Title: Comprehending the Viewpoint of Healthcare Professionals TowardsDigitalization of Clinical Practices in Healthcare Industry

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ABSTRACT

The digitalization of clinical practices in the healthcare industry has ushered in a new era of efficiency, accessibility, and patient-centric care. This transformative shift leverages technology to streamline administrative processes, enhance patient engagement, and improve overall healthcare delivery. The aim of the study is to assess theview pointof healthcare professionals towards telehealth platforms and perform a comparative analysis based on gender, age group, qualification, years of experience, speciality and other factors. This is a descriptive, cross-sectional study and quantitative in nature. The study population includes general physicians, dental surgeons, physiotherapists and nutritionists employed in public and private healthcare organizations, across multiple cities in India. Data was collected over a period of two months, through a well-structured questionnaire across multiple cities in India. The invitation link to the survey was sent to 315 healthcare professionals working at various healthcare organisations,out of which 204 eventually participated in the study. The completed questionnaires were analysed as per the study objectives using descriptive statistics for the quantitative data. The findings indicated that 59% of the participants were female healthcare professionals, while 41% were male. With regard to the view pointtowards telemedicine, the mean score of males and females denotes that the females have a better attitude towards the platform with mean 4.07, in comparison to males with mean 3.85. Healthcare professionals belonging to older age groups (above 50 years) are resistant towards adopting telehealth and are more comfortable in the traditional ways of consultation. This study developed a conceptual framework to determine healthcare professionals' attitude towards telehealth services. Healthcare professionals (Dental surgeons, nutritionists, physiotherapists and alternative medicine) having less experience are more adaptive towards telemedicine platforms compared to healthcare professionals with higher experience. For the adoption of digital mode amongst the older age group of clinicians, frequent demonstrations through webinars and workshops are needed. A noteworthy benefit of telemedicine lies in its potential to alleviate costs and efforts, particularly for rural patients who can forgo arduous journeys for consultations and treatment.

Keywords: Telemedicine 1, telehealth 2, Healthcare professionals 3,view point 4,attitude 5, perception 6, knowledge 7, clinic management platform 8

INTRODUCTION

Telehealth has the potential to fulfil a vital function by establishing a direct connection between patients and doctors situated in remote healthcare facilities. This connection serves as a valuable bridge to the healthcare system. Telehealth solutions and services facilitate patient's access to care. This has incredible value for patients with reduced mobility, who live remotely or who cannot visit their medical clinic, for instance when on a holiday. Furthermore, available data indicates that telehealth offerings can contribute to the reduction of healthcare expenses. In the ever-growing digital market, telehealth which represents the next frontier in medical care can improve patient's lifestyle and boost their overall health. Likewise, telehealth provides the practitioners with a full scope of their client's progress, allowing them to act and modify treatment in order to improve their health.

Medical software is in high demand for clinics. Practitioners have "any-time and any-place" access to these digital health records, which helps examine patients at the clinic significantly faster and with more accuracy [1]. A Clinic Management System is an integrated system for managing all aspects of a clinic's operations such as medical, financial, administrative, legal and compliance. It includes scheduling of appointments, digital prescriptions, patient record management, pharmacy and laboratory investigations, secured messaging, doctor and patient Portals, business analytics, revenue cycle management and can seamlessly interconnects all practice locations. It offers live visual/audio consultations, simpler scheduling, fast registrationand effective clinical documentation, summaries and viewing of notes. It provides convenient access to patient information for generating diverse records, encompassing categorization according to demographics, gender, age and related factors. It is easy to use and eliminates errors caused by illegible handwriting, reducing expenses of an organisation owing to less paperwork, improving safety and reducing duplication of testing. State-of-the-art technology delivers optimal functionality for retrieving information from hosted or cloud servers, presenting all data within a unified platform. This, in turn, empowers the Business Intelligence Module to offer valuable insights into clinic operations and the level of patient care quality. For any busy practitioner, streamlining the workflow and effective patient management are extremely vital for smooth functioning of the clinic. Hence, the need for a system which not only aids in effective clinic management but also allows customisation as per the doctor's individual needs.

