

# The Typology of Physicians According to Perspectives on Telemedicine During and Beyond the Covid-19 Pandemic



Marcellus Francis L. Ramirez, MD,<sup>1</sup>  
 Maria Minerva P. Calimag, MD, PhD<sup>2</sup>

## ABSTRACT

**Introduction** The coronavirus (CoVid-19) pandemic brought about a massive impact to the healthcare system, including disruption of patient follow-ups and consultations. Subsequently, an increase in physicians' use of telemedicine was seen. While this technology has been documented to improve delivery of care, it has encountered varied acceptance among physicians. Gaps in specific national legislation, lack of established rules and accreditation standards, and ethical/legal implications add to the concerns. Anchored on the Unified Theory of Acceptance and Use of Technology model, this study aimed to segment physicians according to their perspectives regarding telemedicine during the pandemic.

**Methods** A mixed methods sequential explanatory design using Q-methodology was applied to identify

distinct patterns and perceptions of physicians on the use of telemedicine during the pandemic. A Q-sample of 25 statements on perceptions of telemedicine was developed through literature review, and 24 physicians were purposively selected. Participants were instructed to sort statements into a distribution grid according to their degree of agreement/disagreement. Post-sorting interview was conducted to expound on their response. Data were analyzed using by-person factor analysis through the PQMethod software version 2.35.

**Result and Conclusion** The analysis identified four profiles which were classified under the following perspective typologies: the "Outcomes-focused Physician" focused on the importance of arriving at a correct diagnosis and lack of physical examination; the "Patient-focused Physician" considered patients' convenience and safety during the pandemic; the "Empathy-focused Physician" gave importance to the emotional aspect of a consultation; and the "Technology-focused Physician" was concerned about the patient's technology literacy. The results can generate insights into professional, ethical and legal implications of telemedicine in medical practice, and provide healthcare organizations, academic institutions, and policy makers information and guidance in the modification and improvement of telemedicine services in the 'new normal'.

✉ Marcellus Francis L. Ramirez  
 mightyramirez@yahoo.com , mlramirez@ust.edu.ph

<sup>1</sup> University of Santo Tomas Graduate School and University of Santo Tomas Faculty of Medicine and Surgery; Department of Medicine, University of Santo Tomas Hospital

<sup>2</sup> University of Santo Tomas Graduate School and University of Santo Tomas Faculty of Medicine and Surgery, Manila, Philippines

Academic editor: Leilani B. Mercado-Asis

Submitted date: February 02, 2023

Accepted date: March 30, 2023

**Key words** telemedicine, perceptions, physicians, pandemic, CoVid-19

## BACKGROUND AND OBJECTIVES

The coronavirus disease (CoVid-19) outbreak brought a massive impact to the healthcare system, setting up unique and extraordinary challenges, all occurring at a very rapid pace. After the World Health Organization announced a global health emergency on January 30, 2020 and declared the novel SARS-CoV2 or CoVid-19 outbreak to be a pandemic on March 11, 2020, and subsequent nationwide lockdowns that ensued, the crisis led to major instant disruptions of healthcare services and medical care of non-communicable diseases as health systems shifted focus to dealing with the pandemic. Among its effects were the discontinuation of planned interventions and procedures, and immediate disruption of needed patient follow-ups and consultations with physicians – all effects of mandated home quarantine and lockdown, unavailability of transportation, closure of outpatient services and clinics, and both patients' and physicians' fear of going to the healthcare facilities. [1-3]

Being faced with a healthcare dilemma on continuing care and services for patients, health systems worldwide modified healthcare delivery with the adoption and shift to virtual consultation using telemedicine. In a flip of a switch, many physicians in the country and all over the world shifted to online virtual consultations and many patients adopted this method of consultation instead of the usual face-to-face consultation. This provided patients' access to their healthcare providers while minimizing exposure for both patients and physicians to possible infection if done in the usual hospital or clinic setting. It also allowed patients from remote areas to continue their medical care during the lockdown, providing convenience of health access and consultations in the comfort of their homes.

Telemedicine refers to the practice of medicine through the use of electronic communication gadgets such as mobile phone, tablet, or computer, utilizing video conference methods so that a physician can deliver healthcare from a site distant from the patient. It is defined by the World Health Organization as the "delivery of health care services, where distance is a critical factor, by all health care professionals using information and communication technologies for the exchange of valid information for diagnosis, treatment and prevention of disease and injuries,

research and evaluation, and for the continuing education of health care providers, all in the interests of advancing the health of individuals and their communities".[4]

There has been a tremendous surge in the use of this method of healthcare in the last decade and a significant boom during the pandemic which accelerated its use and acceptance as a viable means of healthcare delivery for both patients and physicians.[5,6] The Centers for Disease Control subsequently recommended the adoption of telemedicine as a part of the CoVid-19 response systems.[7] Federal and state laws within the USA and Europe evolved in order to facilitate the use of this method of healthcare, with subsequent changes in legal and regulatory requirements, which included expansion of services reimbursement, and relaxation of technology and credentialing requirements.[8,9]

In the Philippines, the Department of Health (DOH) and the National Privacy Commission (NPC) of the Philippines released the Joint Memorandum Circular 2020-0001 on the use of telemedicine in the CoVid-19 response on April 7, 2020, providing a framework for telemedicine services with the intention of improving access to health services during community quarantine.[10] Subsequently, the University of the Philippines Medical Informatics Unit released guidelines in telemedicine, in support of the DOH and NPC joint memorandum.[11] Major hospitals initiated their own telemedicine platforms to serve their patients seeking consultations and follow-ups.[12] Private physicians in many other hospitals followed suit and set up their individual telemedicine practice using available digital applications.

While this has been viewed as a "game-changer" in the practice of medicine, especially during the pandemic, providing convenience and access to care, improving cost-effectiveness, increasing patient satisfaction, and potentially better patient outcomes, and a more efficient healthcare system,[13-20] questions remain on its quality of medical care when compared to a face-to-face encounter, on effectiveness of the consultation, on validity of the physician-patient relationship in such virtual settings, and on issues such as data security, legal and ethical aspects, and reimbursements.[5,21-27] Current gaps in national legislation specific for telemedicine, a lack of established rules and regulations, and accreditation and registration standards add to the concerns that have yet to be addressed. As of this

writing, national legislations relevant to telemedicine are still pending.

Furthermore, it has encountered varied acceptance among physicians and varied applicability across different specialties and subspecialties in medicine and surgery. While there are quite a number of papers exploring perceptions of patients and healthcare professionals on its use before the year 2020, [13,14,28-43] there is a paucity of studies focusing on perceptions of physicians on telemedicine during the CoVid-19 pandemic period. [25, 44-47]

This study aims to explore the viewpoints of physicians on the adoption and use of telemedicine during the pandemic era through the use of Q-methodology. Telemedicine, which involves the use of technology in healthcare settings, is considered a public health issue because it has implications on the access to medical care and quality of healthcare. This also has implications on the practicing physician. Through an understanding of physicians' perspectives on telemedicine, strategies on implementation and policies may be created or modified. Furthermore, the outcomes of this study may benefit government health agencies including the DOH, healthcare organizations and institutions in the modification and improvement of telemedicine services; academic institutions on the implications of incorporating telemedicine in education and training of healthcare professionals; and professional medical organizations on ethical inferences of perceptions.

This study aimed to identify the viewpoints and perspectives of physicians towards the adoption and practice of telemedicine during and after the CoVid-19 pandemic, and to determine the typology of physicians according to their acceptance and willingness to adopt telemedicine in their clinical practice. The specific objectives were: (a) to determine the distinguishing and consensus statements across different perspectives of physicians towards the practice of telemedicine during the pandemic through the use of Q-methodology; (b) to obtain legislative implications from the viewpoints and opinions gained from generated typologies of perspectives on the adoption of telemedicine.

This study employed a mixed methods sequential explanatory design using Q-methodology (quantitative-qualitative design) to measure the

subjective points of view of physicians on the use and adoption of telemedicine during the pandemic.

Q-methodology is the scientific study of subjectivity towards a topic or particular issue. It is a unique combination of qualitative and quantitative research techniques that permits the systematic study of subjectivity to the practice of telemedicine. This mixed methods technique explores attitudes, perceptions, perspectives, opinions, and viewpoints around a specific issue, placing emphasis on a deep understanding of these viewpoints and how these viewpoints and insights are shared with other study participants and how they differ likewise. Among the strengths of Q-methodology is that it can uncover valid opinion clusters within the specific set of participants. It can reveal similarities of opinions or viewpoints leading to a consensus, or differences in thoughts, leading to conflict. It can identify complex subjective viewpoints and allows measurement or quantification of subjectivity through a technique that uses quantitative and qualitative research methods. [48-51]

## SUBJECTS AND STUDY SITE

The study was conducted among physicians practicing in the University of Santo Tomas Hospital, a private level 3 Department of Health accredited hospital and academic center in Metro Manila, Philippines. The study was conducted between the months of February and March of 2021. The participants' inclusion criteria were as follows: (a) consultant physician in medical and surgical specialties; (b) in clinical practice for at least 5 years; (c) held traditional face-to-face consultations with patients during the last 5 years; and (d) familiar with telemedicine consultations.

In order to have an adequate sampling of participants from different specialties, they were further purposively subdivided into the following: 14 from medical specialties (internal medicine and subspecialties, neurology psychiatry, family medicine, and physical medicine and rehabilitation) and 10 from surgical specialties (general surgery and surgical specialties, ophthalmology, otorhinolaryngology, obstetrics and gynecology).

