

Health-Seeking Behaviour and the Use of Artificial Intelligence-based Healthcare Chatbots among Indian Patients

Sangeetha Rangasamy¹, Aishwarya Nagarathinam², Aarthy Chellasamy³, Elangovan, N⁴.

¹School of Business and Management, Christ University, Bengaluru, India
sangeetha.r@christuniversity.in

²School of Business and Management, Christ University, Bengaluru, India
aishwarya.n@christuniversity.in

³School of Business and Management, Christ University, Bengaluru, India
aarthy.c@christuniversity.in

⁴School of Business and Management, Christ University, Bengaluru, India
elangovan.n@christuniversity.in

Abstract: Artificial Intelligence (AI) based healthcare chatbots can scale up healthcare services in terms of diagnosis and treatment. However, the use of such chatbots may differ among the Indian population. This study investigates the influence of health-seeking behaviour and the availability of traditional, complementary and alternative medicine systems on healthcare chatbots. A quantitative study using a survey technique collects data from the Indian population. Items measuring the awareness of chatbot's attributes and services, trust in the chatbots, health-seeking behaviour, traditional, complementary and alternative medicine, and use of chatbots are adapted from previous scales. A convenience sample is used to collect the data from the urban population. 397 samples were fetched, and statistical analysis was done. Awareness of the chatbot's attributes and services impacted the trust in the chatbots. Health-seeking behaviour positively impacted the use of chatbots and enhanced the impact of trust of a chatbot on the use of a chatbot. Traditional, complementary and alternative medicine was not included in the chatbot, which negatively impacted the use of chatbots. At the same time, it dampened the impact of trust in chatbots on the use of chatbots. The study was limited to the urban population and a convenience sampling because of the need to use the Internet and a smart device for accessing the chatbots. The results of the study need to be used cautiously. The results can be inferred from the relationships' existence rather than the impact's magnitude. The study's outcome encourages the availability of chatbots due to the health-seeking behaviour of the Indian urban population. The study also highlights the need for creating intelligent agents with knowledge of Traditional, complementary and alternative medicine. The study contributes to the knowledge of using chatbots in the Indian context. When earlier studies focus mainly on the chatbot features or user characteristics in the intention studies, this study looks at the healthcare system and the services unique to India.

Keywords: Indian Health seeking behaviour, Traditional, complementary and alternative medicine, Health care, Chatbots, Intention to use.

I. Introduction

Consumer awareness of websites and online healthcare apps has skyrocketed, generating a lot of attention. Telehealth utilization exploded as consumers and providers sought secure ways to obtain and deliver healthcare during the COVID-19 pandemic. A survey conducted by Mckinsey Consumer Health Insights (2021) says that the overall telehealth usage for office visits and outpatient care was 78 times higher in April 2020 than in February 2020. Around 40% of customers surveyed anticipate they will continue to utilize telehealth, up from 11% of consumers who used telehealth before COVID-19. Furthermore, according to their research, 40 to 60 percent of customers are interested in a larger set of virtual health solutions, such as a "digital front door" or a lower-cost virtual-first health plan. On the provider side, 58 percent of doctors think telehealth is better now than before COVID-19. However, their opinions have shifted little (64 percent of physicians) since

September 2020[28]. In India, according to a survey by Practo, online healthcare consultations surged by 500% from March 1 to May 31, 2020. According to the survey, around five crore Indians used the Internet to obtain healthcare, with an average of two monthly online doctor consultations per user [41]. Technology intervention in the process of health-seeking has gained prominence as it provides a variety of solutions like easily accessible, cost-effective, less waiting time, anonymity and flexibility in terms of time and use, which has attracted industry and academia [23].

They [32] have categorized chatbots based on purpose (assistant or conversation) and communication (text-based or voice-based). Chatbots are often used in business activities, such as customer service or product/service information providing. In most current business applications, customer service tasks are handled by a combination of humans and robots. Initially, a robot is in charge of the initial portion of the

conversation or replying to simple queries. Then for advanced queries, the conversation is then transferred to the human service agent.

Sometimes, the whole system is called a chatbot [35]. Originally, chatbots were created for fun and entertainment purposes and used simple keyword-matching techniques [42]. Later, chatbots started using natural language processing systems to analyze users' inputs. Gradually chatbots became a huge success in 2011 with the launch of Apple's Siri, a voice assistant with chatbot technology, and since then, chatbots have been applied to diverse industries. The newest trend is integrating chatbots with advanced technologies such as big data and deep learning. Using deep learning technologies, chatbots can learn from the dataset or knowledge database and create models that help predict new outcomes [22]. Thus, 2021 chatbots can simulate an experience for the user as if talking to a real human being. Through chatbots, companies can increase customer engagement in their marketing actions more than the other marketing tools that do not use artificial Intelligence [14]. In the tourism and hospitality industry, chatbots are used for bookings, recommendations and other related services [44]. Chatbots have become popular as it's easy for developers since they are platform-independent and readily available for users without installation. They guarantee the user's identity and provide integrated payment services, ensuring their safety. The chatbot can be categorized based on "knowledge domain, service provided, goals, input processing and response generation method, human aid and build method"[2].

As chatbots are algorithm-driven, they tend to reduce the workload for the professionals, increase the accuracy of results for decision making, can deal with real-time and historic data for prediction and less error, thereby increasing efficiency [40]. The chatbots can give immediate access to health data at the first sign of illness and recommend suitable healthcare providers. Chatbots lack non-judgemental human features, so people trust and disclose information [16]. Chatbots can ensure assistance in physical, psychological and behavioural wellbeing such as diet suggestions, medication routine, exercise reminders and stress reduction. Also, it will reduce administrative delays, help fix healthcare providers, and can attend to commonly asked questions/suggestions. They [39] have listed the logistical benefits of using healthcare chatbots for patients. The benefits are that chatbot can easily locate healthcare clinics, schedule appointments, process medical invoices, and bill payments, make reminders for medications and doctor visits, renew prescriptions, and collect healthcare information for insurance.