LITERATURE REVIEW

This section reviews some related literature in the area of the study from which the researcher tried to identify, capture, evaluate and observe previous studies. Technology has the potential to provide medical practitioners the ability to speed up and improve their diagnostic capabilities by streamlining the flow of information.

Telemedicine Market size was valued at USD 23.17 Billion in 2021 and is projected to reach USD 83.24 Billion by 2030, growing at a CAGR of 17.35 % from 2022 to 2030.This significant growth is notable considering the industry's worth was US$6 billion in 2016, signifying an approximate compound annual growth rate (CAGR) of 13%. Telemedicine offers a multitude of advantages, primarily centered around improved access to timely interventions, encompassing swift service availability and access to offerings that might otherwise remain inaccessible. In India, the provision of in-person healthcare faces considerable challenges, largely due to the vast geographical expanses and limited resources.

Telemedicine services in the nation fall under the purview of both the Ministry of Health and Family Welfare and the Department of Information Technology. The Ministry of Health and Family Welfare's (MoHFW). Telemedicine division has established the National Telemedicine Portal, facilitating the implementation of an innovative e-health initiative. This initiative includes the creation of a National Medical College Network (NMCN) aimed at interlinking medical colleges across the nation for the purpose of e-Education. Additionally, a National Rural Telemedicine Network has been established to enhance healthcare delivery in remote areas. The concept of Village Resource Centre's (VRCs) has been pioneered by the Indian Space Research Organization (ISRO) to offer an array of services encompassing tele-education, telemedicine, online decision support, interactive agricultural advisory services, tele-fishery, e-governance provisions, weather updates, and water management. VRCs serve not only as educational hubs but also facilitate connectivity with specialized hospitals, thus bridging the expertise of skilled doctors with rural communities. The establishment of approximately 500 VRCs across the nation underscores this endeavour [2].

In such contexts, telemedicine emerges as an optimal solution, not only ensuring prompt and expedited access to care but also diminishing the financial, familial, and societal tolls associated with travel. The current healthcare landscape in India presents a disparity. While the World Health Organization (WHO) recommends a doctor-to-population ratio of 1:1000, the current ratio in India stands at 0.62:1000. The extensive time and expenses involved in training new physicians imply that the doctor-to-patient ratio is likely to remain low for a considerable duration[3,4].

Embracing telemedicine as a strategy to minimize patient traffic within hospitals could potentially lower the risk of nosocomial infections for individuals grappling with additional comorbidities, therebypreventing their need for hospital-based services.Recent research demonstrates that telemedicine elevates the quality of care for patients in both medical and mental health domains. Telemedicine has the potential to enhance professional contentment by simplifying patient interactions, thereby aiding healthcare providers in achieving a better equilibrium between their career and personal life commitments[5,6]

RESEARCH METHODOLOGY
TYPE OF THE RESEARCH:
This is a descriptive, cross-sectional study and quantitative in nature.

STUDY POPULATION:
The study population includes general physicians, dental surgeons, physiotherapists and nutritionists employed in public and private healthcare organizations, across multiple cities in India.

DATA COLLECTION:
Data was gathered during a span of three months, commencing from June 2020 and concluding in August 2020. This data collection process employed a meticulously constructed questionnaire, consisting of objective inquiries meticulously shaped following an exhaustive literature analysis. Responses to the posed questions were garnered using a five-point Likert scale, spanning from 1 to 5 (where 1 corresponds to "Very low," 2 to "Low," 3 to "Average," 4 to "High," and 5 to "Very high").

The questionnaire effectively fulfilled the intended study objectives.

The face validity of the questionnaire has been ensured by 5 experts in this field, few corrections were made as suggested by them in terms of language and terminology. Thereafter, the piloting of the questionnaire was done by circulating it to 30 healthcare professionals and the internal consistency (reliability) of the questionnaire was measured and the value of Cronbach's alpha was greater than 0.7. We have ensured the reliability with the help of Cronbach's alpha 0.85 which is considered as good.

SAMPLE SIZE:
The invitation link to the survey was sent to **315**healthcare professionals working at various healthcare organisations, out of which,**204**eventually participated in the study.

