

E-Health Care Services: An Empirical Evidence From Health Care Sector In Tamil Nadu

Mr. K. Sivakumar^{1*}, Dr. Annamalai Solayappan², Dr. Jothi Jayakrishnan³, Mr. A. Kalaiselvan⁴

^{1*}Research Scholar (Part-Time), Roll No: 1911130133, Department of Business Administration, Annamalai University, Annamalai Nagar, Tamilnadu, India. Assistant Professor cum H.O.D, Department of BBA, Jawaharlal Nehru College for Women, Pali, Ulundurpet, Kallakurichi District,

²Assistant Professor, Research Supervisor, Department of Business Administration, (On Deputation from Annamalai University), Sri Subramaniya Swamy Government Arts College, Tiruttani, Tamilnadu, India-631209. Mail Id: an.solayappan@gmail.com, Mobile no: 9944222110

³Professor, Department of Business Administration, Annamalai University, Annamalai Nagar, Tamilnadu, India.

⁴Assistant Professor, Department of Business Administration, Peri College of Arts and Science, Mannivakkam, Chennai, Tamilnadu, India.

ABSTRACT

E-health is generally seen as a strategic tool for overcoming the challenges faced by health-care sectors worldwide. E-health services include everything from very basic health information services to the more advanced interactive services. The most common e health services and applications discussed are electronic prescriptions, telemedical applications (such as teleconsultation and telemonitoring), evidence-based medicine, electronically supported administrative functions, electronic patient records, specialist-oriented and patient-oriented information provision, virtual health teams and other services connecting stakeholders in health care as well as distance learning and provider education. The main objective of the study is to

examine the demographical profile of the respondents and to test the E- health care services factors based on gender. For selecting respondents non-Probability, convenience sampling method is employed. A sample of 445 respondents are taken in to consideration for to collect data. The demographic factors are analysed using simple percentage analysis and MANOVA is used to examine the effects of gender as independent variable and E- health care services factors as dependent variables. Based on the analysis major finding will be found out and by giving suitable suggestion as Create awareness by giving advertisement and by build trust among the patients by way of appearing doctor celebrities and patient celebrities in the advertisement copy. To fully realize the potential of e-health services, continuous advancements in technology, better regulations, and customer-centric approaches are essential. By giving awareness, building trust, attitude and by providing user friendly services can create more customers (patients) of using e-health care services.

Keywords: E-health, E-health care services and Health Care sector.

I. INTRODUCTION

E-Health defined constitutes the application of ICT across the whole range of functions that affect the health sector (Commission of the European Communities, 2004). Also, other terms are often used interchangeably; these include e-healthcare, medical informatics, health informatics, consumer health informatics, telemedicine, telecare or telehealth. Most, however, refer to different aspects of technology in health care, which results in confusion about what really is meant by e-health (Pagliari, 2005). e-health services and applications discussed are electronic prescriptions, telemedical applications (such as teleconsultation and telemonitoring), evidence-based medicine, electronically supported administrative functions, electronic patient records, specialist-oriented and patient-oriented information provision, virtual health teams and other services connecting stakeholders in health care as well as distance learning and provider education (Ligtvoet, 2003; Sharma et al., 2005; Wen and Tan, 2005). Such e-health services can be broadly categorized into three main groups; namely (1) consumer information services, (2) telemedical care, and (3) health business support services (Bauer, 2002; Wilson, et al., 2004)

II. REVIEW OF LITERATURE

Malik Bader Allazam et al. (2016) proposed that trust in e-Health is of vital importance for the effective acceptance and use of EHR systems. They suggested a research model based on the modified UTAUT2 with a new construct such as: trust in the data storage. However, the authors proposed only a theoretical model that would be tested in the future with the aim to increase the intention for use of the EHR system by medical staff. Finally, the authors indicated that this will be a starting point for future research study on the acceptance of EHR systems by medical staff.