With advancements in natural language processing (NLP) and machine learning (ML) techniques, chatbots are becoming more sophisticated and can understand and respond to complex

user queries. However, there is a lack of research on the effectiveness and efficiency of these chatbots and their impact on user satisfaction and experience. A study on Indian Health seeking behaviour and AI-based chatbots can provide valuable insights into the awareness of these healthcare chatbots in the Indian medical systems, ultimately enhancing their performance and usability. This study looks into how the use of healthcare chatbots is impacted by people's health-seeking behaviour and the accessibility of traditional, complementary, and alternative medical treatments.

II. Related Works

The intention to use healthcare chatbots can vary depending on the individual and the specific use case. Some people may be open to using a chatbot for scheduling appointments or refilling prescriptions. In contrast, others may hesitate to use a chatbot for more sensitive medical information or advice. Factors influencing a person's intention to use a healthcare chatbot include trust in the technology, perceived ease of use, and the availability of alternative options. Generally, user acceptance and trust are key for healthcare chatbots to be widely used in the industry.

The potential use of Artificial Intelligence has improved the efficiency and effectiveness of healthcare. However, the acceptance of AI-based chatbots is still in its infancy. Past researchers have stated that the use of chatbots has a positive perception because of their responsiveness, availability, ease of use, improved efficiency, and reduced cost of health care (Kasilingam) [5]. However, concerns like lack of trust, data privacy, patient safety, technological maturity, and automation might lead to negative perceptions among patients about using chatbots. Personal recommendation, linguistic ability, response variability, and customization may enhance the awareness of healthcare chatbots [4].

2.1 Role of Trust in adoption intention

The user's trust in chatbots is determined by factors specific to the chatbot, such as how much it responds like a human, how it presents itself, and how competent it appears. However, it also depends on factors specific to its service contexts, such as the chatbot host's brand, privacy and security, and other risk issues related to the request's topic [3]. Personal and institutional trust influences consumers' decisions to authorize their data for marketing purposes [27]. Indeed, trust is vital in virtual relationships [13] and smart-technology interactions [33]; in the same way, it could help with chatbot privacy issues. By examining the drivers of trust in the interaction between humans and intelligent agents, such as chatbots, a recent study in the health sector looked at the determinants of trust in the relationship between humans and AI [46]. The degree of trust a chatbot earns due to its use is determined by elements such as

its behaviour, look, and other aspects connected to its manufacturer, as well as privacy and security concerns [3]. Consumer personality is one characteristic that helps develop e-commerce trust [10]. In this context, firms should improve language interactions with chatbots by better imitating natural human interactions to increase trust and eliminate privacy issues [46].

Therefore, we propose the following:

H1: Trust in chatbot influences the intention to use healthcare chatbot

Research has shown that users who know they are interacting with a chatbot tend to trust it less than those who believe they are communicating with a human. This is because users often expect more personalized and empathetic responses from humans, while chatbots are often perceived as less able to provide these responses. One way to improve trust in chatbots is to be transparent about their nature as an AI-powered communication tool. This means making it clear to users that they are interacting with a chatbot and explaining its capabilities and limitation[43]. This allows users to adjust their expectations and better understand the chatbot's responses. Apart from performance expectancy, compatibility, perceived ease of use, and social influence increases customers' initial trust towards chatbot, leading to intention to use chatbot [36]. Therefore, we propose the following:

H2: Awareness of chatbot influence the trust in chatbot

2.2 The uniqueness of Indian health-seeking behaviour

Indian health-seeking behaviour is unique in several ways. One aspect is the strong emphasis on traditional and alternative forms of medicine, such as ayurveda and homoeopathy, in addition to modern Western medicine. Many Indians may first turn to alternative forms of medicine, such as ayurveda or homoeopathy, before seeking Western-style medical treatment. Additionally, individuals may be culturally expected to seek treatment from a local practitioner before seeking care from a specialist or hospital. These cultural and traditional influences can make Indian health-seeking behaviour unique compared to other countries.

“Complementary medicine” and “alternative medicine” refer to a wide range of healthcare methods that are not part of a country's traditional or conventional medicine and are not fully incorporated into the dominant healthcare system. People who use complementary and alternative medicine (CAM) usually seek solutions to improve their health and wellbeing or alleviate symptoms associated with chronic, even terminal illnesses or the side effects of traditional treatments [11]. A holistic health philosophy or a transformational experience that affects one's

worldview and wanting better control over one's health are reasons for using CAM.

Complementary and Ayurvedic medicine is an integral part of traditional healthcare in India, and the use of chatbots in this sector is growing. Chatbots can provide information and guidance on Ayurvedic remedies, dietary recommendations, and lifestyle changes, which can help users manage their health and wellness. Chatbots can also help users find reputable Ayurvedic practitioners and products and provide information on the safety and effectiveness of various treatments. They can also assist users in managing symptoms and tracking their progress over time, which can help users make informed decisions about their health [1].