Excluded were physicians from the following fields: pediatrics, anesthesiology, radiology, nuclear medicine and pathology. Pediatricians were

excluded as the study concentrated on physicians focused on the care of adult patients. In addition, because of differences in dynamics between pediatric and adult consultations, and the issue of patient consent which is a little more complex in the context of the pediatrician-patient-guardian relationship, the authors of this study deemed that this group of specialists be excluded. The other four subspecialties were also excluded as the study only centered on physicians who were doing regular patient consultations in clinics.

## RESEARCH METHOD

Q-methodology was developed by William Stephenson to explore individuals' perceptions relating to an issue of discourse.[51,52] Unlike surveys which reveal what respondents think about questions and issues and do not provide understanding of how respondents think about questions, Q-methodology helps the investigator understand how respondents arrive at their viewpoints. Unlike surveys, interviews or focus group discussions in which the response variables are respondents' answers to questions, and provide only qualitative data; in Q-methodology, the response variable is the participant in the study, and both quantitative and qualitative data are provided. [48,50,51] This method is ideal for understanding perspectives on a particular topic. It allows for in-depth understanding of individual physicians' varied perceptions on a single issue such as telemedicine, and at the same time emphasizes on the common shared values between participants.

Q-methodology studies, which usually do not require large or representative samples, employs a purposive sampling technique wherein participants are selected based on interest in this case, who will have a range of viewpoints and perceptions. Individuals who do not suit the purpose are excluded.

## THE THEORETICAL FRAMEWORK

A theoretical framework was constructed based on the concept that telehealth and telemedicine were innovative healthcare services which were based on information technology. Several theoretical models have been studied and conceptualized to explain the use and acceptance of technology in healthcare: the Technology Acceptance Model and its modifications,

Theory of Planned Behavior, Theory of Reasoned Action, Diffusion of Innovations Theory, and Unified Theory of Acceptance and Use of Technology.

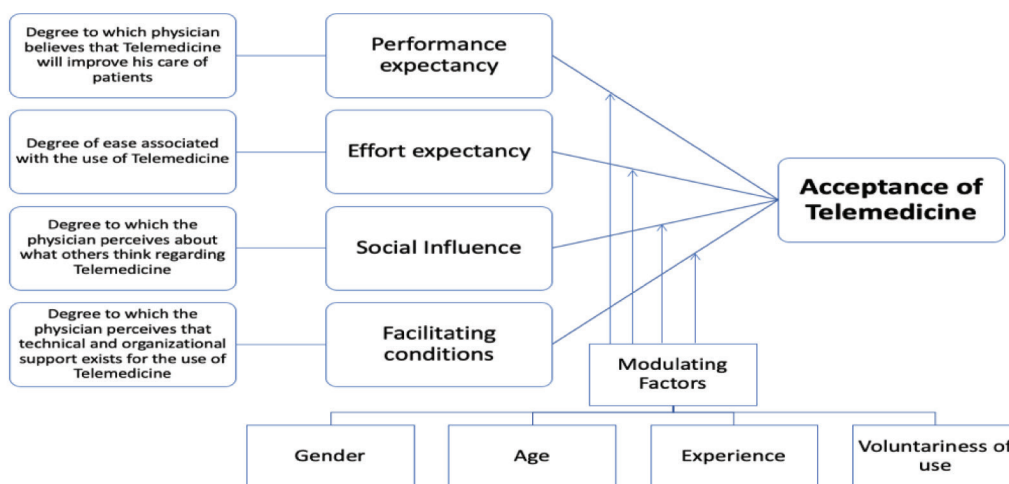
The Unified Theory of Acceptance and Use of Technology (UTAUT) is an integration of eight behavioral theories and technology acceptance models, namely, the Technology of Acceptance Model, Theory of Reasoned Action, Theory of Planned Behavior, Diffusion Innovation Theory of Rogers and Social Cognitive Theory.[53,54] UTAUT proposes that performance expectancy, effort expectancy and social influence predict behavioral intention towards acceptance of information technology and that facilitating conditions and behavioral intention predicts use behavior in the acceptance of information technology. This concept has been widely used in research involving adoption and acceptance of technologies,[53] and was seen as the gold standard in understanding user acceptance of information technology.[55]

UTAUT (Figure 1) combined perceived characteristics of innovation by integrating relative advantage, trialability and observability from the diffusion of innovations theory to the performance expectancy component of UTAUT, while combining complexity and compatibility from the diffusion of innovations theory to effort expectancy and social influence aspects, respectively of the latter.[53,56]

As our study focused on perceptions of physicians on the use of telemedicine, we integrated concepts and constructs from different theories and models mentioned above, as applicable to telemedicine from the perspectives of the user being a physician. We selected opinions and statements which built up the concourse of our Q-methodology study and classified them accordingly based on predictors listed from the studied theories.

In general, for any specific innovative service or technology, there were two types of reactions from users or consumers: acceptance or resistance.[56] The perception of telemedicine was an interplay of different factors that either drive users toward acceptance or resistance. Positive perceptions drove users toward acceptance and use of technology. Negative perceptions served as barriers or factors that drive resistance to the use of technology.

For telemedicine, resistance refers to opposition of a user to the use of technology and can result from different factors. These include personality,



**Unified Theory of Acceptance and Use of Technology (UTAUT)**

**Figure 1** Unified Theory of Acceptance and Use of Technology (UTAUT)

traits, attitude, experience and skills.[56] According to Kamal, et al, the factors that drove users, in our case, physicians, toward use and adoption of telemedicine, consisted of the following prime enablers: perceived ease of use, perceived ease of usefulness, social influence, trust and facilitating conditions. In addition, issues on convenience for the physician, safety for both patients and physicians, improved accessibility and care of patients, and patient satisfaction also constituted positive perceptions.[57]

The factors that inhibited the use, called inhibitors or barriers in their study include technological anxiety, perceived risk, resistance to use and privacy. Technology anxiety is a negative affective reaction to technology use and focuses on the users' state of mind regarding their ability and intention to use technological tools. Furthermore, concerns on data privacy, legal responsibility issues, data safety, quality of care and the perception of lack of empathy and humanism were among the negative perceptions.[57]

From the above perspectives, the concourse of this study was derived. The adoption and use of telemedicine for healthcare of patients during the pandemic was a product of the following factors: 1) perceived usefulness and relative advantage of its use, 2) perceived ease of use, 3) social influence, 4) facilitating conditions, 5) compatibility and 6) attitude. The negative perceptions or barriers comprised of: 1) perceived risk, which include important issues of data privacy, legal and ethical issues, lack of empathy and humanism, and quality of care; 2) technological anxiety, 3) complexity and

4) resistance to technology. These attributes formed the basis for physicians' acceptance of the use of telemedicine (Figure 2).

Anchored on the UTAUT, this study aimed to segment physicians according to their viewpoints and adoption of telemedicine during the time of the CoVid-19 pandemic through Q-methodology. Using a sequential mixed methods explanatory study design, this study sought to create a typology of physician according to their perceptions of telemedicine as a strategy to create clinical practice, health policy and legislative implications in the practice of this method of healthcare.

Q-methodology study involves the following steps: 1) development of the concourse; 2) development of the Q-set; 3) selection of the P-set; 4) Q-sorting; and 5) analysis and interpretation (Figure 3).

**Development of the Concourse**

The first step, development of the concourse, consisted of creating a list of statements about the specific issue, in this case, the use of telemedicine. The statements contained all possible opinions related to the topic, based on reviews of current literature which include journal articles and reports, reviews of news articles and other information material, conduct of interviews, informal conversations and observations.

**Development of the Q-set**

The second step of the Q-methodology study was the development of the Q-set or Q-sample - a list