Hsieh et al. (2017) conducted a survey by using TAM, UTAUT and protection motivation theory in Taiwan with the aim to explore factors that affect adopting of PHR system. Their survey included structured questionnaire confirmed that the TAM, UTAUT and protection motivation theory were effective at predicting PHR usage behaviour among healthcare

primary care practitioners. All ten proposed hypotheses were measuring various technology acceptance items with behavioural intentions. Exploratory factor analyses, confirmatory factor analyses and structural equation modelling were used to test the hypotheses. Perceived usefulness, perceived ease of use, self-efficacy, subjective norm and response efficacy were identified as technology acceptance constructs that which have significant effect on PHR acceptance. There was a significant positive correlation between behavioural intention for PHR and usage behaviour among the respondents. Finally, the authors proposed promotion of health management to increase public acceptance of the PHR systems. This study tested the correlation between behavioural intention and usage behaviour.

Handayani et al. (2017) proposed a model by using a TAM in hospital information system acceptance focusing on organisational, technical and human characteristics. The study used qualitative and quantitative approaches assessing the attitudes of hospital management officers, doctors, nurses and administrative staff. The data were analysed using structural equation modelling. The authors recommended that the hospital management and IT developers should have more understanding on the non-technical factors (i.e. technology acceptance) to better plan the hospital information system implementation and they have concluded: “hospital management can provide benefits perceived by the user so that they accept the health information system even though the application is not necessarily suited to their needs.”

Bartholomew (2017) reported that although the ‘Affordable Care Act’ in the United States was passed in 2010 there was still a digital divide in medical practices and some patients did not have access to their health information. In this study he examined the effect of perceived usefulness, social norms and social influence on intentions through a qualitative study. He also reported that nine (three doctors and six other staff) healthcare providers were interviewed and expressed frustration with government requirement for meaningful use of the PHR which has placed an undue burden for record keeping. However, this may lead to a decrease in the effectiveness and efficiency of the system.

Chen et al., (2017) introduced a new model called e-Health readiness with the aim to understand and explain the relationship between: “user habits, perceived healthiness and beliefs towards, sensing technologies (mobile health monitoring technologies).” They proposed that readiness will be significantly impacted by perceptions of healthiness, technology satisfaction and usefulness of such technology. The authors used confirmatory factor analyses and structural equation modelling to analyse their data.

Macdonald et al., (2018) conducted an interview study on 12 hospital healthcare professionals. They found that participants in their study were not using the system to its full extent focusing mainly on health information. However, they have also concluded that more experienced participants may ask for additional issues in e-Health use. Finally, they proposed better professional education specific to e-Health and better equipping of healthcare professionals to adopt e-Health technologies.

III. RESEARCH METHODOLOGY

This Research study comes under the descriptive research category. Data were collected through online mode. Respondents contact details was collected through the hospitals such as Apollo, Billroth, Fortiz, Vijaya, MMM and Other leading hospitals in Chennai City. After collecting the responded details researcher will personally contact the respondent and explain the full theme of research and the necessity to collect the data through questionnaire. A sample of 445 respondents are considered for this study. Depending on the type of data the tools used for data analysis are percentage analysis and Analysis of variance (ANOVA). The data collected was compiled and edited to check for logical inconsistencies. The data was then coded according to the responses. All the respondent data was collected from the google sheet and the same was transformed in to the software SPSS.

Objectives

- ❖ To examine the demographical profile of the respondents
- ❖ To find out the opinion between E- health care services factors based on gender

Hypothesis

H₀: There is no significant difference of opinion between gender and E- health care services Factors.

IV. ANALYSIS AND INFERENCE

The quantitative analysis of the demographic data and presented as the tables. The demographic factors are analysed using simple percentage analysis.