Therefore, we propose the following:

H3: Health-seeking behaviour influences the usage of healthcare chatbot

2.3 The Uniqueness of Alternative Medicine Systems in India

Complementary and alternative medicine refers to treatments or practices not part of the standard medical care. Complementary and alternative medicine (CAM) is used by around 75% of the world's population for their healthcare [46]. “Complementary medicine” and “alternative medicine” refer to a wide range of healthcare methods that are not part of a country's traditional or conventional medicine and are not fully incorporated into the dominant healthcare system. CAM is a multibillion-dollar sector that has grown exponentially in industrialized countries during the last two decades. CAM has been practised for centuries all over the world. Traditional healers cure 90% of patients in Bangladesh, 85 percent in Burma, 80 percent in India, 75 percent in Nepal, 65 percent in Sri Lanka, and 60 percent in Indonesia, according to the WHO survey [8]. Physicians and medical students favour complementary and alternative medicine (CAM). Prayer/spirituality was the most widely recognized and effective modality with the least amount of harm among all of the students, followed by massage, nutritional supplements, cupping, yoga, herbal medicine, acupuncture, and aromatherapy, and bloodletting was the least widely recognized and effective modality with the most amount of harm [8]. As many Western populations also strongly believe in alternative medicine systems in India, especially ayurveda and naturopathy, a chatbot which could give suggestions or details on practitioners and medicines will increase the intention to use chatbots (Mayur Vaishnav, 2020).

Therefore, we propose the following:

H4: Alternative medicine system in India influences the usage of healthcare chatbot

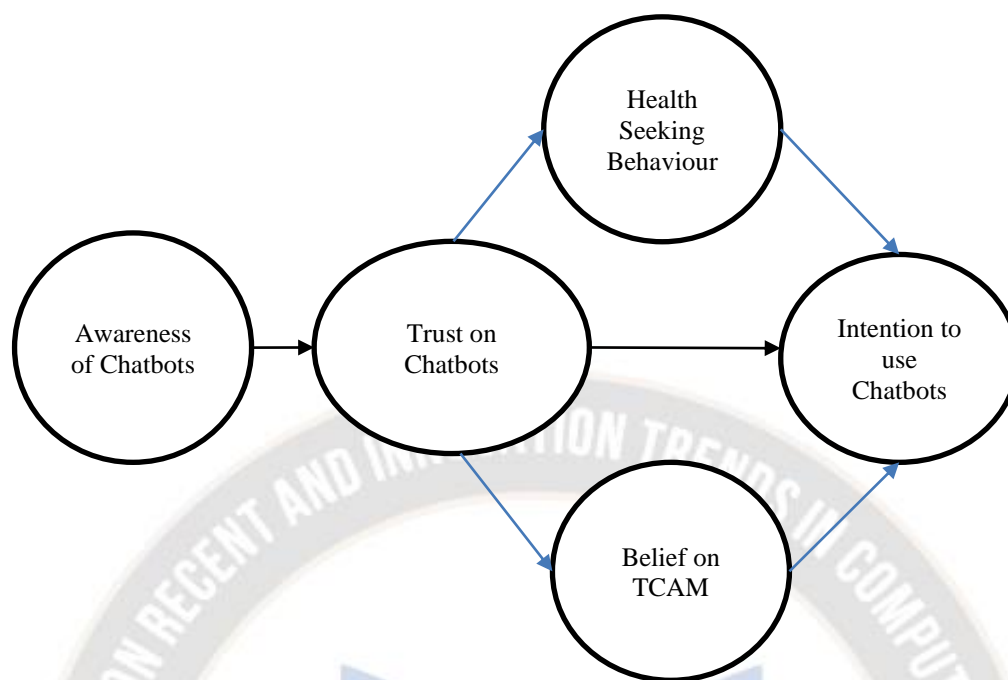


Figure 1. Conceptual framework on intention to use healthcare chatbots.

III. Methodology

The study validates a conceptual model developed based on the literature review. Hypotheses are framed from the relationships indicated in the model. Survey data is used to validate the hypotheses. Survey instruments are adapted from the standard scales (Table 1). The questionnaire had seven sections measuring awareness of chatbots, trust in chatbots, health-seeking behaviour, attitude towards traditional, complementary and alternative medicine, intention to use chatbots and demography variables. The instrument was validated at multiple stages. First, the instrument was reviewed by medical practitioners, technology consultants and academic experts. In the second stage, the instrument was reviewed by chatbot users. Language correction of the instrument was further done. The validated instrument was pilot tested with a few actual respondents. The instrument was modified by changing some difficult words for the common person. The final instrument was prepared in digital format.

Table 1 Measurement scales of the study

Variable		Scale
Intention to use Chatbots	[19];[17]	10 items of 5-Point Agreeableness Likert Scale
Traditional, Complementary and Alternative Medicine	[25]	11 items of 5-Point Agreeableness Likert Scale

Awareness of AI Healthcare chatbots	[37]	9 items of 5-Point Agreeableness Likert Scale
Health seeking behaviour	Hillary Lewin-Tuvia, (2012)	12 items of 5 Point Never to Always scale 6 items of 5-Point Agreeableness Likert Scale
The Trust of AI Healthcare Chatbots	Hong et al. (2019)	12 items of 5-Point Agreeableness Likert Scale

Sampling technique Since it is difficult to get a database of urban Internet users, the study applied a non-probability sampling. We use an unrestricted self-selected survey. In this method, any person who comes across the link for the survey and wishes to take part in the survey becomes the sample. There are no restrictions for the participants. This technique is a form of convenience sampling. Though this cannot be generalized to a larger population, the finding will be useful for research [20].

The survey monkey platform was used for collecting data. The questionnaire was prepared on the platform, and the link was circulated on social media (Whatsapp, LinkedIn etc.). The survey was open for three months during the second half of 2022. The survey link was posted in various groups, and 513 responses were received. There was no control over who received the survey, so many incomplete responses. A total of

397 filled responses were available for the analysis.