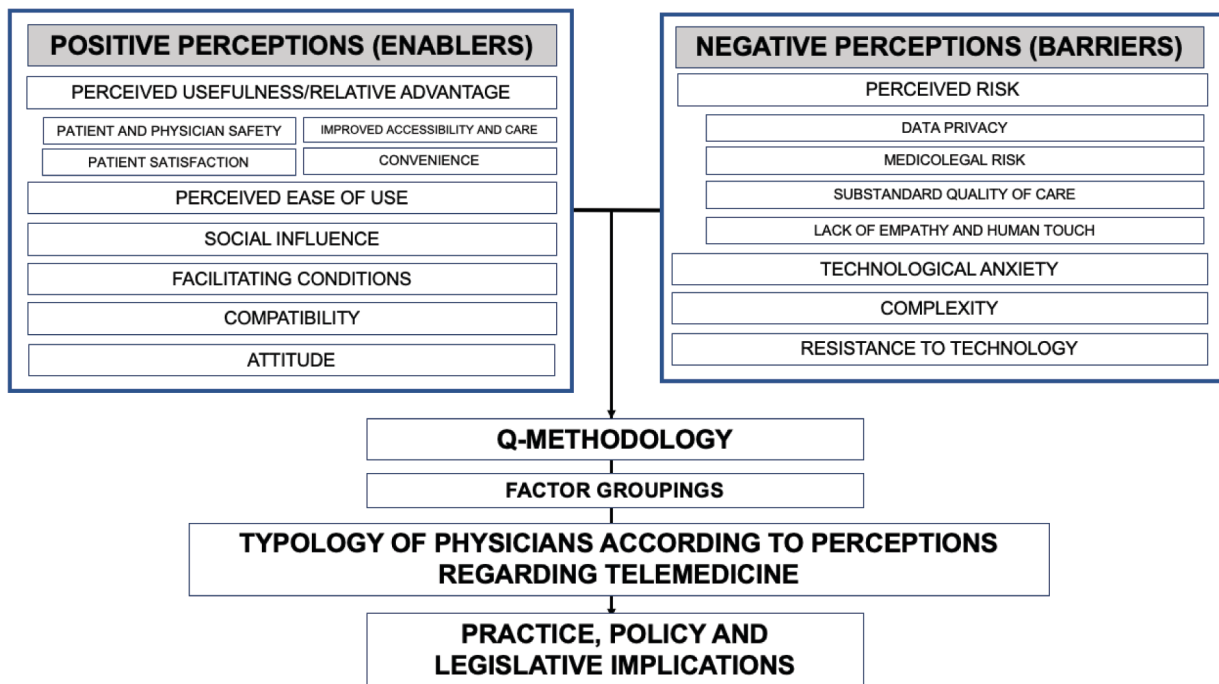


Figure 2 The Conceptual Framework of the Study

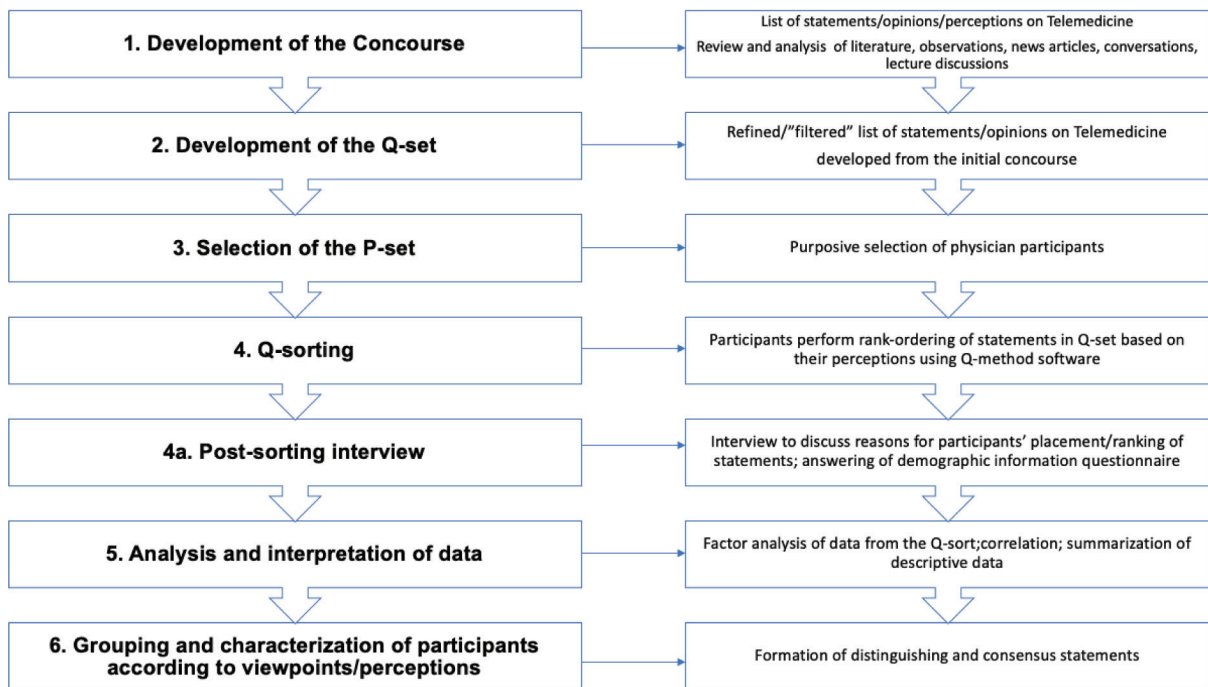


Figure 3 Methodology of the Study

of statements developed from the concourse which had been refined or "filtered". Vague or unclear statements were removed from the list in order to come up with a validated, comprehensive and balanced set of statements.[58,59] Similar statements were also removed to avoid repetition.

This set of statements were sorted and grouped into themes which expressed similar or related viewpoints. The themes were drawn mainly from concepts described as factors in the acceptance of innovation and technology as written in the theoretical framework.

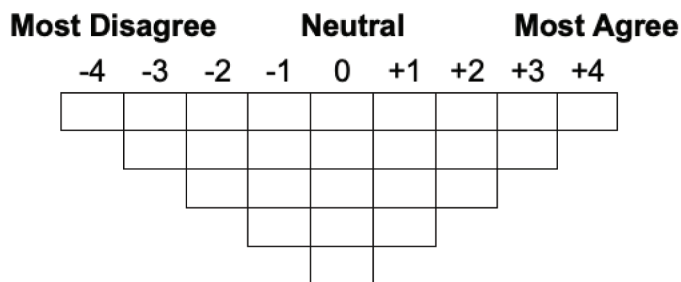


Figure 4 Q-sort Matrix Table

A pilot study involving five volunteer participants was done in order to evaluate the clarity and understandability of statements and assess if the viewpoints were comprehended by participants according to objectives of the study. From this pilot study, further refinements of statements were made to come up with the final Q-set of statements reflective of attitudes and perceptions toward telemedicine that were employed in the study.

There were 25 final statements drawn from literature, which formed the Q-set, as shown in Table 1, with corresponding general themes based on the theoretical framework. Perceptions ranged from points on perceived usefulness which related to improvement of efficiency and quality of patient care, safety, continuity of care, comfort and convenience, and ease of use. Other perceptions were based on social influence, facilitating conditions, compatibility, attitude, and perceived risk with issues on reimbursement, ethical implications, lack of formal training and accreditation, lack of standard of care, issues on data privacy and confidentiality, medico-legal risks, quality of healthcare, empathy, complexity of its use and installation, technological anxiety and resistance to technology.

**Selection of the P-set**

After the Q-set creation, selection of P-set which was the set of study participants who will sort the Q-set was done. Based on principles of Q-methodology, the recommended minimum ratio of the Q-set to P-set is 2:1 with a maximum of less than the number of items in the Q-set.[51] Hence, the designated number of physicians chosen to participate depended on the final number of statements in the Q-set after the pilot study. Based on the Q-set that was constructed consisting of 25 statements, the set minimum and maximum number of participants was 12 and 24,

respectively. For our study, purposive sampling was followed and selected participants were physicians who fulfilled the inclusion criteria.

**Q-sort**

The fourth step was the Q-sort. First, the selected participants were asked to complete an online informed consent for the study, the link for which was sent via email. The selected participants were tasked to complete a sorting exercise online wherein they would rank order the statements in the Q-set according to how they perceived it, from "agree" to "neutral" to "disagree". They were presented with a set of slides with the research question, instructions on how to do the sorting in relation to the research question, and a slide containing the Q-sort table for them to place items in accordance with their subjective rank ordering. The statements were printed on numbered cards, and these were shown in a random arrangement to participants individually and respondents were instructed to sort the items based on their personal point of view, and place the items in specific boxes in the Q-sort table according to each item's perceived rank.[58,59] They were instructed to sort the cards according to their response to the question, "To what extent do you agree or disagree with the following statements regarding your perception towards the use of telemedicine during this time of CoVid-19 pandemic?". They were asked to read carefully the statements and to sort or rank cards depending on whether they "agree", are "neutral", or "disagree", by placing cards on the appropriate box on the Q-sort matrix table (Figure 4). They were then asked to take cards from the "agree", read them again, and choose a statement they most agree with from the group, and place this on the far right of the Q-sort matrix table. Then the remaining cards were placed on the rest of the agree portions of

**Table 1** Q-set statements with corresponding themes based on the theoretical framework

Theme based on Theoretical Framework	Statements/Perceptions
PERCEIVED USEFULNESS/RELATIVE ADVANTAGE	Telemedicine services improve my efficiency and effectiveness as a physician. Telemedicine improves the quality of patient care.
PATIENT/PHYSICIAN SAFETY	Telemedicine ensures safety of my patient and me from getting CoVid-19 infection.
IMPROVED ACCESSIBILITY AND CARE	Telemedicine provides continuity of health care services and improves accessibility.
PATIENT SATISFACTION	Telemedicine provides comfort and convenience to my patients.
CONVENIENCE	I practice telemedicine because it provides convenience for me and improves my quality of life.
PERCEIVED EASE OF USE	I find telemedicine easy to learn and use.
SOCIAL INFLUENCE	I use telemedicine because I have friends and colleagues who use it.
FACILITATING CONDITIONS	I practice telemedicine because my hospital/institution has the technology, infrastructure and support to use the system.
COMPATIBILITY	Applying telehealth services does not create any conflicts with my working and living habits.
ATTITUDE	I like practicing telemedicine.
PERCEIVED RISK	I have major concerns regarding reimbursement in telemedicine. I am not sure of the ethical implications of practicing telemedicine. I am concerned with inadequate formal training and accreditation/license in the practice of telemedicine. There is no set standard of telemedicine care yet established and no clear reporting standard.
DATA PRIVACY	I am concerned with data security and risk to patient confidentiality with telemedicine technology.
MEDICOLEGAL RISK	I am concerned with the medicolegal issues and legal responsibility with the use of telemedicine. There is no direct doctor-patient relationship between the physician and patient in a telemedicine consult.
SUBSTANDARD QUALITY OF CARE	I worry about the quality of health care provided when practicing telemedicine. I worry that I may miss a diagnosis when practicing telemedicine because of the inability to do physical examination.
LACK OF EMPATHY AND HUMAN TOUCH	I am afraid that telemedicine practice will remove the "human touch" in the patient care experience and is associated with lack of empathy.
COMPLEXITY	Practicing telemedicine requires significant amount of time, skill and technology. I do not want to use telemedicine because it will be a problem to install and operate new technology. It will take me a lot of time and effort to switch to telemedicine.
TECHNOLOGICAL ANXIETY	I am concerned that my patient is not computer-literate for telemedicine.
RESISTANCE TO TECHNOLOGY	I wouldn't want telemedicine to alter my traditional way of seeing patients.

the Q-sort matrix table according to their relative agreement with the statement. The same procedure was followed for the "disagree" cards. The card that they most disagreed with were to be placed on the far left of the Q-sort matrix table, and accordingly ranked. The "neutral" cards were placed last on the remaining boxes at the center of the Q sort matrix table. The resulting filled Q-sort matrix table then

formed the physician's Q-sort and was recorded accordingly.