SAMPLING METHOD:
The questionnaire had 22 questions pertaining to the study topic which was divided into three parts, starting from the participant's socio-demographic characteristics which included gender, age, highest educational level, years of experience, specialty and number of patients per day. The educational level was categorized into bachelors, mastersor above that. No age restrictions were imposed.The second section included questions about knowledge, attitude and the third section included questions for outcome variables and the participants were also asked to give their opinions on clinical service and administrative related features.

TOOL USED FOR DATA ANALYSIS:
The analysis of data was performed utilizing Statistical Package for the Social Sciences (SPSS) version 22. Categorical variables were exhibited in terms of frequencies and corresponding percentages. The means were computed for the responses garnered from the five-point Likert scale.

ETHICAL CONSIDERATION:
The study link stated that the participation was voluntary and completion of survey reflected their consent to participate.

DATA ANALYSIS & RESULT
The questionnaire effectively met the study's intended objectives. Out of 300, 204 questionnaires were completed, with no missing data. The reliability of the questionnaire was ensured again with the value of Cronbach's alpha $\alpha = 0.85$ which is considered as good.

The results showed that 121 (59%) females and 83 (41%) males, mostly belonging to the dental profession (n=123, 60%) followed by physicians (n=63, 31%) participated in the study, while professionals from other specialties (9%) were in numbers less than 10. 63% of the healthcare professionalswere of the age groupranging 20-30, 29% were in the 30-40 age group, 6% were in age group 40-50, followed by 2% amongst the rest.
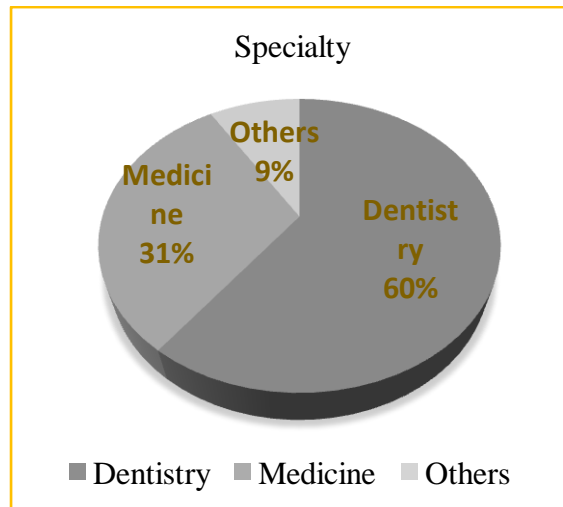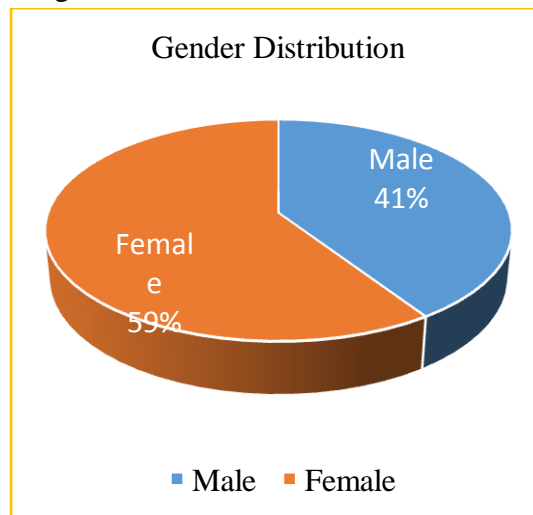
Figure 1: Based on Gender distribution
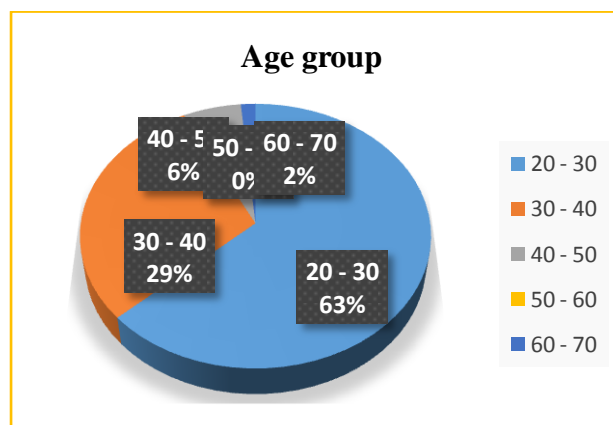

Figure 2: Based on Specialities

Figure 3: Based on age group

Clinician's attitude towards the clinic management platform based on gender:

H0: Gender plays no role in attitude towards this clinic management platform.