IBM SPSS and AMOS are used for statistical analysis. The demography and various measures are described first. Confirmatory factor analysis is done to check the validity of the constructs. Reliability values are also checked. Further, the model is tested in the software. The coefficient values are used for hypothesis testing, and the fitness indices for the model testing.

IV. Results

The demographics of the sample respondents are presented in Table 2. The majority of the respondents are employed (57.68%). The respondents have a moderate income level, where 37.28% have an income below 0.5 million INR, and 31.23% have an income between 0.5 million to one million

INR. The majority have graduated (UG=33.0% and PG=28.6%). More women responded to the survey (46.10%).

Table 3 presents the construct-level descriptive statistics. All the constructs were higher than the mid value indicating an agreeableness on the concepts among the respondents. There was a higher trust in the chatbots (4.267). There was a higher intention to use the chatbots (4.161). The reliability and validity of the data are presented in Table 4. The composite reliability (CR) for all the constructs is above 0.7, with the highest being for TCAM (0.921) and the lowest for AWARE (0.879). AVE values for all the constructs are above 0.5, and the square root of AVE values of the construct (Values in the diagonal) is above the correlation of the construct with other constructs. The results prove the constructs' good reliability, convergent and discriminant validity.

Table 2. Demography Details

Demography	Category	N (397)
Gender	Men	155 (39.04%)
	Women	183 (46.10%)
	Did not mention	59 (14.86%)
Profession	Student	88 (22.17%)
	Employed	229 (57.68%)
	Self-employed	50 (12.59%)
	Unemployed	30 (7.56%)
Annual Income	No Income	93 (23.43%)
	Less than INR 0.5 million	148 (37.28%)
	INR 0.5 to 1 million	124 (31.23%)
	Above INR 1 million	32 (8.06%)
Education	School level	123 (30.98%)
	UG	131 (33.00%)
	PG	113 (28.46%)
	Above PG	30 (7.56%)

Table 3. Descriptive Statistics

	N	Sum	Mean	SD	Var	Skew	Kurt
AWARE	397	1579.00	3.977	.653	.426	-1.126	4.107
THC	397	1694.00	4.267	.707	.499	-.733	.642
HSB	397	1439.00	3.625	.684	.467	-.934	.453
TCAM	397	1579.00	3.977	.691	.477	-.572	1.057
INT	397	1652.00	4.161	.699	.489	-.900	2.119

Table 4. Reliability and Validity

	CR	AVE	MSV	THC	AWARE	TCAM	HSB	INT
THC	0.896	0.524	0.481	0.724				
AWARE	0.879	0.551	0.436	0.655	0.742			
TCAM	0.921	0.516	0.491	0.431	0.374	0.718		
HSB	0.916	0.515	0.438	0.557	0.447	0.399	0.718	
INT	0.891	0.552	0.496	0.634	0.675	-0.431	0.429	0.743

Table 5 presents the regression coefficients of the structural model. Awareness (B=0.411, P<0.000) is found to influence trust in chatbots. TCAM (B= -0.322, P<0.000) negatively impacts the intention to use chatbots. However, HSB (B=0.519, P<0.000) and trust (B=0.456, P<0.000) have a positive impact

on the intention to use chatbots. As a mediation effect is proposed between trust in chatbots and intention to use chatbots, the effect between trust in chatbots and health-seeking behaviour (B=0.519, P<0.000), and TCAM (0.393, P<0.000) are found to be positive and significant.

Table 5 Regression coefficients

			Estimate	SE.	CR.	P	Std Est
THC	<---	AWARE	.411	.081	10.061	***	0.467
HSB	<---	THC	.519	.092	8.875	***	0.588
TCAM	<---	THC	.393	.081	11.030	***	0.466
INT	<---	TCAM	-.322	.063	-5.101	***	-0.454
INT	<---	HSB	.215	.044	3.496	***	0.216
INT	<---	THC	.456	.084	5.457	***	0.624

Table 6 presents the results of the mediation analysis. The results show that the TCAM and HSB partially mediate the effect of trust on the intention to use. TCAM mediates the relationship negatively (-0.126). HSB is found to mediate

positively (0.112). When both variables act together, a mediation effect of -0.014 is reduced to the direct effect (0.456) between trust and intention to use. The total effect between the variables is found to be 0.442.

Table 6 Mediation effect between THC and INT

		Estimate
Direct Effect		0.456
Indirect Effect	Indirect Effect (TCAM) = -0.126	-0.014
	Indirect Effect (HSB) = 0.112	
Total Effect		0.442

Table 7 Squared Multiple Correlations

	R Sq
INT	0.586
THC	0.451

Table 7 presents the coefficient of determination or the RSq values of the predicted. Trust in Chatbots is predicted by awareness to the extent of 45.1%. Intention to use chatbots is predicted by the trust in chatbots, health-Seeking behaviour and TCAM to the extent of 58.6%.

Table 8 presents the model fitness indices. CMIN/DF is found to be less than five (3.380). However, the chi-square significance is 0.000, indicating that the model has scope to improve. GFI (0.891) is close to 0.9, showing a good fit. CFI (0.920), NFI (0.914) and TLI (0.910) showed a good incremental fit compared to the null model. PNFI (0.555) is above 0.5, indicating a good parsimony fitness of the model. The RMSEA value that measures the bad fit is lower than 0.08, indicating that the errors are within the limit. Overall, the model fits well with the data and supports the conceptualized relationships between the constructs.