In adherence to health safety measures and infection prevention protocols during the CoVid-19 pandemic, data collection was done online via email and virtual conference using video conference platform. The Q-sorting was done one participant at a time in accordance to the physician's availability within the specified study period.



A forced choice distribution was used for the Q-sort table which is considered the standard for Q-methodology. The number of boxes in the Q-sort table was based on number of statements that formed the concourse. After the Q-sorting, participants were interviewed as to why they chose the statements in the "most agree" and "most disagree" portions of the grid. They were also asked what other statements or opinions they had about the use of telemedicine that they would have wanted included in the list. This was done to get a better understanding of their reasons behind placements of the statements.[51,58,59] This interview was done immediately by the primary investigator via video conference, after the Q-sorting exercise per participant. At the end of the exercise, participants were asked to answer the demographic profile questionnaire, which was sent via a Google form link. The duration of subject participation was approximately one hour.

### Data Analysis and Interpretation

Analysis was conducted electronically using the PQ Method Software (<http://schmolck.org/qmethod/downpqdos.htm>). Data were uploaded into the Q-Method program which conducted a reverse factor analysis of data from the Q-sort, and automatically computed for correlations and eigenvalues. The software employed centroid factor analysis to extract factors. Factor analysis consisted of transforming each respondent's rank-ordered list of statements into an array of numerical data. Statements which are placed at the "Most Agree" end of distribution received the highest scores (positive number), and next agreeable statements received lesser scores subsequently, up to the last statements deemed "Most Disagree", which were given the least score (a negative number). Statements placed in the middle of the bell-shaped curve in the table were given a zero score. Correlation was done for each participant's array of numerical data with arrays of others (by-person correlation), and an extraction process to find similar or shared viewpoints, called "factors" was done. The original set of factors was rotated with Varimax method to determine the final set of factors. Each resulting final factor represented viewpoints of individuals. Development of the correlation matrix, eigenvalues, factor loadings, and factor arrays were done through the software. The program analyzed the data and sorted out the result

as a matrix, and automatically grouped physicians according to types based on their perceptions.

Participants with similar viewpoints were grouped into the same factor. The factor represented a cluster of respondents whose Q-sorts were statistically similar and characterized a group of individual perspectives that were highly correlated with each other and uncorrelated with others.[59] Factor loadings showed each respondent's association with each of the identified opinion types, ranging from -1.00 through 0 to +1.00, similar to correlation coefficients. A factor loading of 0.80 indicated high correlation of a person's statement array with the particular viewpoint.[50]

After the reverse factor analysis, interpretation of results was done by the investigator by describing the groups of individuals with similar points of view that emerged from the exercise. Consensus and distinguishing statements which characterized each factor when compared to another factor were extracted. Using statistical analysis together with participants' answers and explanation during the post-sort interview, individuals with similar viewpoints were grouped and characterized.

### Ethical Considerations

The study was reviewed and approved by the Institutional Review Board of the hospital. It was conducted in accordance with principles of the Declaration of Helsinki, the National Ethical Guidelines for Health and Health-related Research (NEGHRR 2017), and the Data Privacy Act of 2012. Informed consent was taken from participants. The investigator ensured privacy and confidentiality of data taken, and only the author and research assistant were privy to the names/identities of participants. Demographic questionnaires were represented by a code number. Collected online data were accessible only to the author, were password protected and stored in a computer that could be accessed only by the primary investigator.

## RESULTS

### Demographic Profile of Respondents

The respondents consisted of 13 male and 11 female physicians, with a mean age of 55.25, with average clinical practice duration of 23.25 years. More than 90% of respondents had been in clinical practice for

**Table 2** Summary profile of the participants

Total Respondents	24
Male/Female	13/11
Mean Age	55.25 years
Duration of Clinical Practice	23.25 years
Attended formal certification courses on Telemedicine	16.7%
Attended lectures/webinars on Telemedicine	75%
Specialties:	
Medical Specialties	16
Internal Medicine	12
Neurology and Psychiatry	2
Family Medicine	1
Physical Medicine and Rehabilitation	1
Surgical Specialties	8
Obstetrics Gynecology	3
Ophthalmology	3
Otorhinolaryngology, Head and Neck Surgery	1
General and Cancer Surgery	1

**Table 3** Factor characteristics with average relative coefficient and composite reliability

	FACTOR CHARACTERISTICS			
	1	2	3	4
No. of Defining Variables (Respondents)	9	6	5	2
Average Relative Coefficient	0.800	0.800	0.800	0.800
Composite Reliability	0.973	0.960	0.952	0.889
S.E. of Factor Z-Scores	0.164	0.200	0.218	0.333

S.E. – standard error

more than 10 years. Twelve physicians (45%) came from Internal Medicine and its subspecialties, while the remaining were from surgical and miscellaneous specialties. Majority (75%) of the participants previously attended lectures and webinars on telemedicine which were promoted during the pandemic, however, only 16% underwent formal certification courses (Table 2).

**The Q-Analysis**

The Q-sorts were entered into the Q-method software and principal component factor analysis was done to extract factors. A grand central average of relationships between all the sorts, as represented by their correlation coefficients was done by the program, with +1 indicating perfect positive relationship, and -1 indicating perfect negative relationship. This resulted in unrotated factor matrix or factor loadings which indicate the initial

association, or correlation, of each Q-sort with each factor. This was followed by rotation of factors by Q-Varimax, which performed a varimax rotation of all extracted factors, resulting in factor loading. Four factors emerged after this process. This was then followed by Q-analyze wherein automatic analysis was performed by the program resulting in different factors/typologies.

Using the loading scores, participants were then segregated to their identifying factor profiles. Based on different statements agreed and disagreed upon by the respondents, four factors or typologies emerged. Nine participants or 38% of the population were loaded to Factor 1; six or 25% to Factor 2; five or 21% to Factor 3 and two or 8% were loaded to Factor 4. Two or 8% did not meet any factor loading and were not classified under any of the four profiles because they did not meet any consensus statements.

Factor characteristics, also known as Typology, and their respective average relative coefficient

**Table 4** Q-set with composite factor scores

List of statements (q-sample) with composite factor scores		FACTOR ARRAYS			
		1	2	3	4
No.	Statement				
1	Telemedicine services improve my efficiency and effectiveness as a physician	-1	0	-3	0
2	Telemedicine improves the quality of patient care	-1	1	-4	0
3	Telemedicine ensures safety of my patient and me from getting CoVid-19 infection	1	4	4	0
4	Telemedicine provides continuity of health care services and improves accessibility	1	3	2	1
5	Telemedicine provides comfort and convenience for my patients	1	3	1	-2
6	I practice telemedicine because it provides convenience for me and improves my quality of life	-2	0	0	-1
7	I find telemedicine easy to learn and use	-2	2	0	0
8	I use telemedicine because I have friends and colleagues who use it	-3	-1	0	2
9	I practice telemedicine because my hospital/institution has the infrastructure and support to use the system	-4	-3	0	3
10	Applying telehealth services does not create any conflicts with my working and living habits	-2	0	-1	-2
11	I like practicing telemedicine	-3	1	-2	2
12	I have major concerns regarding reimbursement in telemedicine	0	-2	-1	1
13	I am not sure of ethical implications of practicing telemedicine	0	-1	1	-1
14	I am concerned with inadequate formal training and accreditation/license in the practice of telemedicine	0	-1	1	2
15	There is no set standard of telemedicine care yet established and no clear reporting standard	2	0	1	1
16	I am concerned with data security and risk to patient confidentiality with telemedicine technology	1	1	2	-3
17	I am concerned with the medicolegal issues and legal responsibility with use of telemedicine	3	1	0	-3
18	There is no direct doctor-patient relationship between the physician and patient in a telemedicine consult	0	-4	-2	-4
19	I worry about the quality of health care provided when practicing telemedicine	3	2	2	0
20	I worry that I may miss a diagnosis when practicing telemedicine because of inability to do physical examination	4	2	3	0
21	I am afraid that telemedicine practice will remove the "human touch" in patient care experience and is associated with lack of empathy	0	-2	3	-1
22	Practicing telemedicine requires significant amount of time, skill and technology	2	-2	-3	3
23	I do not want to use telemedicine because it will be a problem to install and operate new technology. It will take me a lot of time and effort to switch to telemedicine	-1	-3	-1	-2
24	I am concerned that my patient is not computer-literate for telemedicine	2	-1	-1	4
25	I wouldn't want telemedicine to alter my traditional way of seeing patients	-1	0	-2	-1

and composite reliability are shown in Table 3. The defining variables indicate the number of participants who fit into individual factors. Results showed that Factor 1 had the highest number of defining

variables at nine, signifying that these participants who belonged to Factor 1 had answered in a similar pattern and thus were grouped in a particular typology.

