square	F	Sig.
.064	3	.021	.070	.976[b]
16.920	56	.302		
16.983	59			

a. Dependent Variable: VAR00004

b. Predictors: (Constant), VAR00003, VAR00002, VAR00001

Table5

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4.241	.636		6.673	.000
	VAR00001	.027	.179	.030	.150	.882
	VAR00002	.041	.173	.041	.235	.815
	VAR00003	-.006	.142	-.007	-.043	.966

a. Dependent Variable: VAR00004

Therefore, in terms of support, if it can be done effectively and immediate maintenance and problem-solving can be provided, it will further enhance user confidence in the functionality of the information system and their willingness to apply it to their work.

However, it has been found that approximately 20% of users encounter difficulties while using the system for work and are unable to receive immediate solutions, causing inconvenience. Therefore, improving the support system, enhancing the system's repair capabilities and problem-solving abilities may increase user support for the system.

Implementing an information system in clinical work requires not only a significant budget but also the support of decision-makers within the organization. It is also essential to have experienced personnel responsible for coordinating training, troubleshooting, and other tasks within the organization, so that clinical professionals can truly benefit from using the information system.

III. CONCLUSION

The introduction of AIMS (Anesthesia Information Management System) is a significant investment that requires a substantial allocation of manpower for system implementation and maintenance. The successful implementation of AIMS relies not only on the collaboration of anesthesia department staff but also on comprehensive cooperation with software vendors and medical equipment manufacturers.

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In terms of anesthesia records, compared to handwritten records, the digitization of anesthesia record systems can improve accuracy, reduce workload, generate detailed billing records, enhance operating room management, and lower anesthesia-related costs.

However, anesthesia information management systems are still not widely used. This study aims to increase the adoption rate of AIMS to further enhance anesthesia safety. The research findings are expected to provide reference for other medical institutions and relevant authorities.

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