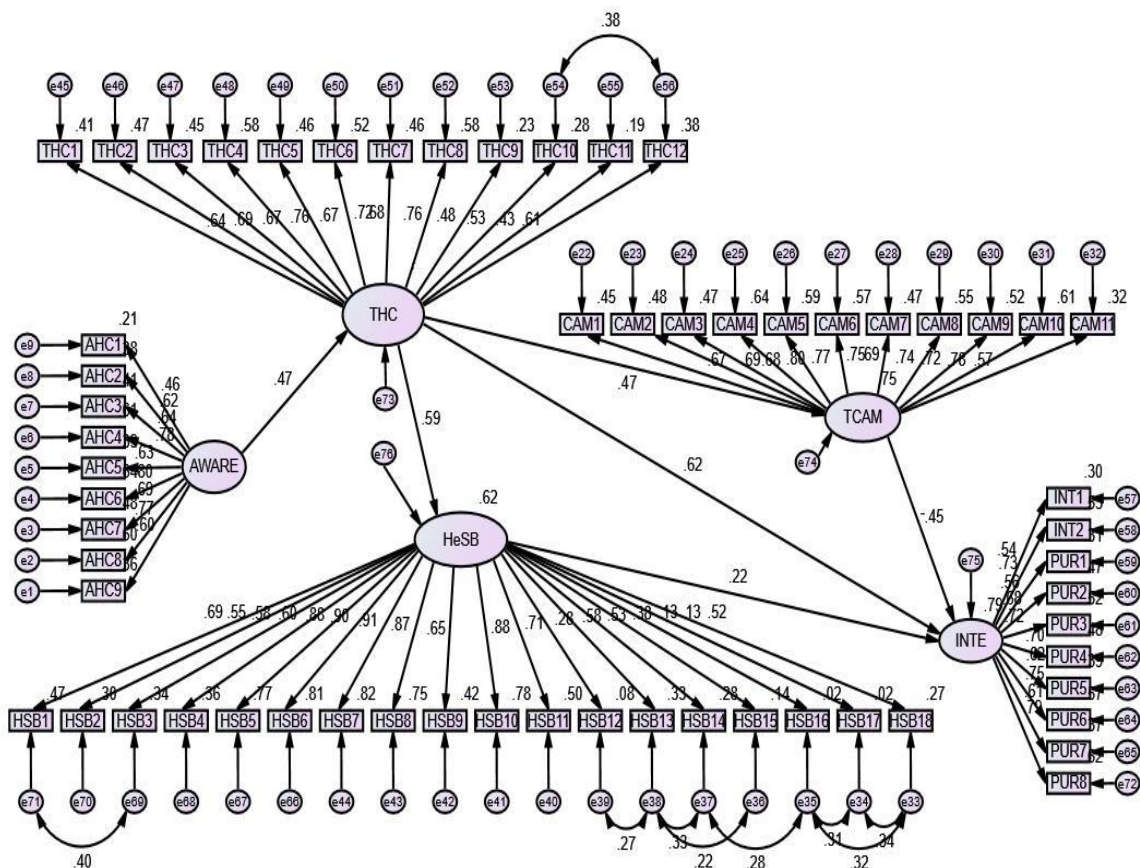


Figure 2 Model with standardized estimates

Table 8 Model Fit indices

Index	Value	
CMIN	5729.14	
DF	1695	
P	0.000	The p-value is less than 0.05. Scope for improvement.
CMIN/DF	3.380	The value is less than 5. Good fit
GFI	0.891	Less than 0.9. Good Fit
PNFI	0.555	Above 5. Good parsimony fit
CFI	0.920	Above 0.9. Very Good Fit
NFI	0.914	Above 0.9. Very Good Fit
TLI	0.910	Above 0.9. Very Good Fit
RMSEA	0.077	Less than 0.08. Less bad fit
PCLOSE	0.000	The p-value is less than 0.05. Scope for improvement.

V. Discussions

Indian health-seeking behaviour is impacted due to the availability and affordability of the healthcare system to everyone. India has multiple medicine systems, such as Ayurveda, Siddha, homoeopathy, Unani etc., that are still practised and are popular. These traditional medicine systems are used as complementary or alternative medicine systems. These factors are unique to Indian patients. AI-based healthcare chatbots are predominantly based on the modern medicine system. The usage of chatbots can impact health-seeking behaviour and the belief in TCAM. This study has attempted to investigate how the use of healthcare chatbots is impacted by people's health-seeking behaviour and the accessibility of traditional, complementary, and alternative medical treatments.

The respondents of the study were educated, employed and of moderate income. Earlier studies have found that non-urban migrant employees had limited access to health services, and health-seeking behaviour was different between patients with paid employment and self-employment[12]. Chatbot use requires a certain level of literacy, access to the internet and an electronic device. The study's respondents are appropriate for assessing the intention to use chatbots.

We found a higher intention to use the chatbot among the respondents, who were well aware of its features and benefits. The respondents better perceive how chatbots can provide healthcare solutions. The trust in chatbots, too, is found to be higher. Health-seeking behaviour shows poor access to the healthcare system, and patients try self-treatment or believe in the supreme power.

This study found that awareness of chatbots influences trust in chatbots. It is the general norm that awareness about a concept, trend or technology enhances trust leading to better experience and satisfaction. This is also emphasized by various studies

conducted to understand the effect of awareness on trust in banking [7], marketing [9] and healthcare[43]. It was also discussed that human-like features of chatbots provide a sense of human contact resulting in social presence. Sometimes the effective AI mechanism through natural language processing provides an appropriate answer to the queries raised during the consultation and overcomes the presence of a conversational human being. An exploratory study undertaken by [19] and [38] also revealed the same. It can be reiterated that the receptiveness and trust among users of AI chatbots are improving. However, the intervention designers have to apply user-centred and theory-based approaches to bridge the gap in expectations of the user and the support or response given by the AI chatbot [37].