H1: Gender plays a role in attitude towards this clinic management platform.

Table 1: Clinician's attitude towards the clinic management platform based on specialty

	Gender	N	Mean
Attitude_Mean	Male	83	3.8503
	Female	121	4.0708

With the help of an independent sample T – test, it has been found that the **p value** is **0.026** which is **less than 0.05** (5 % significance level). Moreover, the mean score of males and females denotes that the **females have a better acceptance attitude towards the platform** with **mean 4.07**, in comparison to males with a **mean 3.85.**

Clinician's attitude towards the clinic management platform based on specialty:

H0: There is no difference in the attitude of healthcare professionals based on specialty.

H1: There is difference in the attitude of healthcare professionals based on specialty.
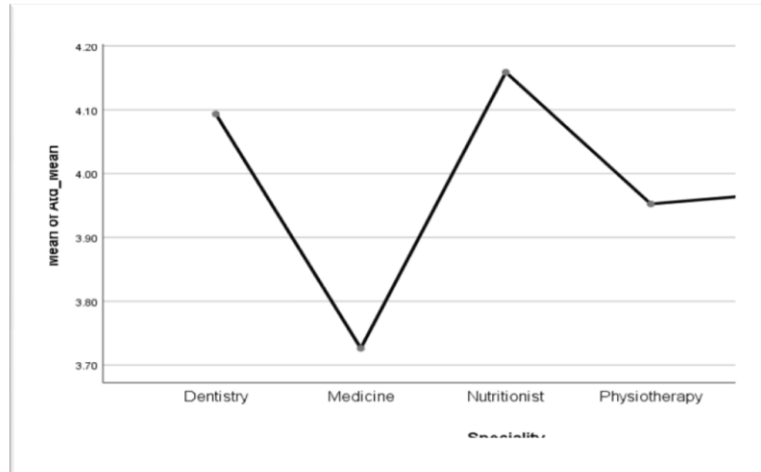

ANOVA with Post hoc test is being carried out in SPSS and it has been found out that the **P value is 0.017 which** is **less than 0.05** hence null hypothesis is rejected and alternate hypothesis is accepted i.e., **there is difference in attitude based on specialities**.

Here in this graph, we can see thatmedical practitioners have a lower mean compared to target nutritionists, dentists, physiotherapists.

Clinicians' attitude towards the clinic management platform based on years of experience:

Having calculatedthe correlation between years of experience and attitude, it was found to be significant with the **negative value of0.262**, emphasizing **moderate negative correlation between years of**

experience and attitude. This is reflective of the finding that with an increase in age there is gradual decline in acceptance attitude.
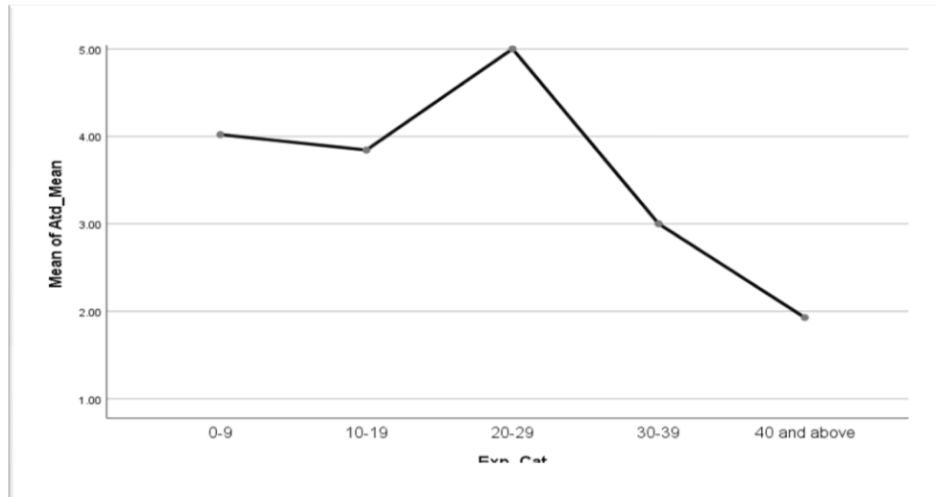
The **ideal age group of the** healthcare professionals **is** between **40-49** years with an average **20-29 years of experience,** beyond which it was found to be difficult to persuade healthcare professionals above this age group to adopt clinic management platform.