Table-4.1: Respondents Profile Distribution

S.no	Respondent Profile		Frequency	Percentage
1	Gender	Male	264	59.3
		Female	152	34.2
		Transgender	29	6.5
2	Age (years)	up to 30	130	29.2
		30-40	262	58.9
		40-50	9	2.0
		50-60	32	7.2
		above 60	12	2.7
3	Educational level	UG	75	16.9
		PG	155	34.8
		Diploma / ITI	104	23.4
		Schooling	99	22.2
		Others	12	2.7
4	Work Status	Government Employee	28	6.3
		Private Employee	256	57.5
		Self Employed	37	8.3
		House wife	95	21.3
		Student	29	6.5
5	Monthly Earnings (Rs)	less than 15000	136	30.6
		15000-30000	180	40.4
		30000-45000	31	7.0
		45000-60000	74	16.6
		above 60000	24	5.4
6	Marriage Status	Married	371	83.4
		Unmarried	53	11.9
		Divorce	21	4.7
7	Types of Family	Nuclear family	251	56.4
		Joint family	194	43.6
8	Place of Residence	Rural	141	31.7
		Urban	205	46.1
		Semi Urban	51	11.5
		Semi-Rural	24	5.4
		Metropolitan City	24	5.4

Source: Primary data computed.

Inference:

Profile of the Respondents is displayed in table-4.1. Gender, Age, Educational level, Work Status, Monthly Earnings, Marriage Status, Types of Family and Place of Residence are considered as a Respondent profile for this study.

The distribution of the respondents based on gender is depicted in the above table-4.1.

Here Gender of the respondent are categorised as Male, Female and Transgender. A sample of 445 respondents are considered for our study. Out of 445 respondents, 264 (59.3 percent) of the respondents are belong to male category followed by 152 (34.2 percent) respondents are in the female category and 29 (6.5 percent) respondents are belong to transgender. While gone through the table value Majority of the respondents are male. From this it can be inferred that most of the male respondents are using e-health care services.

In the respondent profile Age of the respondent distribution is showed in the above table-4.1. Age of the respondents are grouped as up to 30 years as first group followed by 30 to 40 years as second group, 40-50 years as third group, 50 to 60

years as fourth group and above 60 years as fifth group. While gone through the table value majority 262 (58.9 percent) of the respondents in the age cadre of 30 to 40 years followed by 130 (29.2 percent) respondents belong to the age group of up to 30 years, 32 (7.2 percent) respondents are in the age group of 50 to 60 years, 12 (2.7 percent) respondents are belonging to the age cadre of above 60 years and only 9 (2.0 percent) respondents are in the age group of 40 to 50 years. From the above table value, it is to be noted that Majority of the respondents are in the age group of 30 to 40 years. The above table reveals that majority of the middle age group people are effectively using e-health care services.

Educational level of the respondents is displayed in the table-4.1. Here educational level of the respondent is categorized as UG, PG, Diploma / ITI, schooling and others. A sample of 445 respondents, 155 (34.8 percent) respondents are completed their PG degree followed by 104 (23.4 percent) of the respondents completed their Diploma / ITI degree, 99 (22.2 percent) of the respondents completed their schooling, 75 (16.9 percent) of the respondents completed their UG Degree and 12 (2.7 percent) of the respondents studied other degree. while gone through the table value a greater number of the respondents are completed their PG degree. From this it can be inferred that most of the PG degree holders are using E- health care services.

Working status of the respondent's is mentioned in the table-4.1. Working status of the respondent are categorised as government employee, private employee, self-employed, house wife and students. out of 445 respondents 256 (57.5 percent) respondents are employed in the private sector followed by 95 (21.3 percent) respondents are in the house wife category, 37(8.3 percent) respondents are self-employed, 28 (6.3 percent) of the respondents are working in the government sector and 29 (6.5 percent) of the respondents are belong to the student category. While gone through the percentage value in the above table majority of the respondents are employed in the private sector. It is inferred that private sector employees perceived e-health care services.