Everyone is concerned about health irrespective of age, gender, income and educational qualification. Trust in Chatbots is predicted by awareness to the extent of 58.6%. It can be justified by the findings of [38] and [49]. They also want reliable information if they seek health advice through chatbots. Most studies expressed a positive relationship between trust and HSB [6],[31],[43].

When explored further, it was found that TCAM negatively impacts the intention to use chatbots. This goes with the belief that face-to-face, touch, and consultancy are the best remedies than the medicine itself. So, people tend to prefer human consultation to human-made machine AI chatbot consultation. However, it was identified that HSB has a positive impact on the intention to use chatbots, which was supported by the findings of a study [32]. The mediation effect between trust in chatbots and intention to use chatbots, the effect between trust in chatbots and health-seeking behaviour and TCAM are positive and significant. The negative effect of TCAM has been made positive with the mediation effect of trust on chatbot and intention to use along with HSB.

In the present study, TCAM has negatively impacted the intention to use chatbots. However [30] found that attitude, subjective norms, perceived price, and knowledge significantly impact willingness to pay for TCAM. In contrast to that, HSB and trust have a positive impact on the intention to use chatbots. The same is being studied by [45], considering gender-based intention. It was found that highly anthropomorphized female chatbots bring in positive consumer behaviour. However, the trust and intention to use chatbots can be enhanced if there is an alignment in the main feature of the language of interaction, which [48] also highlight.

As a mediation effect is proposed between trust in chatbots and intention to use chatbots, the effect between trust in chatbots and health-seeking behaviour and TCAM is positive and significant. Trust in Chatbots is predicted by awareness to the

extent of 58.6%. It can be justified by the findings of [38] and [50].

The present study reveals that the AI chatbots' awareness and trust impact an individual's health-seeking behaviour. However, factors like the availability of traditional and alternative medicine and the intention to use Chatbots determine the penetration and success of AI Chatbots. Hence to make the AI-based chatbot sustainable, it is important to constantly update and upgrade to make it user-friendly so that people become aware of the usefulness of the chatbot so that trust and awareness can be improved.

Based on the study findings, it can be suggested that the improved awareness of AI chatbots and their success rates in other advanced countries might improve the general public's awareness. Trust in chatbots among common people can be enhanced with the help of government intervention through the Digital India campaign resulting in digitized health services.

The general tendency of people is to seek support and guidance on health issues. However, the availability of an individual and interest to share the information as and when required is a challenge. The AI-based Chatbots, based on their design and model, can be made available to respond to patients' queries of patients around the clock, along with their promptness in advising on health issues might improve the trust.

The availability of multiple medicine systems makes the patients give second priority to the chatbots due to their present awareness of Chatbots. However, if the Chatbots are trained to include suggestions based on multiple medicine systems and their availability is made known to the general public, there is a high chance that awareness can be improved. Better awareness will build trust leading to better usage.

Previous studies have proved that trust in chatbots influences the intention to use chatbots [36]. This study adds to the literature on testing the same in healthcare chatbots. In addition, the proposition that unique characteristics of the Indian healthcare system will impact chatbot use is confirmed. The study also adds to the theory that multiple medicine systems and health-seeking dynamics among the Indian population affect healthcare chatbots.

VI. Conclusion

As healthcare chatbots are gaining popularity across the world, the question of how it is relevant to the Indian market and what is its future is being investigated through this study. The role of Indian health-seeking behaviour and the belief in TCAM in using healthcare chatbots are studied among the urban population in India. The study found that the awareness of the functions of the chatbot towards the services of the chatbots create better trust in the chatbots. Though trust in chatbots

influences the use of the chatbots, Indian health-seeking behaviour enhances the intention to use them. However, the belief of TCAM is found to reduce the intention to use healthcare chatbots. The findings of this study highlight the role of unique characteristics of India, such as the practice of different medical systems and the health-seeking behaviour of the people to use healthcare chatbots. The outcome of the study recommends including TCAM in the chatbot and scaling up additional services to provide inclusiveness of healthcare services to a larger population who do not afford basic healthcare through hospitals. This study is limited to urban populations due to the awareness and access to the Internet and smart devices required to use chatbots. Future studies can expand the challenges of chatbot usage in other geographies.

REFERENCES

- [1] Aash Jain, Jinal Padhiar, Jigar Kadiya and Dr Yogita Mane (2022). Dr Bot - Ayurvedic, Allopathic, and Home-made solutions to all your diseases. *Journal of Emerging Technologies and Innovative Research*.2 (4).153-158.
- [2] Adamopoulou, E., & Moussiades, L. (2020). An overview of chatbot technology. In *Artificial Intelligence Applications and Innovations: 16th IFIP WG 12.5 International Conference, AIAI 2020, Neos Marmaras, Greece, June 5–7, 2020, Proceedings, Part II* 16 (pp. 373-383). Springer International Publishing.
- [3] Adamopoulou, E., & Moussiades, L. (2020b). Chatbots: History, technology, and applications. *Machine Learning with Applications*, 2, 100006.
- [4] Aishwarya Nagarathinam, Aarthy Chellasamy, Elangovan. .N, Sangeetha Rengasamy (2022). Modeling the Intention to Use AI Healthcare Chatbot's in the Indian Context. *Proceedings of the 2nd International Conference on Emerging Technologies and Intelligent Systems* (pp.657-666).
- [5] Almalki, M., & Azeez, F. (2020). Health chatbots for fighting COVID-19: a scoping review. *Acta Informatica Medica*, 28(4), 241.
- [6] Arakelyan, S., Jailobaeva, K., Dakessian, A., Diaconu, K., Caperon, L., Strang, A., Bou-Orm, I. R., Witter, S., & Ager, A. (2021). The role of trust in health-seeking for non-communicable disease services in fragile contexts: A cross-country comparative study. *Social Science & Medicine*, 291, 114473.
- [7] Arzu, E. B. (2021). Determinants of customer satisfaction in chatbot use: evidence from a banking application in Turkey. *International Journal of Bank Marketing*, 39(2), 294–311.
- [8] Khan, A., Ahmed, M. E., Aldarmahi, A., Zaidi, S. F., Subahi, A. M., Al Shaikh, A., ... & Alhakami, L. A. (2020). Awareness, self-use, perceptions, beliefs, and attitudes toward complementary and alternative medicines (CAM) among health professional students in King Saud bin Abdulaziz University for Health Sciences Jeddah, Saudi Arabia. *Evidence-Based Complementary and Alternative Medicine*, 2020.. <https://doi.org/10.1155/2020/7872819>.
- [9] Badr, M. R., & Kasamani, T. (2021). Antecedents and consequences of chatbot initial trust. *European Journal of Marketing*, 56(6), 1748–1771.

