ORIGINAL RESEARCH ARTICLE EXPERIMENTAL

Attitude of Ayurveda doctors toward the impact of health information technology

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ABSTRACT

Background: Health information technology (HIT) equips healthcare professionals with the required information and tools for making quality decisions in patient care, but it is always advisable to assess their attitude before its actual implementation. **Objectives:** To assess the attitude of Ayurvedic doctors toward the impact of HIT. **Materials and Methods:** A cross-sectional survey was carried out among 140 doctors of an Ayurvedic center of Southern India. A validated questionnaire consisting of 18 questions based on a 5-point Likert scale was administered to the participants after receiving their due consent. **Results:** About 75–80% of the respondents concurred that the HIT application, such as electronic health record, has the potentials to reduce the duplication of documentation work, is easy and has an instant processing and real-time access to patient information. They also felt the need of such application to report the patient data to local and national health institutions. A total of 85% of them mentioned that these applications can make the collection and accessibility of patient data much easier compared with paper-based records, whereas 87.4% of them claimed telemedicine as a platform for multidisciplinary collaborative research and patient care. **Conclusion:** Even though most of the respondents agreed about the role of HIT in improving the quality of health care, there were many who held no opinion about HIT, including privacy and security of patient data. The need of proper awareness and training program is identified to make them aware about the HIT and its application in patient care, education and research.

Key words: Attitude, Ayurveda, education, health information technology, patient care, public health, research, telemedicine

INTRODUCTION

The practice of Ayurveda works with an aim to preserve and protect the health and prolong the life of the patient by relieving the suffering and pain.[1] To achieve this aim, healthcare practitioners are largely dependent on easy access to patient's accurate, adequate and complete information in a timely manner along with the availability of domain knowledge at their fingertip. Unavailability of these may lead to medical error or delay in providing care to the patient, but these can easily be eliminated if the practitioners are equipped and supported by a well-managed health information system.

Since the last few decades, information and communication technology has supported the hospitals in streamlining their health information system. Health information technology (HIT) is a promising tool of information and communication technology, involving both computer hardware and software to store, retrieve, share and use of healthcare data and information for clinical decision making in patient care.[2] It has all the potentials to improve the health of the individual and the community as well as the performance of the healthcare providers by supporting them with accurate, complete and timely healthcare data that ultimately improve their clinical efficiency and lead to a better outcome of patient care.[3]

HIT applications such as electronic health records, clinical decision support system, telemedicine, eHealth and mHealth are evident and more prevalent among the

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allopathic practitioners, but the literature search evidence the existence of these kinds of applications in Ayurveda practice also, such as Body Tune-Computerized Ayurvedic Medicare, Prakes, Prakriti, Madhava, Rasex, Pilex, etc. These applications assist the Ayurvedic practitioners to detect, communicate and interpret data for accurate diagnosis, estimate the body constitution, suggest health advice about diet and instruct for daily activities as well as support them in managing the patient data in an easy and more accessible manner.[4,5]

The AYUSH research portal also acts as a knowledge base repository that allows the researchers, academicians and students to update their knowledge related to Ayurveda, Yoga and Naturopathy, Unani, Siddha and Homoeopathy along with AYUSH-related research performed by the allied sciences. The details of the research are listed and provided under clinical research, pre-clinical research, drug research and fundamental research headings, which is easily accessible to the end users. It also provides various links and allows the researcher to learn about ICPC, ICD and evidence-based criteria for clinical studies.[6]

AyuSoft, a decision support system designed and developed by the Center for Development of Advance Computing, assists the Ayurvedic health care practitioners, academicians and researchers in diagnosis and treatment of patients as well as in conducting various researches. The repositories presented in Ayusoft assist the practitioners in physiological and psychological assessment, diagnosis and treatment of the patient based on symptoms and causative factors. It also allows the practitioners to refer the case to other consultants for expert review and collaborative consultation, which ultimately promote evidence-based practice.[7]

In addition to benefits, a few challenges such as privacy, confidentiality and security of patient data, doctors' resistance toward paper-based documentation system, cost of maintenance of such a system, user-friendly access, lack of awareness about HIT and its application, etc., may impede the successful implementation and use of these applications.[8-11] Hence, it is always advisable that the attitude of healthcare practitioners toward these challenges need to be assessed and addressed before the actual implementation of any IT application for better acceptability and sustainability. This study focuses on assessing the attitude of Ayurvedic doctors toward the impact of HIT in managing patient data, public health, patient care, education and research, which ultimately assists the planner in finding the scope of implementing and using a better application in Ayurvedic practice.