**Table 5** Distinguishing statements for factor 1

		FACTOR 1	
		Q-SV	Z-SCR
20	I worry that I may miss a diagnosis when practicing telemedicine because of inability to do physical examination	4	1.97
19	I worry about the quality of health care provided when practicing telemedicine	3	1.90
17	I am concerned with the medicolegal issues and legal responsibility with the use of telemedicine	3	1.29
24	I am concerned that my patient is not computer-literate for telemedicine	2	0.54*
18	There is no direct doctor-patient relationship between the physician and patient in a telemedicine consult	0	0.13*
2	Telemedicine improves the quality of patient care	-1	-0.51
1	Telemedicine services improve my efficiency and effectiveness as a physician	-1	-0.78
7	I find telemedicine easy to learn and use	-2	-0.98*
6	I practice telemedicine because it provides convenience for me and improves my quality of life	-2	-1.30*
11	I like practicing telemedicine	-3	-1.48*
8	I use telemedicine because I have friends and colleagues who use it	-3	-1.50*

**Table 6** Distinguishing statements for factor 2

		FACTOR 2	
		Q-SV	Z-SCR
5	Telemedicine provides comfort and convenience for my patients	3	1.19*
17	I am concerned with medicolegal issues and legal responsibility with the use of telemedicine	1	0.68
10	Applying telehealth services does not create any conflicts with my working and living habits	0	-0.09
8	I use telemedicine because I have friends and colleagues who use it	-1	-0.62
21	I am afraid that telemedicine practice will remove the "human touch" in patient care experience and is associated with lack of empathy	-2	-1.18*
23	I do not want to use telemedicine because it will be a problem to install and operate new technology. It will take me a lot of time and effort to switch to telemedicine	-3	-1.90*

Table 4 shows the Q-set with composite factor scores with a variance of 4.000 and standard deviation of 2.000. The scores from Q-sorting ranged from 1 to 9, from the lowest (-4) to highest (+4) degree of agreement. This showed how different factors or typologies arranged the different statements according to their agreement and disagreement.

The z-score (Z-SCR), which indicates the relationship between statements and factors, that is, how much each factor agrees with a statement, reflects the strength of relationship of statement with

the factor, with a higher level of agreement for a higher value, and a higher level of disagreement for the more negative value. The Q-SV reflects how statements were ranked within the factor, with +4 being most agreed, and -4 having the highest level of disagreement.

**The Distinguishing and Consensus Statements**

Nine physicians loaded to Factor 1. The major distinguishing statements for this cluster with the

**Table 7** Distinguishing statements for factor 3

		FACTOR 3	
		Q-SV	Z-SCR
21	I am afraid that telemedicine practice will remove the "human touch" in patient care experience and is associated with lack of empathy	3	1.82*
17	I am concerned with medicolegal issues and legal responsibility with the use of telemedicine	0	0.02
8	I use telemedicine because I have friends and colleagues who use it	0	0.01
9	I practice telemedicine because my hospital/institution has the infrastructure and support to use the system	0	-0.31*
18	There is no direct doctor-patient relationship between the physician and patient in a telemedicine consult	-2	-0.68*
11	I like practicing telemedicine	-2	-0.75*
1	Telemedicine services improve my efficiency and effectiveness as a physician	-3	-1.46
2	Telemedicine improves quality of patient care	-4	-2.19*

**Table 8** Distinguishing statements for factor 4

		FACTOR 4	
		Q-SV	Z-SCR
24	I am concerned that my patient is not computer-literate for telemedicine	4	1.90*
9	I practice telemedicine because my hospital/institution has the infrastructure and support to use the system	3	1.57*
8	I use telemedicine because I have friends and colleagues who use it	2	0.95
19	I worry about the quality of health care provided when practicing telemedicine	0	0.00
20	I worry that I may miss a diagnosis when practicing telemedicine because of inability to do physical examination	-0	0.05*
5	Telemedicine provides comfort and convenience for my patients	-2	-0.95*
16	I am concerned with data security and risk to patient confidentiality with telemedicine technology	-3	-1.23*
17	I am concerned with medicolegal issues and legal responsibility with the use of telemedicine	-3	-1.62*

highest Q-SV and z-scores included statements 20 ("I worry that I may miss a diagnosis when practicing telemedicine because of the inability to do physical examination"), 19 ("I worry about the quality of health care provided when practicing telemedicine") and 17 ("I am concerned with the medicolegal issues and legal responsibility with the use of telemedicine"). The statements with the highest level of disagreement were statements 6 ("I practice telemedicine because it provides convenience for me and improves my quality of life"), 8 ("I use telemedicine because I have friends and colleagues

who use it") and 11 ("I like practicing telemedicine") (Table 5).

Six respondents loaded to Factor 2, with statement 5 having the highest level of agreement ("Telemedicine provides comfort and convenience for my patients"). In this group, statements 21 ("I am afraid that telemedicine practice will remove the "human touch" in patient care experience and is associated with lack of empathy") and 23 ("I do not want to use telemedicine because it will be a problem to install and operate new technology") had the highest level of disagreement (Table 6).

**Table 9. Consensus statement**

**Consensus Statements - Those That Do Not Distinguish Between ANY Pair of Factors.**

All Listed Statements are Non-Significant at  $P > 0.01$ , and Those Flagged With an \* are also Non-Significant at  $P > 0.05$ .

		FACTORS							
		1		2		3		4	
		Q-SV	Z-SCR	Q-SV	Z-SCR	Q-SV	Z-SCR	Q-SV	Z-SCR
13	I am not sure of the ethical implications of practicing telemedicine	0	0.11	-1	-0.30	1	0.42	-1	-0.56

**Table 10** Typologies of physicians with respective perspectives on telemedicine

Factor/ Profile	Driver	Focus	Persona	Perspective Typology
1	Purpose	The physician and his delivery of care to the patient	Outcomes-focused physician	Quality of Patient Care Delivery
2	People	The physician-patient and their interaction	Patient-focused physician	Quality of Physician-Patient Encounter
3	Process	The patient and how he may miss out on empathy in the patient experience	Empathy-focused physician	Quality of Patient Care Experience
4	Platform	Technology and computer literacy of the patient	Technology-focused physician	Quality of Patient Technology Literacy

**Table 11** Summary of professional and legal implications

Barriers (Negative Perceptions) to Telemedicine	Professional and Legal Implications
<p>CONSENSUS: Lack of clarity on the ethical implications</p> <p>DISTINGUISHING PERCEPTIONS</p> <ul style="list-style-type: none"> <li>• Fear of missing a diagnosis due to inability to do physical examination</li> <li>• Lack of empathy and human touch during a teleconsult</li> <li>• Concern about substandard quality of care</li> <li>• Certain clinical cases not applicable for telemedicine</li> <li>• Concern over data security and patient confidentiality</li> <li>• Potential for abuse</li> </ul>	<ul style="list-style-type: none"> <li>• Education on ethical and legal implications of telemedicine</li> <li>• Incorporation of telemedicine training in undergraduate medical education</li> <li>• Mandate a universal general consent form</li> <li>• Training on proper communication strategies and on imparting "digital empathy" in telemedicine</li> <li>• Policies on designation of clinical cases that are acceptable to telemedicine</li> <li>• Set guidelines for applicability of telemedicine and reimbursement for teleconsults</li> </ul>

Four respondents loaded to Factor 3. In this group, statement 21 ("I am afraid that telemedicine practice will remove the "human touch" in patient care experience and is associated with lack of empathy") had the highest Q-SV and z-scores, while statements 1 ("Telemedicine services improve my efficiency and effectiveness as a physician") and 2 ("Telemedicine

improves the quality of patient care") had the most negative values (Table 7).

Finally, two physicians were loaded to Factor 4 for which the most distinguishing statements were statements 24 ("I am concerned that my patient is not computer-literate for telemedicine") and 9 ("I practice telemedicine because my hospital/

institution has the infrastructure and support to use the system"). Statements 16 ("I am concerned with data security and risk to patient confidentiality with telemedicine technology") and 17 ("I am concerned with medicolegal issues and legal responsibility with the use of telemedicine") had the most negative values in this group (Table 8).

For all the groups, one consensus statement emerged which did not distinguish between any pair of factors: statement 13 which related to ethical implications of practicing telemedicine (Table 9).

## DISCUSSION

### The Typologies

Unlike previous studies on perceptions of physicians on the use of telemedicine which primarily used qualitative surveys, our novel study used Q-methodology to conduct a systematic qualitative quantitative exploration on attitudes, perceptions and viewpoints of physicians toward this mode of healthcare delivery. From the analysis, four profiles of respondents were classified based on distinguishing statements and perceptions on telemedicine which were designated under the following drivers: Purpose, People, Process and Platform, corresponding to factor/profile 1 to 4. The respective perspective typologies are designated as Quality of Patient Care Delivery, Quality of Physician-Patient Encounter, Quality of Patient Care Experience, and Quality of Patient Technology Literacy (Table 10).

### The Outcomes-focused Physician: Purpose-driven

Typology 1 was the "outcomes-focused" or "diagnosis-directed" physician whose perspective was driven by his purpose - to deliver quality patient care. This typology emphasized on the importance of arriving at a correct diagnosis during a consultation. They formed majority of the respondents and were concerned that they would not be able to give the utmost quality of care to their patients because of the fear of missing a diagnosis due to lack of physical examination and physical interaction. They exhibited an aversion to telemedicine. This group was particularly concerned with legal issues and implications with telemedicine, risk to data security and patient confidentiality, and lack of set standards

of care. They disagreed with practicing telemedicine because of the availability of infrastructure and technology provided by their institution. They also disagreed that technology was easy to use and that it provides convenience for them, and in fact perceived that it required a significant amount of time and skill, although they moderately agreed that it was convenient for patients.

In the post-sort interview, a common perception was "because of the inherent limitation of telemedicine due to the inability to do physical examination, there is a high risk of missing a diagnosis."

This group worried that telemedicine might affect quality of patient care that they deliver and were specifically concerned about making the correct diagnosis and medicolegal repercussions.

Hence for this profile, the physician and his delivery of care to the patient was the focus, and quality of patient care was the perspective typology.