This graph depicts a negative correlation between years of experience and age group thereby indicating that with an increase in age group, there is a steady decline in acceptance attitude.

FACTOR ANALYSIS:
Factor analysis constitutes a statistical technique employed to elucidate the variance present among observed and correlated variables by attributing them to a potentially reduced set of latent variables known as factors. Measurement constructs were evaluated according to their validity and reliability.

The initial set comprised 16 items, out of which 4 items were excluded due to cross-loading concerns. Consequently, the study incorporated 12 items that demonstrated favourable factor loadings on both dimensions.

Based on the function of features we have termed them as administrative and service features.
Here, we have categorized the twelve features of the clinic management platform into two categories viz. administrative features and service features consisting of six parameters each. The administrative features are those which are required for business activities and resource management of the clinic like plans/packages, lead sourcing, payroll, employee profile, annual report, team rostering whilst the service features are those which are essential for seamless functioning of the clinic operations like patient history management, appointment scheduling, digital consent of patient, digital prescription and payment modalities.

"PrincipalAxis Factoring" is used as an extraction method and "Varimax Rotation Method" was used with "Kaiser Normalization".

"Kaiser-Meyer-Olkin (KMO) measure of Sampling Adequacy" is **0.925.**KMO was above 0.7 which shows that the sample was adequate to run factor analysis.

Table 2: Rotated Factor Matrix based on administrative features and service features

ROTATED FACTOR MATRIX			
SL No.		FACTOR	
		Administrative features	Service features
1	Plans/Packages	.886	
2	Lead sourcing	.779	
3	Payroll	.736	
4	Employee Profile	.772	
5	Team availability, Rostering	.707	
6	Annual Reports	.682	
7	Digital Consent of Patient		.758
8	Digital Prescription		.735
9	Digital Payment		.690
10	Inventory Management		.677
11	Patient History Management		.657
12	Appointment Scheduling		.611
Extraction Method: Principal Axis Factoring.			
Rotation Method: Varimax with Kaiser Normalization.			
Rotation converged in 3 iterations.			

Table 3: Coefficients analysis based on administrative features and service features

COEFFICIENTS					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta	90.022	.000
Constant	3.981	0.44		2.704	.007
Administrative features	.129	0.48	.173	5.830	.000
Service Features	.287	0.49	.374		
Dependent Variable: Attitude_ mean					

Regression Equation: Y (Attitude) = 3.9 + .17 (Administrative Related Feature) + .37 (Service-related features)

With the help of thisaforementioned model, this regression equation has been developed. It is noted that with an increase in each unit of administrative related features there is a corresponding 0.17 unit increase in acceptance attitude.

Table 4: Model summary for administrative features and service features

MODEL SUMMARY									
					Change Statistics				
MODEL	R	R Square	Adjusted R Square	Std Error of the estimate	R square change	F Change	df1	Df2	Sig. F Change
1	.432a	.186	.178	.63164	.186	23.020	2	201	.000
a. Predictors: (Constant), Service Features, Administrative Features									
b. Dependent Variable: Attitude_Mean this mode									

In designing this model, a regression of the administrative and service-related factorscombined with acceptance attitude has been done.

This model shows 18.6% variation in attitude with the help of administrative and service-related features.
This model signifies that service-related features should be improvised more in comparison to administrative aspects. More research and development are needed to improve this aspect. Consequently, the acceptance attitude might also change and result in better adoption of the clinic management platform.
P value is significant here i.e., 0.00.