MATERIALS AND METHODS

A cross-sectional survey was carried out among 140 doctors of an Ayurvedic teaching hospital and research center of Southern India. A structured and validated questionnaire consisting of 18 questions about the health care professional's attitude toward the impact of HIT was used for data collection. A 5-point Likert scale from "Strongly Agree" to "Strongly Disagree," with the score ranging from 5 to 1, was used to collect their response. The content of the questionnaire was derived based on the discussion with the domain expert, i.e. Ayurveda doctors who had experience in working with HIT applications, and also keeping in mind the respondents who were working in the center where a Linux-based information management system was implemented and used for patient care, education, research and administration. As the respondents were already exposed to the computerized system, the content of the questionnaire was very specific to their day to day working with the system. The questionnaire was administered to the respondents after obtaining due permission from the concerned institutional authorities. A total of 140 doctors among 164 doctors were willing to participate and were available during the survey. The doctors were first briefed about the study and its objectives and the purpose of the survey. An informed consent was obtained from the respondents for being part of the study where the data were collected by distributing the questionnaire among those who were willing to respond. The doctors were asked to mark their response by choosing the appropriate options from "Strongly Agree" to "Strongly Disagree" for the given parameters. The completed questionnaire was then collected for further data analysis using SPSS 20.0 for the frequency and percentage. The Chi-square test was carried out to determine the association of responses with other variables, where $P < 0.05$ was considered significant.

To determine the respondent's safety, certain ethical issues were addressed during and after the data collection, such as privacy and confidentiality of information supplied by them. The investigator had assured the respondents that their identification details and responses would not be revealed, but the relevant data for responding to the survey objective would be used.

RESULTS

Response related to the attitude about HIT was collected from 140 healthcare professionals practicing Ayurveda and presented in the form of tables and discussed hereunder:

Characteristics of the respondents

Among 140 doctors, 91 (65%) were male and 49 (35%) were female, and majority of them, i.e. 87, were between

the ages of 27 and 31 years, 47 (19.3%) were about 32–36 years, 18 (10%) of were between 37 and 41 years and about 13 (9.5%) of them were above 42 years of age. The distribution based on their total years of practicing Ayurveda indicated that 112 (80%) of the respondents had 0–5 years of experience, 13 (9.3%) had 6–10 years of experience, nine (6.6%) had 11–15 years of experience and about five (4.2%) of the respondents found to be practicing for more than 15 years.

Of 140 respondents, four respondents were Ph.D., 81 were Postgraduate and 55 were Undergraduate. Only 56% (78) of the doctors claimed that they have undergone short-term training on use of computer and various HIT applications. They were found to have very good knowledge of the computer and also exposure to an information management system for patient care, education, research and reporting purposes. This is due to the utilization of the present information management system of the hospital for more than 5 years. Nearly 44% (62) found themselves to be comfortable with the system and would desire to undergo short-term training on the use of various HIT applications in Ayurveda.

Attitude of doctors toward HIT

To understand the attitude of the doctors practicing Ayurveda toward HIT, a list of questions was imposed to 140 respondents and their response was collected and discussed. Here, the limitations observed were in terms of discussing all the parameters included in the survey because the related literature search evidenced maximum studies in Allopathic settings compared with an Ayurveda setting. The benefits of the HIT is similar and enormous, irrespective of the type of medical practice. Thus, wherever indicated about its practice in Ayurveda, the parameters are discussed else the evidence from the surveys performed in allopathic settings are included and discussed under the following heading.