In the respondent's profile monthly earnings of the respondent is distribution and is showed in the above table-4.1. Here the monthly earnings of the respondents are categorized as less than 15000, 15000-30000, 30000-45000, 45000-60000 and above 60000. Out of 445 respondents, 180 (40.4 percent) of the respondents are earned Rs.15000-30000 as a monthly salary followed by 136 (30.6 percent) of the respondents are earned monthly salary as less than Rs.15000, 74 (16.6 percent) of the respondents earned Rs.45000-60000, 31(7.0 percent) of the respondents earned Rs.30000-45000 and above 60000 Rs earned by 24 (5.4 percent) respondents. It is to be noted that most of the respondents are earned Rs.15000-30000 as a monthly salary. Most of the Medium income group respondents are using e-health care services effectively.

The distribution of the respondents based on Marriage Status is depicted in the above table-4.1. Here married status of the respondents are categorised as married, unmarried and divorce. Out of 445 respondents, 371 (83.4 percent) of the respondents are married followed by 53 (11.9 percent) of the respondents are unmarried and 21(4.7 percent) of the respondents are belong to divorce category. While gone through the table value majority of the respondents are married. As majority of the respondents are youngsters, considerable percent of them are not married due to their age. From this it can be inferred that most of the married respondents are using E-health care service.

Family type of the respondent is displayed in the table-4.1. Family types are categorised as nuclear family and joint family. Out of 445 respondents, 251 (56.4 percent) of the respondents are belong to nuclear family followed by 194 (43.6 percent) of the respondents are belong to joint family. It is inferred that majority of the respondents are from nuclear family. Most of the nuclear family members are effectively using e-health services.

The distribution of the respondents based on place is showed in table-4.1. The place of residency is categorized as Rural, Urban, Semi-Urban, Semi-Rural and metropolitan city. Over all 445 respondents 205 (46.1 percent) of the respondents are belongs to urban area followed by 141 (31.7 percent) of the respondents are belongs to rural area, 51 (11.5 percent) of the respondents are belongs to semi-urban area and 24 (5.4 percent) of the respondents are belongs to semi-rural and metropolitan city. From the table value it is to be noted that most of the respondents are from urban area. It is inferred that most of the urban area people are using e-health care services.

The aim of this analysis is to find out the difference of opinion between e-health care services based on gender of the respondent.

Analysis of variance (ANOVA) is a statistical test used to evaluate the difference between the means of more than two groups. The analysis of variance, or ANOVA, looks at how the means of more than two groups differ from one another. Differentiation between gender of the respondent and E- health care services Factors is displayed in table-4.3. In view of the fact that the researcher has used eleven E-health care services factors such as perceived usefulness, perceived ease of use, perceived risk, compatibility, facilitating conditions, relative advantage, trialability, self-efficacy, subjective norms, attitude and trust to collect the data. Gender of the respondent are categorised as Male, Female and Transgender, where gender is taken as independent variable and E- health care services as dependent variables.

Table-4.2: Differentiation between gender of the respondent and E- health care services