- [10] Bansal, G., Zahedi, F. M., & Gefen, D. (2016). Do context and personality matter? Trust and privacy concerns in disclosing private information online. *Information & Management*, 53(1), 1–21.
- [11] Barnes PM, Bloom B, Nahin RL. Complementary and alternative medicine use among adults and children: United States, 2007. *National health statistics reports; no 12*. Hyattsville, MD: National Center for Health Statistics. 2008.
- [12] Cheatham, C. T., Barksdale, D. J., & Rodgers, S. G. (2008). Barriers to health care and health-seeking behaviors faced by Black men. *Journal of the American Academy of Nurse Practitioners*, 20(11), 555–562.
- [13] Coppola, N. W., Hiltz, S. R., & Rotter, N. G. (2004). Building trust in virtual teams. *IEEE Transactions On Professional Communication*, 47(2), 95–104.
- [14] de Cosmo, L.M., Piper, L. & Di Vittorio, A (2021). The role of attitude toward chatbots and privacy concern on the relationship between attitude toward mobile advertising and behavioral intent to use chatbots. *Italian Journal of Marketing*. 2021, 83–102. <https://doi.org/10.1007/s43039-021-00020-1>
- [15] de Gennaro, M., Krumhuber, E. G., & Lucas, G. (2019). Effectiveness of an Empathic Chatbot in Combating Adverse Effects of Social Exclusion on Mood. *Frontiers in Psychology*, 10, 3061.
- [16] Dennis, A. R., Kim, A., Rahimi, M., & Ayabakan, S. (2020). User reactions to COVID-19 screening chatbots from reputable providers. *Journal of the American Medical Informatics Association: JAMIA*, 27(11), 1727–1731.
- [17] Dharun Lingam Kasilingam (2020). Understanding the attitude and intention to use smartphone chatbots for shopping. *Technology in Society*. Volume 62.101280, ISSN 0160-791X, <https://doi.org/10.1016/j.techsoc.2020.101280>.
- [18] Fadhil, A., & Gabrielli, S. (2017). Addressing challenges in promoting healthy lifestyles. *Proceedings of the 11th EAI International Conference on Pervasive Computing Technologies for Healthcare. Pervasive Health '17: 11th EAI International Conference on Pervasive Computing Technologies for Healthcare*, Barcelona, Spain. <https://doi.org/10.1145/3154862.3154914>
- [19] Folstad, A., Nordheim, C. B., & Bjørkli, C. A. (2018). What Makes Users Trust a Chatbot for Customer Service? An Exploratory Interview Study. *Internet Science*, 194–208.
- [20] Fricker, R. D. (2016). Sampling methods for online surveys. *The SAGE Handbook of online research methods*, 162–183.
- [21] Hillary, L. T. (2012). On spirituality, religiosity and health among college students in Mumbai, India (Doctoral dissertation, Yeshiva University).
- [22] Huang, D. H., & Chueh, H. E. (2021). Chatbot usage intention analysis: Veterinary consultation. *Journal of Innovation & Knowledge*, 6(3), 135–144.
- [23] Hauser-Ulrich, S., Künzli, H., Meier-Peterhans, D., & Kowatsch, T. (2020). A Smartphone-Based Health Care Chatbot to Promote Self-Management of Chronic Pain (SELMA): Pilot Randomized Controlled Trial. *JMIR mHealth and uHealth*, 8(4), e15806.
- [24] Hong Z, Deng Z, Zhang W. Examining factors affecting patients' trust in online healthcare services in China: The moderating role of the purpose of use. *Health Informatics Journal*. 2019;25(4):1647-1660. doi:10.1177/1460458218796660
- [25] Islahudin, F., Shahdan, I. A., & Mohamad-Samuri, S. (2017). Association between belief and attitude toward preference of complementary alternative medicine use. *Patient preference and adherence*, 913–918.
- [26] Jan Van den Bulck, Kathleen Custers, Belief in complementary and alternative medicine is related to age and paranormal beliefs in adults, *European Journal of Public Health*, Volume 20, Issue 2, April 2010, Pages 227–230, <https://doi.org/10.1093/eurpub/ckp104>.
- [27] Jayawardhena, C., Kuckertz, A., Karjaluoto, H., & Kautonen, T. (2009). Antecedents to permission-based mobile marketing: An initial examination. *European Journal of Marketing*, 43(3/4), 473–499.
- [28] Jenny Cordina, Eric Levin, George Stein (2021). McKinsey Consumer Health Insights Survey. <https://www.mckinsey.com/industries/healthcare/our-insights/covid-19-consumer-healthcare-insights-what-2021-may-hold>
- [29] Khan, R., Qudrat-Ullah, H. (2021). Technology Adoption Theories and Models. In: *Adoption of LMS in Higher Educational Institutions of the Middle East. Advances in Science, Technology & Innovation*. Springer, Cham. https://doi.org/10.1007/978-3-030-50112-9_5
- [30] Koh, M. Z. Y., & Goh, Y.-N. (2021). Willingness to pay for traditional, complementary and alternative medicine (TCAM) among Malaysian adults. *International Journal of Pharmaceutical and Healthcare Marketing*, 15(2), 312–330.
- [31] Lau, L. L. H., Hung, N., Dodd, W., Lim, K., Ferma, J. D., & Cole, D. C. (2020). Social trust and health seeking behaviours: A longitudinal study of a community-based active tuberculosis case finding program in the Philippines. *SSM - Population Health*, 12, 100664.
- [32] Lee, Y.-C., Yamashita, N., Huang, Y., & Fu, W. (2020). “I Hear You, I Feel You”: Encouraging Deep Self-disclosure through a Chatbot. *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems*, 1–12.
- [33] Li, X., Hess, T. J., & Valacich, J. S. (2008). Why do we trust new technology? A study of initial trust formation with organizational information systems. *The Journal of Strategic Information Systems*, 17(1), 39–71.
- [34] Vaishnav, M. (2020). Service-oriented chatbot for essential oils using natural language processing (Doctoral dissertation, Dublin Business School).
- [35] Melián-González, Santiago & Taño, Desiderio & Bulchand-Gidumal, Jacques. (2019). Predicting the intentions to use chatbots for travel and tourism. *Current Issues in Tourism*. 24. 1-19. 10.1080/13683500.2019.1706457.
- [36] Mostafa, R. B., & Kasamani, T. (2022). Antecedents and consequences of chatbot initial trust. In *European Journal of Marketing* (Vol. 56, Issue 6, pp. 1748–1771). <https://doi.org/10.1108/ejm-02-2020-0084>
- [37] Nadarzynski, T., Miles, O., Cowie, A., & Ridge, D. (2019). Acceptability of artificial intelligence (AI)-led chatbot services in healthcare: A mixed-methods study. *Digital Health*, 5, 2055207619871808.