HIT in the management of patient data

HITs have proven well in managing patient data by streamlining the processes of collection, processing, analysis, retrieval, dissemination, etc. It decreases or eliminates the paperwork of the healthcare professionals by supporting with real-time communication facilities with peers and other professionals.[12]

When the respondents were asked about the impact of implementing HITs in managing patient data, approximately 75–80% of the respondents agreed on the fact that the electronic health record or hospital information system has the potential in reducing their duplication of work, is easy and has instant processing, real-time access and managing the flow of information [Table 1]. The responses were found to be statistically significant with the age and gender of the respondents ($P < 0.05$). A similar finding was observed in the study by Moustafa *et al.*, where the healthcare professionals felt that the electronic medical record improve the quality of medical documentation and save time in disseminating the data to various stakeholders.[13] Campbell *et al.* also reported that the patient data from a single electronic source equips the healthcare professionals in avoiding the idle waiting time to access patient data from various sources.[14]

Marchibroda *et al.*[15] also claimed that the HIT, including electronic health record, assist the health care professionals in addressing the barriers related to the exchange of patient's data to the needed. The result of this study also indicated a similar response, where 80.5% of the respondents were in favor of HIT to avoid unnecessary time in exchanging patient data to other professionals or institutions [Table 1].

The literature search evidenced that the contribution of HIT in public health is countless in terms of supporting the healthcare professionals in improving the data collection processes and real-time access of population data in providing elective, emergency and long-term clinical care, educating the community, improving nutrition and hygiene and providing more sanitary living conditions.[16,17] Moreover, the World Health Organization has marked it as a backbone of health care services to prevent, diagnose

Table 1: Health information technology in management of patient data

Health information technology assists in	Agree		No opinion		Disagree	
	f	%	f	%	f	%
Reducing the duplication of work in documenting patient data	113	79	20	14.0	10	7
Easy and instant processing of patient data	108	75.5	32	22.4	3	2.1
Real-time access of patient's data	112	78.3	17	11.9	14	9.8
Managing the flow of data within and outside the organization	106	74.1	25	17.5	12	8.4
Easy communication among healthcare professionals	115	80.5	25	17.5	3	2.1
Reporting of patient data to local and national institutions	119	83.3	17	11.9	7	4.8
Improving the quality of data collection	121	84.6	18	12.6	3	2.8
Early detection and control of infectious diseases	111	77.6	20	14.0	12	8.4
Monitoring health care programs and its coverage	112	78.3	24	16.8	7	4.9
Maintain privacy and security of patient health information	99	69.2	31	21.7	13	9.1

and treat disease and illness.[18] The framework and standard guidelines for developing a country health information system by the World Health Organization also stressed the use of health information technology in streamlining the health information system of the institutions irrespective of ownership or practice.[19]

A similar attitude is reflected among the respondents about the application of HIT in public health, where more than 80% of the respondents felt the need of such a system to report the local and national health institution about their practices as well as to improve the collection of patient data on a routine basis. They strongly claimed that the HIT, such as online electronic health records and telemedicine, will be a boon for them in avoiding such barriers [Table 1].

Nearly 77.6% of the respondents agreed with the fact that the population-based database system can assist the program manager and planner in early detection and control of infectious disease when reported by the health care institution, whereas 78.3% felt that the data furnished by the system can assist them in monitoring various health programs of health care institutions and its reporting. The response was found to be significant with years of working experience of the respondents ($P < 0.05$) [Table 1].

In spite of having several benefits, issues such as privacy, confidentiality and security of patient data in using HIT are still a major concern among healthcare professionals. A similar finding was observed in this study, where only 69% of the respondents felt that HIT was reliable in maintaining the privacy and security of patient data, whereas 31 respondents did not have any opinion in this regard [Table 1].

HIT in patient care

HIT applications such as Electronic Health Record, Clinical Decision Support System, Clinical Reminder System, Computerized Providers Order Entry, Telemedicine, etc., are very much in practice among Allopathic practitioners, and they are getting benefited with these in improving the clinical workflow, reducing the medication error and updating themselves with clinical guidelines[20-22] that ultimately improve the patient outcomes and promote evidence-based practice.[23,24]

DISCUSSION

The advances in HIT, such as telemedicine, allow the healthcare practitioners to simultaneously attend several patients at a time using audio and videos conferencing facilities. These services reduce the cost of patient care and proved to be very helpful during emergency patient care when the patient at a geographically isolated area required advice and consultation from the experts. The electronic health records associated with the same, assisting the healthcare professionals in sharing the collected data with the patient and various other stakeholders. These technologies are very effective in conducting multidisciplinary research and collaborating between geographically dispersed researchers.[25-27] The literature search evidenced few telemedicine applications in Ayurveda, such as "Unary,"[28] DHARE[29] and Telemedicine,[30] which not only support the patient in accessing experts consultation facilities but also assist the experts in documenting patient data as well as reaching the outreach.