R square is a goodness of fitmeasure for linear regression models.
Value of R square is .186

RECOMMENDATIONS

a) This study developed a conceptual framework to determine clinician's attitude towards telehealth services.
b) Target healthcare professionals (Dental surgeons, nutritionists, physiotherapists and alternative medicine) having less years of experience as they are more adaptive to the clinic management platform compared to healthcare professionals with higher experience.
c) For the adoption of digital mode amongst the older age group of clinician's frequent demonstrations needs to be given through webinars and workshops.
d) Ease of operability should be a prime concern for the older age group.
e) More importance should be given to the service-related features as there was a higher value of

coefficient compared to administrative related features.

f) Marketing strategy needs to be modified, more focused on the ease of operability.

CONCLUSION

Whilst the use of telemedicine is common in many countries, the results of the current study show the acceptance attitude of healthcare professionals towards telehealth platforms needs to be improved. The limited information about the technology, especially amongst medical practitioners, influenced healthcare professionals' perception of the technology. Therefore, before this platform is deployed, it is essential to increase awareness of users about the technology and demonstrate its capabilities and benefits. Adequate knowledge and positive attitude towards the technology are key factors to encourage users to use the technology in the future.

The security aspect of telehealth platforms emerged as a significant concern. Consequently, it becomes imperative to establish a foundation of robust security measures for the technology, mitigating potential future losses or damages. Overarchingly, healthcare professionals would not embrace or utilize any technology that lacks effective security assurances.

More emphasis has to be given towards the service-related features such as clinical history taking and its seamless incorporation with in depth research.Frequent demonstration drives need to be plannedespecially for the more senior healthcare professionalsin order to ease the use of operating digital platforms and thus largely benefiting the healthcare ecosystem as a whole. The most recent Covid pandemic has catalysed the digital healthcare platform to a great extent. Hence, the market for such platforms is highly competitive. Accordingly, to carve out a niche in the market, ease of operability should be prioritised and strategizedwell.

LIMITATION

a) Given the restriction of COVID pandemic, the size of the sample was sadly limited to 204 healthcare professionals.

b) In this study, the respondents seem to show a disparity in the zeal/proactive approach to a tech-based questionnaire.

c) For this reason, the results may not be representative of the entire healthcare professional population. Conducting this study on a national scale, encompassing a larger sample of healthcare professionals across multiple facilities and regions, would greatly enhance the utility of our findings.

d) Data collection period was short which resulted in a limited response.

e) Regular follow ups had to be done for getting the responses of the questionnaire which was circulatedamongst the healthcare professionals for data collection.

REFERENCE

1. Mathur P., Srivastava S., Lalchandani A., Mehta J. (2017). Evolving Role of Telemedicine in Health Care Delivery in India. Primary Health Care Open Access, 07. 10.4172/2167-1079.1000260.
2. Chellaiyan, V. G., Nirupama, A. Y., & Taneja, N. (2019). Telemedicine in India: Where do we stand?Journal of family medicine and primary care,8(6),1872–1876.
3. https://www.verifiedmarketresearch.com/product/telemedicine-market/?gclid=CjwKCAjwu4WoBhBkEiwAojNdXlo9m0-UG0Tt9p5LvQwsGfRJRtBxc3XbKks-TeTN1hxeqnQmnPkCsBoCySkQAvD_BwE

4. Dasgupta, A., & Deb, S. (2008). Telemedicine: a new horizon in public health in India. Indian journal of community medicine: official publication of Indian Association of Preventive & Social Medicine, 33(1), 3–8. https://doi.org/10.4103/0970-0218.39234

5. BOARD OF GOVERNORS In supersession of the Medical Council of India (2020). Telemedicine Practice Guidelines

6. Enabling Registered Medical Practitioners to Provide Healthcare Using Telemedicine. https://www.mohfw.gov.in/pdf/Telemedicine.pdf.

7. TheInternational Society for Telemedicine and e- health (4), https://www.researchgate.net/publication/311439328_TELEMEDICINE_IN_A_TERTIARY_CARE _HOSPITAL_IN_SOUTH_INDIA_-A_THIRTEEN_YEAR_REVIEW.

8. Awareness and attitudes to telemedicine among doctors and patients in India
Sushil K Meher 1, Rajeshwar S Tyagi 2, Tanushree Chaudhry 3.

9. Knowledge and Attitude of Health Professionals toward Telemedicine in Resource-Limited Settings: A Cross-Sectional Study in North West Ethiopia Kirubel Biruk 1 and Eden Abetu 2