### The Patient-focused Physician: People-driven

For the second profile, the highest distinguishing statement was that telemedicine provides comfort and convenience for patients, and they disagreed with the loss of empathy associated and difficulty associated with installation of telemedicine technology. They strongly agreed that telemedicine ensures safety of the patient and physician from CoVid-19 infection, and provides continuity of care and convenience for patients during the pandemic. This typology strongly disagreed about there being no doctor-patient relationship in a telemedicine consult, and did not agree that it removes the human touch in the patient care experience.

"Safety and convenience" was a common theme from respondents during the interview. One respondent expressed that "telemedicine saves time and money", emphasizing on issues of traffic, travel and waiting times associated with actual consultation. "It is convenient for the patient and for me (the physician) as well." Another respondent articulated that it is "convenient also for patients who are from the provinces".

One physician said he was "forced to do telemedicine during the pandemic because the patients could not consult me during the lockdown. I would not be doing this if there was no pandemic".

The driver of this typology was people, and the perspective was quality of the physician-patient encounter. This typology was the “patient-focused physicians”. They considered patients’ comfort and convenience during the pandemic. Their primary consideration in setting up a telemedicine platform was for patients to have consultation at the comfort of their own homes and avoid being exposed to CoVid-19. Hence the physician-patient interaction was the focus.

### **The Empathy-focused Physician: Process-driven**

For the third profile, the distinguishing statements consisted of concern with lack of empathy, and disagreements with the statement that there is no doctor-patient relationship during a telemedicine encounter, that telemedicine improves one’s efficiency and effectiveness as a physician, and that it improves quality of care. This typology is the “empathy-focused” physician. The driver was the process, and the perspective typology was quality of patient care experience. This physician gave importance to emotional aspect of a consultation and believed that being able to feel a patient’s emotions would help a provider deliver more compassionate care and better outcome. “The human touch is lost in telemedicine,” stressed one respondent, an internist. “You are just seeing the patient on screen. The human touch also involves getting the blood pressure, pulse rate, auscultating the patient, and speaking to the patient directly.” Another respondent claimed that “one way to empathize with the patient is to touch, and this is gone with telemedicine.” In line with this typology’s disagreement that telemedicine improves one’s efficiency and effectiveness as a physician, this group believed that part of being an effective physician was being able to impart empathy towards the patient. It was also in this line that they worry about the quality of health care provided and about the limitation of not being able to examine the patient.

This group perceived that there is still a doctor-patient relationship in telemedicine. “I believe that the moment you agree to the teleconsult, the relationship is already there.”

Hence the focus for this group was the patient and how he may miss out on empathy in the patient experience. This typology was heavily influenced by negative perceptions of perceived risk[57] and

compatibility[60] which drive resistance to the use of telemedicine.

### **The Technology-focused Physician: Platform-driven**

The last typology was typified by the following distinguishing statements: that they practice telemedicine because the hospital provides infrastructure and that they are concerned that the patient is not computer literate. They also agreed that telemedicine requires significant amount of time, skill and technology. This typology was the “technology-focused” physician with the platform as driver, and quality of patient technology literacy as the perspective typology. This group had less concern on issues of data security and confidentiality as well as medicolegal aspects. The core construct that drove this typology was technological anxiety[57] and complexity.[60]

“Not everyone is able to do it. As a doctor you have to be comfortable in doing it and have a system in communicating with the patient. Because you will be relying mostly only on the history, the communication should be clear. If technology is not good, it will make the doctor impatient,” one respondent explained.

These physicians were telemedicine-inclined but were concerned that modern software designs were very sophisticated and that it would be difficult for their patients with minimal technical skills to adapt and use teleconsult as a platform. Thus, these physicians had reservations when it came to doing teleconsult compared to face-to-face consult, and they perceived that telemedicine might not provide convenience and comfort for patients. Hence, the focus was on technology and computer literacy of the patient.

From the post-sort interviews, majority of the respondents claimed that they practiced telemedicine or “were forced to do it” due to the pandemic. “There are still a lot of things that telemedicine won’t answer for the patient and the doctor. We’re doing it because we don’t have a choice”, stated an internist. Another surgeon claimed, “I was forced to do it because the patients could not contact me”.

Contrary to older perceptions on the depersonalization of the physician-patient relationship when doing telemedicine, most of the respondents did not consider it as a major



issue. Similarly, a recent study by Cheshire and colleagues[61] revealed that patients receiving care with telemedicine during the pandemic did not perceive decreased empathy compared to those who were seen by their physicians physically.

One interesting statement from two participants centered on the potential for abuse of telemedicine because of the convenience of its use on the part of the physician. "Doctors may get comfortable with it and when (there are situations that) you can already go face to face, they still do telemedicine because they found it convenient. They will abuse it." Bashshur and colleagues[62] mentioned this potential abuse of telemedicine for maximizing revenue and reimbursement, hence emphasizing on establishing defining criteria for reimbursement based on continuity of care, quality and value, as well as monitoring mechanisms to minimize potential exploitation. In this line, another respondent commented that "there should be regulations and guidelines on how the patient is going to consult you, and pay you, and guidelines on follow up."

One consensus statement which however fell in either the neutral, or mildly disagree or agree, was the ethical implications of practicing telemedicine. Several respondents stated about not being sure of ethical implications if they missed a diagnosis.

"We need to reevaluate the ethical issues involved in telemedicine with the current situation. We cannot use the ethical issues pre-Covid era. Policies of what constitute a patient-physician relationship in the context of telemedicine must be updated," declared one of the participants, an obstetrician-gynecologist, who also suggested that the medical act as well as curriculum of the medical school must be updated in relation to telemedicine.

This issue on ethics drew similarity to a previous local study[63] on physician perspectives on telemedicine which cited unanswered questions on its ethics and legality.

In the post-sort interview, majority of participants agreed that telemedicine will persist beyond the pandemic. Many concurred that the post-pandemic clinical practice will be a mixture of telemedicine and face-to-face consultation, citing advantages of telemedicine for certain patients, especially those in the provinces and other islands.

"I think telemedicine should stay but not 100%", "Telemedicine is here to stay but I think it will be

hybrid - virtual and face to face", "I think it will stay but I hope it will not be the way we practice medicine in the future" were some of the comments.

### Professional and Legal Implications

While telemedicine will never replace the face-to-face physician-patient encounter, it was seen as a viable alternative to healthcare, especially during the pandemic. The different typologies that surfaced from this study reflected the presence of varied perceptions among physicians on the application of telemedicine as an avenue of healthcare delivery. This may be partially caused by lack of well-defined telemedicine guidelines and regulations, as well as a lack of definite policies pertaining to data confidentiality, reimbursement, and patient criteria. An inadequacy of uniform legislation that will allow integration of telemedicine into the healthcare system will pose a continuing challenge to its acceptance and adoption by physicians beyond the pandemic.[64] The aspect of compensation is itself a very important and sensitive topic and an object for wider discussion as there are no established guidelines or criteria and yet it has huge implications on healthcare. The issue on patient criteria that is deemed acceptable for a telemedicine consult needs to be decided by established health authorities. Which specific clinical cases are eligible? Is telemedicine applicable for a first consult? What are the clinical situations that will make telemedicine applicable and acceptable? Which health authorities and entities should create these rules of practice? These regulatory, legal and ethical implications have to be formally established and included in official guidelines, including rules on credentialing and licensure. Set standards on applicability of telemedicine for certain patient profiles, clinical situations and medical specialty fields will improve physicians' perception and increase its sustainability.

The divergent perceptions of the physician-patient relationship in telemedicine expose the need for a strict definition of requirements of a physician-patient relationship in the context of telemedicine in the code of conduct and practice of physicians. In this line, while telemedicine through video consults allows real-time communication with virtual visualization of the patient's and physician's faces in nearly simulating an actual face-to-face encounter, this mode of interaction has important

limitations. Certain non-verbal communications play a significant role in clinical consultation and is an important variable in the patient-physician relationship. These non-verbal cues, which help build professional relationship and establish rapport also help to strengthen the messages from verbal conversation and provide certain signals to certain emotions and sentiments.[65,66] Factors such as body posture, tone of voice, hand movements, and changes in facial expressions convey important messages. Ultimately, they help establish trust. These are evidently absent in a telemedicine consult. Video teleconsult simply does not capture the complexity of personal human interaction. Furthermore, the ethical principles of respect for autonomy, non-maleficence, beneficence and justice which constitute the elements of an informed consent in the context of the physician-patient relationship,[67] need to be clearly conceptualized in the telemedicine consent. There is a need to formally integrate this mode of healthcare in medical education and training and reevaluate ethical issues with the current situation. In line with this, the concept of "digital empathy" must be included in the curriculum of the medical profession.[68]

The results of this study can generate insights into professional, ethical and legal implications of telemedicine in medical practice. This can benefit healthcare organizations, academic institutions, and policy makers by providing information and guidance in the modification and improvement of telemedicine services in the "new normal", as well as provide relevant points in the implications of this technology in education and training of healthcare professionals.

The acceptance and adoption of telemedicine, especially beyond the current pandemic, in the "new normal", will depend on how healthcare policies will be modified based on perceptions of the primary users - the physicians.

### Limitations

This study covered perspectives of physicians who were already in clinical practice and had graduated from their respective training programs. Both, primary care physicians (family physicians and general internists) as well as specialists and subspecialists from different medical and surgical specialties were included. However, the study was

limited to physicians attending to adult patients and excluded pediatric specialists as well as specialties not routinely holding face-to-face consultations before the pandemic. The included participants were limited to physicians practicing in the university hospital and did not include those in provinces and rural areas. While there are different forms and classifications of telemedicine consultations, this study was limited to perceptions on the online synchronous real-time video consultations by patients and physicians, which was deemed closest to the in-clinic environment (video tele-consultations), and did not include other forms such as audio consultations via phone, and consultations via text messages, chats and emails, and other aspects of telehealth such as online transmission of patient clinical data, laboratory and ancillary results, and electronic medical records. Future studies directed at a more homogenous group such as physicians with similar specialties might be worth exploring.