Descriptive Statistics					ANOVA RESULT	
E-health care services	Gender	Mean	SD	N	F-VALUE	P-VALUE
Perceived Usefulness	Male	3.9645	0.88112	264	22.283	0.001*
	Female	3.2905	1.16919	152		
	transgender	3.7109	0.92528	29		
	Total	3.7177	1.03801	445		
Perceived Ease of Use	Male	3.1126	1.02556	264	0.074	0.929 (NS)
	Female	3.1532	1.05621	152		
	transgender	3.1232	1.10176	29		
	Total	3.1271	1.03890	445		
Perceived Risk	Male	3.1977	0.94386	264	0.003	0.997 (NS)
	Female	3.2033	0.93727	152		
	transgender	3.1897	0.86864	29		
	Total	3.1991	0.93491	445		
Compatibility	Male	3.3182	0.98937	264	1.453	0.235 (NS)
	Female	3.1513	0.96372	152		
	transgender	3.3333	1.11270	29		
	Total	3.2622	0.99003	445		
Facilitating conditions	Male	3.2462	1.00804	264	0.021	0.980 (NS)
	Female	3.2648	1.10733	152		
	transgender	3.2328	0.88371	29		
	Total	3.2517	1.03357	445		
Relative Advantage	Male	3.2938	0.85170	264	0.043	0.957 (NS)
	Female	3.3102	0.88534	152		
	transgender	3.2611	0.99640	29		
	Total	3.2973	0.87121	445		
Trialability	Male	3.4811	0.90106	264	2.125	0.121 (NS)
	Female	3.2911	1.01211	152		
	transgender	3.5431	1.23214	29		
	Total	3.4202	0.96640	445		
Self-Efficacy	Male	3.3025	0.92537	264	0.419	0.658 (NS)
	Female	3.3797	0.97087	152		
	transgender	3.4138	1.11401	29		
	Total	3.3361	0.95277	445		
Subjective Norms	Male	3.3049	0.91073	264	0.375	0.687 (NS)
	Female	3.3495	0.76804	152		
	transgender	3.2069	0.71361	29		
	Total	3.3138	0.85163	445		
Attitude	Male	3.4992	0.91444	264	2.150	0.118 (NS)
	Female	3.3066	1.06676	152		
	transgender	3.5655	1.00580	29		
	Total	3.4378	0.97741	445		
Trust	Male	3.4252	0.91912	264	0.644	0.526 (NS)
	Female	3.5156	0.92129	152		
	transgender	3.3491	1.05347	29		
	Total	3.4511	0.92820	445		

* Significant at one percent level, NS-Non significant.

Inference:

While gone through the table values mean value range from 3.1126 to 3.9645 and standard deviation range between 0.71361 and 1.23214

It is to be noted that male respondents secure a high mean value of 3.9645 towards Perceived Usefulness of E-health care services factors and the corresponding standard deviation value shows a very slight variation (0.88112) within this group. From the mean values, it is noted that the female respondents secure a high mean value of 3.1532 towards Perceived Ease of Use of E-health care services factors and the corresponding standard deviation value shows that there is a high variation (1.05621) within this group.

While gone through the mean value female respondents getting a high mean value of 3.2033 towards Perceived Risk of E-health care services factors and the corresponding standard deviation value shows that there is a less variation (0.93727) within this group.

Further E-health care services factors of Compatibility, transgender respondents secure a high mean value of 3.3333 and the corresponding standard deviation value (1.11270) shows a high variation in this group.

In E-health care services factors of Facilitating conditions, female respondents secure a high mean score of 3.2648 and corresponding standard deviation value shows a high deviation 1.10733 within this group.

Regarding E-health care services factors of Relative Advantage, female respondents getting a high mean score value of 3.3102 and corresponding standard deviation value (0.88534) shows a little variation in this group.

It is to be noted that transgender respondents secure a high mean value of 3.5431 towards Trialability of E-health care services factors and the corresponding standard deviation value shows a high variation (1.23214) within this group.

From the mean values, it is noted that the transgender respondents secure a high mean value of 3.4138 towards Self-Efficacy of E-health care services factors and the corresponding standard deviation value shows that there is a high variation (1.11401) within this group.

While gone through the mean value female respondents getting a high mean value of 3.3495 towards Subjective Norms of E-health care services factors and the corresponding standard deviation value shows that there is a less variation (0.76804) within this group.

Further E-health care services factors of Attitude, transgender respondents secure a high mean value of 3.5655 and the corresponding standard deviation value (1.00580) shows a high variation in this group.

In E-health care services factors of Trust, female respondents secure a high mean score of 3.5156 and corresponding standard deviation value shows a low deviation 0.92129 within this group.