- [38] Nordheim, C. B., Følstad, A., & Bjørkli, C. A. (2019). An Initial Model of Trust in Chatbots for Customer Service—Findings from a Questionnaire Study. *Interacting with Computers*, 31(3), 317–335.
- [39] Palanica, A., Flaschner, P., Thommandram, A., Li, M., & Fossat, Y. (2019). Physicians' perceptions of chatbots in health care: cross-sectional web-based survey. *Journal of medical Internet research*, 21(4). <https://doi.org/10.2196/12887>
- [40] Parviainen, J., & Rantala, J. (2021). Chatbot breakthrough in the 2020s? An ethical reflection on the trend of automated consultations in health care. *Medicine, Health Care, and Philosophy*. <https://doi.org/10.1007/s11019-021-10049-w>
- [41] Practo Insights Report. (n.d.). Retrieved January 11, 2020, from <https://blog.practo.com/5-crore-indians-accessed-healthcare-online-in-the-last-three-months/>
- [42] Shawar, B. A., & Atwell, E. (2007). Chatbots: Are they really useful? *LDV-Forum*, 22(1), 29–49.
- [43] Seitz, L., Bekmeier-Feuerhahn, S., & Gohil, K. (2022). Can we trust a chatbot like a physician? A qualitative study on understanding the emergence of trust toward diagnostic chatbots. *International Journal of Human-Computer Studies*, 165, 102848. <https://doi.org/10.1016/j.ijhcs.2022.102848>
- [44] Thompson, A. E., Anisimowicz, Y., Miedema, B., Hogg, W., Wodchis, W. P., & Aubrey-Bassler, K. (2016). The influence of gender and other patient characteristics on health care-seeking behaviour: a QUALICOPC study. *BMC Family Practice*, 17, 38.
- [45] Toader, D.-C., Boca, G., Toader, R., Măcelaru, M., Toader, C., Ighian, D., & Rădulescu, A. T. (2020). The Effect of Social Presence and Chatbot Errors on Trust. *Sustainability*, 12(1), 256. <https://doi.org/10.3390/su12010256>
- [46] Ukpabi, D. C., Aslam, B., & Karjaluoto, H. (2019). Chatbot adoption in tourism services: A conceptual exploration. In Ivanov, S. & Webster, C. (Eds.) *Robots, Artificial Intelligence, and Service Automation in Travel, Tourism and Hospitality*, 105–121. <https://doi.org/10.1108/978-1-78756-687-320191006>.
- [47] Van den Bulck, J., & Custers, K. (2010). Belief in complementary and alternative medicine is related to age and paranormal beliefs in adults. *European Journal of Public Health*, 20(2), 227-230.
- [48] Wang, W., & Siau, K., (2018). Living with Artificial Intelligence—Developing a Theory on Trust in Health Chatbots. *Proceedings of the Sixteenth Annual Pre-ICIS Workshop on HCI Research in MIS*. San Francisco, California.
- [49] Wilkinson, D., Alkan, Ö., Liao, Q. V., Mattetti, M., Vejsbjerg, I., Knijnenburg, B. P., & Daly, E. (2021). Why or Why Not? The Effect of Justification Styles on Chatbot Recommendations. *ACM Transactions on Information and System Security*, 39(4), 1–21.
- [50] Yen, C., & Chiang, M.-C. (2021). Trust me, if you can: a study on the factors that influence consumers' purchase intention triggered by chatbots based on brain image evidence and self-reported assessments. *Behaviour & Information Technology*, 40(11), 1177–1194.