Q-methodology has certain limitations. This type of study has a limited number of participants and does not determine perceptions of the general population. It only provides a snapshot of physicians' perceptions about this type of care. While such limitation may make findings non-generalizable, this method provides an opportunity to use both quantitative and qualitative methods to analyze viewpoints of physicians towards this particular topic and gives a glimpse of medical professionals' perceptions towards adoption of telemedicine in clinical practice during and after the pandemic.

### Conclusion and Recommendations

Applying a mixed methods sequential explanatory design with the use of Q-methodology, four typologies of physicians were identified according to their perspectives on telemedicine during the CoVid-19 pandemic: (1) the Outcomes-focused physician who was driven by his purpose - to deliver quality patient care; (2) the Patient-focused physician who was people-driven and emphasized safety and convenience of his patients during the physician-patient encounter; (3) the Empathy-focused physician who valued the process, emphasized the human touch and gave importance to quality of patient care experience; and (4) the Technology-focused physician who was driven by the platform and technology inclination of the patient. One consensus

statement emerged - the neutral perception on ethical implications of telemedicine.

The factors that facilitated adoption of telemedicine were: (1) its provision of comfort, convenience and safety for patients; (2) its provision for continuity of health care services and accessibility; and (3) the availability of infrastructure and support in the institution. There were several barriers that inhibited its use: (1) the inability to perform physical examination; (2) the risk of substandard quality of care; (3) the loss of empathy; (4) the medicolegal issues of data security and patient confidentiality; and (5) the concern about patient's computer literacy.

Even in a pandemic, healthcare must continue (especially for non-pandemic related illnesses). Telemedicine revolutionized healthcare during this crisis, and medicine must evolve. Today's physician was not adequately trained to practice telemedicine.

He was trained to see the patient face-to-face, examine the patient personally, feel the emotions of the patient and empathize with the patient's symptoms. But he was forced to do telemedicine out of the need to continue healthcare service for the patient. The physician must evolve and healthcare systems must evolve. The future of medical care might involve a combination of face-to-face and virtual consultation. While this study revealed four typologies of physicians based on their perspectives on telemedicine, the focus remained on one - the patient. This was the common denominator in all typologies. In the end, it was the willingness to serve the patient that took precedence over other perceptions.

**Declaration of Conflicts** The authors declare no conflict of interest in relation to this article.

## REFERENCES

- World Health Organization. 90% of countries report disruptions to essential health services since COVID-19 pandemic. In: WHO global pulse survey 2020. Available from: <https://www.who.int/news/item/31-08-2020-in-who-global-pulse-survey-90-of-countries-report-disruptions-to-essential-health-services-since-covid-19-pandemic>
- World Health Organization. Pulse survey on continuity of essential health services during the COVID-19 pandemic, interim report 27 August 2020. Available from: [https://www.who.int/publications/i/item/WHO-2019-nCoV-EHS\\_continuity-survey-2020.1](https://www.who.int/publications/i/item/WHO-2019-nCoV-EHS_continuity-survey-2020.1)
- World Health Organization. Rapid assessment of service delivery for noncommunicable diseases during the COVID-19 pandemic. Available from: [https://www.who.int/docs/default-source/ncds/ncd-covid-19/for-web-rapid-assessment-30-june-2020-\(cleared\).pdf?sfvrsn=6296324c\\_20&download=true](https://www.who.int/docs/default-source/ncds/ncd-covid-19/for-web-rapid-assessment-30-june-2020-(cleared).pdf?sfvrsn=6296324c_20&download=true)
- World Health Organization. Telemedicine: Opportunities and developments in member states: report on the second global survey on eHealth 2009. Switzerland: WHO Press 2010. Available from: [http://www.who.int/goe/publications/goe\\_telemedicine\\_2010.pdf](http://www.who.int/goe/publications/goe_telemedicine_2010.pdf).
- Betancourt JA, Rosenberg MA, Zevallos A, Brown JR, Milecki M. The impact of COVID-19 on telemedicine utilization across multiple service lines in the United States. *Healthcare (Basel)* [Internet]. 2020;8(4):380. Available from: <http://dx.doi.org/10.3390/healthcare8040380>
- Shah S, Diwan S, Kohan L, Rosenblum D, Gharibo C, Soin A, et al. The technological impact of COVID-19 on the future of education and health care delivery. *Pain Physician*. 2020;23(4S):S367–80.
- Centers for Disease Control. What is telemedicine in a non-US setting? 2020. Available from: <https://www.cdc.gov/coronavirus/2019-ncov/global-covid-19/telemedicine.html>
- US Department of Health and Human Sciences. Notification of enforcement discretion for telehealth remote communications during the COVID-19 nationwide public health emergency. HHS.gov. 2020. Available from: <https://www.hhs.gov/hipaa/for-professionals/special-topics/emergency-preparedness/notification-enforcement-discretion-telehealth/index.html>
- Rockwell KL, Gilroy AS. Incorporating telemedicine as part of COVID-19 outbreak response systems. *Am J Manag Care* [Internet]. 2020;26(4):147–8. Available from: <http://dx.doi.org/10.37765/ajmc.2020.42784>
- Department of Health. Department of Health Memorandum Circular No. 2020-0016: Guidelines for the use of telemedicine in CoViD19 response, 2020. Available from: <https://www.privacy.gov.ph/wp-content/uploads/2020/10/DOH-mc2020-0016.pdf>
- UP medical informatics unit: Telemedicine guidance for Filipino physicians and patients [Internet]. *The Endocrine Witch*. 2020 [cited 2023 Apr 11]. Available from: <https://www.endocrine-witch.net/2020/05/02/up-medical-informatics-unit-telemedicine-guidance-for-filipino-physicians-and-patients/>
- Salud G. Get a checkup from home: Metro manila hospitals & clinics offering telemedicine [Internet]. Tripzilla Philippines. 2020 [cited 2023 Apr 11]. Available from: <https://www.tripzilla.ph/teleconsultation-metro-manila/17229>
- Acharya RV, Rai JJ. Evaluation of patient and doctor perception toward the use of telemedicine in Apollo Tele Health Services, India. *J Family Med Prim Care* [Internet]. 2016;5(4):798–803. Available from: <http://dx.doi.org/10.4103/2249-4863.201174>
- Albarrak AI, Mohammed R, Almarshoud N, Almujailli L, Aljaeed R, Altuwaijiri S, et al. Assessment of physician's knowledge, perception and willingness of telemedicine in Riyadh region, Saudi Arabia. *J Infect Public Health* [Internet]. 2021;14(1):97–102. Available from: <http://dx.doi.org/10.1016/j.jiph.2019.04.006>
- Donelan K, Barreto EA, Sossong S, Michael C, Estrada JJ, Cohen AB, et al. Patient and clinician experiences with telehealth for patient follow-up care. *Am J Manag Care*. 2019;25(1):40–4.
- El-Mahalli A, El-Khafif S. Successes and challenges in the implementation and application of telemedicine in the eastern province of Saudi Arabia. *Perspect Health Inf Manag*. 2012;9:1–27.
- Rosen D, McCall JD, Primack BA. Telehealth protocol to prevent readmission among high-risk patients with congestive heart failure. *Am J Med* [Internet]. 2017;130(11):1326–30. Available from: <http://dx.doi.org/10.1016/j.amjmed.2017.07.007>
- Schreiber SS. Teleneurology for veterans in a major metropolitan area. *Telemed J E Health* [Internet]. 2018;(tmj.2017.0202);24(9):698-701. Available from: <http://dx.doi.org/10.1089/tmj.2017.0202>
- Sood A, Watts SA, Johnson JK, Hirth S, Aron DC. Telemedicine consultation for patients with diabetes mellitus: a cluster randomised controlled trial. *J Telemed Telecare* [Internet]. 2017;24(6):1357633X17704346. Available from: <http://dx.doi.org/10.1177/1357633X17704346>
- Taylor A, Morris G, Pech J, Rechter S, Carati C, Kidd MR. Home telehealth video conferencing: Perceptions and performance. *JMIR MHealth UHealth* [Internet]. 2015;3(3):e90. Available from: <http://dx.doi.org/10.2196/mhealth.4666>
- Alami H, Fortin J-P, Gagnon M-P, Pollender H, Têtu B, Tanguy F. The challenges of a complex and innovative telehealth project: A qualitative evaluation of the Eastern Quebec telepathology network. *Int J Health Policy Manag* [Internet]. 2017;7(5):421–32. Available from: <http://dx.doi.org/10.15171/ijhpm.2017.106>
- Martínez Álvarez M, Chanda R, Smith RD. How is telemedicine perceived? A qualitative study of perspectives from the UK and India. *Global Health* [Internet]. 2011;7(1):17. Available from: <http://dx.doi.org/10.1186/1744-8603-7-17>
- Greenhalgh T, Koh GCH, Car J. Covid-19: a remote assessment in primary care. *BMJ* [Internet]. 2020;368:m1182. Available from: <http://dx.doi.org/10.1136/bmj.m1182>
- Kruse CS, Karem P, Shifflett K. Evaluating barriers to adopting telemedicine worldwide: A systematic review. *Journal of Telemedicine and Telecare*. 2018;24(1):4–12.
- Helou S, El Helou E, Abou-Khalil V, Wakim J, El Helou J, Daher A, et al. The effect of the COVID-19 pandemic on physicians' use and perception of telehealth: The case of Lebanon. *Int J Environ Res Public Health* [Internet]. 2020;17(13):4866. Available from: <http://dx.doi.org/10.3390/ijerph17134866>
- Hollander JE, Carr BG. Virtually perfect? Telemedicine for Covid-19. *N Engl J Med* [Internet]. 2020;382(18):1679–81. Available from: <http://dx.doi.org/10.1056/NEJMp2003539>