In view of this, about 70–80% of the respondents felt that there are several elements that may adversely affect the patient's body and, if these are captured during the first visit of a patient and stored permanently in an electronic form, can alert the attending clinicians during any wrong prescription and avoiding many medication errors. They also expected to have a common knowledge repository in electronic form to access the domain knowledge during patient care to take an evidence-based informed decision making, which ultimately improves the patient outcome. These responses were found to be statistically significant with the age and year of working experience of the respondents ($P < 0.05$). About 87.4% of them felt that the telemedicine and web conferencing facilities can provide a platform to the healthcare professionals in multidisciplinary collaborative research [Table 2].

The Electronic Health Records or any online information management system can be seen as an important tool in gathering complete data of the patient during routine,

Table 2: Health information technology in patient care

Health information technology assists in	Agree		No opinion		Disagree	
	f	%	f	%	f	%
Increasing patient safety by alerting about any medication error	108	75.5	25	17.5	10	7.0
Evidence-based informed decision making with available patient data and clinical knowledge	110	76.9	26	18.2	7	4.9
Improving patient health outcomes	114	79.7	23	16.1	6	4.2
Promoting evidence-based multidisciplinary research	125	87.4	11	7.7	7	5.0
Gathering complete data during emergency care	121	84.6	12	8.4	10	7
Providing better patient care during follow-up	122	85.3	15	10.5	6	4.2
Enhancing the evidence-based practice	122	85.3	16	11.2	5	3.5

follow-up and emergency care.[9,11,13] In view of this, about 85% of the respondents agreed and mentioned that the electronic health records or any online information system can make the collection and accessibility of patient data during emergency and follow-up much easier compared with paper-based records. They also felt that the HIT applications highly support evidence-based practice in the provision of quality healthcare to the individual and the community [Table 2].

Only 66.4% of the respondents agreed that the HIT should be implemented and practiced in every healthcare institution, irrespective of ownership and size, as it is unavoidable in health care practice, whereas 20.3% of them had no opinion about it as they claimed themselves as being beginners in Ayurveda practice and less exposed to the information management system in their day to day activities in patient care, education and research ($P < 0.05$) [Table 3].

As the study was conducted in an AYUSH center for excellence, where the respondents were found to have access to computer and information management system, but those who were new to the practice looked more enthusiastic to learn about various HIT applications and its benefits. The majority of them expected to have telemedicine facilities at their center to reach out to the distant patient and families for providing quality health services. The training could be seen as one of the areas that the respondents were looking forward to undergo to enhance the usage of present applications and other future implementations.

Further scope of the study

Similar studies can be conducted in many more Ayurveda centers to understand the level of perception and requirement of Ayurveda doctors, which will allow the researchers in suggesting a common HIT solution to not only integrate all the Ayurveda centers on a common platform to access health information but also to share their knowledge and expertise in achieving quality health care.

CONCLUSION

The HIT is seen as one of the promising tools in providing a new way to the healthcare professionals practicing Ayurveda in managing patient data and domain knowledge. The result of the study reported the respondent's agreement on various facts related to the impact of HIT in patient care, education, research and public health, but many of them also had no opinion about it. The reason could be their non-exposure to the various applications such as electronic health records, telemedicine or any other electronic patient database, as they have indicated during the survey. The result also indicated the need of these technologies in Ayurveda to improve the practices of documentation, dissemination and availability of patient data to the practitioners as well as to reach out to the maximum. Those who reported no opinion expected to have an induction and training program to understand the better utilization of these technologies in their practice. As the implementation and utilization of these technologies are scarce or very minimum in the practice of Ayurveda, the need identified is to design and develop cost-effective applications with the involvement of actual user and also to disseminate the benefits and availability of these to the institutions practicing and promoting Ayurveda. HIT applications will not only support in health information management but will also take these practices to a greater height.

Table 3: Health information technologies are unavoidable in health care practice

Parameter	Agree		No opinion		Disagree	
	f	%	f	%	f	%
Health information technologies are unavoidable in health care practice	95	66.4	29	20.3	19	13.3

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