In order to test the difference of opinion between E- health care services Factors and gender of the respondent ANOVA (F-test) test is applied.

H₀: There is no significant difference of opinion between E- health care services Factors and gender of the respondent.

In order to check the above stated hypothesis, ANOVA (F-test) test is applied.

The F-value of Perceived Usefulness of E-health care services factors is 22.283 and P value is 0.001 which is significant at 1% level.

Further, F-value of Perceived Ease of Use is 0.074 and corresponding P-value is 0.929 which is non-significant. Here, E-health care services factors of Perceived Risk secure a F-value of 0.003 and P-value is 0.997 which is non-significant. F-value for Compatibility is 1.453 and corresponding P-value is 0.235 which is non-significant. Regarding E-health care services factors of Facilitating conditions F-value is 0.021 and respective P-value is 0.980 which is non-significant. The F-value of Relative Advantage of E-health care services factors is 0.043 and P value is 0.957 which is non-significant. Further, F-value of Trialability is 2.125 and corresponding P-value is 0.121 which is non-significant. Here, E-health care services factors of Self-Efficacy secure a F-value of 0.419 and P-value is 0.658 which is non-significant. F-value for Subjective Norms is 0.375 and corresponding P-value is 0.687 which is non-significant. Regarding E-health care services factors of Attitude F-value is 2.150 and respective P-value is 0.118 which is non-significant. Trust secures the F-value of 0.644 and the corresponding p value is 0.526 which is non-significant.

From the above table the calculated P-values for perceived usefulness is found to be significant whereas perceived ease of use, perceived risk, compatibility, facilitating conditions, relative advantage, trialability, self-efficacy, subjective norms, attitude and trust are found to be non-significant.

While gone through the table values majority of the P-values are non-significant so the hypothesis gets accepted.

The results revealed that there is no significant difference of opinion between E- health care services Factors and gender of the respondent.

V. FINDINGS

Findings relevant to the demographic profile of the respondents. Percentage analysis are used to analyse the collected data. The following findings were drawn from the quantitative analysis made from the demographic factors. Majority 59.3 percent of the respondents are male. From this it can be inferred that most of the male respondents are using e-health care services.

The F-value of Perceived Usefulness of E-health care services factors is 22.283 and P value is 0.001 which is significant at 1% level. whereas perceived ease of use, perceived risk, compatibility, facilitating conditions, relative advantage, trialability, self-efficacy, subjective norms, attitude and trust are found to be non-significant.

VI. SUGGESTIONS

- ✓ Create awareness by giving advertisement in various forms (including social media) and mode of Voice Tele Health Services and other forms.
- ✓ Build trust among the patients by way of appearing doctor celebrities and patient celebrities in the advertisement copy.
- ✓ Ensure e-health services are accessible to a broader population by offering multilingual support, mobile-friendly platforms, and solutions for those with disabilities. Collaborate with local healthcare providers to bridge the digital divide and reach underserved communities.
- ✓ Provide ongoing education and training for both healthcare providers and patients on using e-health services effectively. Offer webinars, tutorials, and customer support to help users maximize the benefits of the platform, ensuring higher adoption and satisfaction rates.
- ✓ Using modern technology within healthcare enables professionals to reduce inefficiency, save time and accurately diagnose and treat diseases.
- ✓ e-Health services enable both the consumers and healthcare providers to feel more empowered by making available the knowledge base of medical data and health records over the internet.

VII. CONCLUSION

While analyzing the e-health care services majority of the male respondents are using e-health care services. However, challenges such as building trust, attitude, data privacy, digital literacy, and the need for seamless integration with traditional healthcare systems remain. To fully realize the potential of e-health services, continuous advancements in technology, better regulations, and customer-centric approaches are essential. By giving awareness, building trust, attitude and by providing user friendly services can create more customers (patients) of using e-health care services. If patients are ready to use e-health care services frequently then government will try to implement the services in government hospitals for the betterment of patients.

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