27. Timpel P, Harst L. Research implications for future telemedicine studies and innovations in diabetes and hypertension-A mixed methods study. *Nutrients* [Internet]. 2020;12(5):1340. Available from: <http://dx.doi.org/10.3390/nu12051340>
28. Hanlon P, Daines L, Campbell C, McKinstry B, Weller D, Pinnock H. Telehealth interventions to support self-management of long-term conditions: A systematic metareview of diabetes, heart failure, asthma, chronic obstructive pulmonary disease, and cancer. *J Med Internet Res* [Internet]. 2017;19(5):e172. Available from: <http://dx.doi.org/10.2196/jmir.6688>
29. Knudsen LR, de Thurah A, Lomborg K. Experiences with telehealth followup in patients with rheumatoid arthritis: A qualitative interview study. *Arthritis Care Res (Hoboken)* [Internet]. 2018;70(9):1366–72. Available from: <http://dx.doi.org/10.1002/acr.23483>
30. Warner MM, Tong A, Campbell KL, Kelly JT. Patients' experiences and perspectives of telehealth coaching with a dietitian to improve diet quality in chronic kidney disease: A qualitative interview study. *J Acad Nutr Diet* [Internet]. 2019;119(8):1362–74. Available from: <http://dx.doi.org/10.1016/j.jand.2019.01.023>
31. du Toit M, Malau-Aduli B, Vangaveti V, Sabesan S, Ray RA. Use of telehealth in the management of non-critical emergencies in rural or remote emergency departments: A systematic review. *J Telemed Telecare* [Internet]. 2019;25(1):3–16. Available from: <http://dx.doi.org/10.1177/1357633X17734239>
32. Hatcher-Martin J, Factor AE. Patient acceptance and potential cost-savings of teleneurology in an academic outpatient movement disorders practice (P1.022). *Neurology*. 2016;86(16):P1-022.
33. Müller KI, Alstadhaug KB, Bekkelund SI. A randomized trial of telemedicine efficacy and safety for nonacute headaches. *Neurology* [Internet]. 2017;89(2):153–62. Available from: <http://dx.doi.org/10.1212/wnl.0000000000004085>
34. Powell RE, Henstenburg JM, Cooper G, Hollander JE, Rising KL. Patient perceptions of telehealth primary care video visits. *Ann Fam Med* [Internet]. 2017;15(3):225–9. Available from: <http://dx.doi.org/10.1370/afm.2095>
35. Provenzano D. Telemedicine healthcare for headache medicine during COVID-19 and beyond. *AHM Journal* [Internet]. 2020; Available from: <http://dx.doi.org/10.30756/ahmj.2020.02.03>
36. Ballester S, Scott JM, Owei MF. Patient preference for time-saving telehealth postoperative visits after routine surgery in an urban setting. *Surgery*. 2018;163(4):672–9.
37. Fryer K, Delgado A, Foti T, Reid C, Marshall J. Implementation of obstetric telehealth during COVID - 19 and beyond. *Maternal and Child Health Journal*. 2020;24:1104–10.
38. Landow SM, Mateus A, Korgavkar K, Nightingale D, Weinstock MA. Teledermatology: key factors associated with reducing face-to-face dermatology visits. *J Am Acad Dermatol* [Internet]. 2014;71(3):570–6. Available from: <http://dx.doi.org/10.1016/j.jaad.2014.02.021>
39. Tensen E, van der Heijden JP, Jaspers MWM, Witkamp L. Two decades of teledermatology: Current status and integration in national healthcare systems. *Curr Dermatol Rep* [Internet]. 2016;5(2):96–104. Available from: <http://dx.doi.org/10.1007/s13671-016-0136-7>
40. Salongcay RP, Silva PS. The role of teleophthalmology in the management of diabetic retinopathy. *Asia Pac J Ophthalmol (Phila)* [Internet]. 2018;7(1):17–21. Available from: <http://dx.doi.org/10.22608/APO.2017479>
41. Humphreys J, Schoenherr L, Elia G, Saks NT, Brown C, Barbour S, et al. Rapid implementation of inpatient telepalliative medicine consultations during COVID-19 pandemic. *J Pain Symptom Manage* [Internet]. 2020;60(1):e54–9. Available from: <http://dx.doi.org/10.1016/j.jpainsymman.2020.04.001>
42. Cota A, Tarchala M, Parent-Harvey C, Engel V, Berry G, Reindl R, et al. Review of 5.5 years' experience using E-mail-based telemedicine to deliver orthopedic care to remote communities. *Telemed J E Health* [Internet]. 2017;23(1):37–40. Available from: <http://dx.doi.org/10.1089/tmj.2016.0030>
43. Reider-Demer M, Raja P, Martin N, Schwinger M, Babayan D. Prospective and retrospective study of videoconference telemedicine follow-up after elective neurosurgery: results of a pilot program. *Neurosurg Rev* [Internet]. 2018;41(2):497–501. Available from: <http://dx.doi.org/10.1007/s10143-017-0878-0>
44. Indria D, Alajlani M, Fraser HSF. Clinicians perceptions of a telemedicine system: a mixed method study of Makassar City, Indonesia. *BMC Med Inform Decis Mak* [Internet]. 2020;20(1):233. Available from: <http://dx.doi.org/10.1186/s12911-020-01234-7>
45. Cantos PL, Chua NJ, Florentin MJ, Gomez TG, Hapan MF, Salmon S. Perceived level of satisfaction of Filipino patients residing in Metro Manila towards teleconsultation as new means of healthcare delivery. *International Journal of Progressive Research in Science and Engineering*. 2021;2(8):229–43.
46. Peine A, Paffenholz P, Martin L, Dohmen S, Marx G, Loosen SH. Telemedicine in Germany during the COVID-19 pandemic: Multi-professional national survey. *J Med Internet Res* [Internet]. 2020;22(8):e19745. Available from: <http://dx.doi.org/10.2196/19745>
47. Cruz-Lim EM, Co HC, Mendoza MJ, Dumlao P III, Lucero JA, Yap B, et al. Physicians' perceptions on the role of telemedicine in cancer care during and post-COVID-19 pandemic. *Acta Med Philipp* [Internet]. 2021;55(2). Available from: <http://dx.doi.org/10.47895/amp.v55i2.2836>
48. Brown SR. Q methodology and qualitative research. *Qual Health Res* 1996;6:561–7. Available from: <http://schmolck.org/qmethod/srbqhc.htm>
49. Ladan MA, Wharrad H, Windle R. Towards understanding healthcare professionals' adoption and use of technologies in clinical practice: using Q-methodology and models of technology acceptance. *BMJ Health Care Inform* [Internet]. 2018;25(1):27–37. Available from: <http://dx.doi.org/10.14236/jhi.v25i1.965>
50. Valenta AL, Wigger U. Q-methodology: definition and application in health care informatics. *J Am Med Inform Assoc* [Internet]. 1997;4(6):501–10. Available from: <http://dx.doi.org/10.1136/jamia.1997.0040501>
51. Watts S, Stenner P. Doing Q methodology: Theory, method and interpretation. *Qualitative Research in Psychology*. 2005;2:67–91.
52. Barker JH. Q-methodology: An alternative approach to research in nurse education. *Nurse Educ Today* [Internet]. 2008;28(8):917–25. Available from: <http://dx.doi.org/10.1016/j.nedt.2008.05.010>
53. Kiwanuka A. Acceptance Process: The missing link between UTAUT and diffusion of innovation theory. *American Journal of Information Systems*. 2015;3(2):40–4.

54. Venkatesh, Morris, Davis. User acceptance of information technology: Toward a unified view. *MIS Q* [Internet]. 2003;27(3):425. Available from: <http://dx.doi.org/10.2307/30036540>
55. Taiwo AA, Downe AG. The theory of user acceptance and use of technology (UTAUT): a meta-analytic review of empirical findings. *Journal of Theoretical and Applied Information Technology*. 2013;49(1):48–58.
56. Tsai J-M, Cheng M-J, Tsai H-H, Hung S-W, Chen Y-L. Acceptance and resistance of telehealth: The perspective of dual-factor concepts in technology adoption. *Int J Inf Manage* [Internet]. 2019;49:34–44. Available from: <http://dx.doi.org/10.1016/j.ijinfomgt.2019.03.003>
57. Kamal SA, Hussain S, Shafiq M, Jahanzaib M. Investigating the adoption of telemedicine services: an empirical study of factors influencing physicians' perspective in Pakistan. *Nucleus*. 2018;55(3):153–63.
58. Bartlett JE II, DeWeese B. Using the Q methodology approach in human resource development research. *Adv Dev Hum Resour* [Internet]. 2015;17(1):72–87. Available from: <http://dx.doi.org/10.1177/1523422314559811>
59. Van Exel J and de Graaf G. Q methodology: A sneak preview. 2005:pp.1–21. Available from: <https://sites.nd.edu/lapseylab/files/2014/10/vanExel.pdf>
60. Rogers EM. *Diffusion of Innovations*. 5th Ed. The Free Press 2003. New York.
61. Cheshire WP, Barrett KM, Eidelman BH, Mauricio EA, Huang JF, Freeman WD, et al. Patient perception of physician empathy in stroke telemedicine. *J Telemed Telecare* [Internet]. 2021;27(9):572–81. Available from: <http://dx.doi.org/10.1177/1357633x19899237>
62. Bashshur R, Doarn CR, Frenk JM, Kvedar JC, Woolliscroft JO. Telemedicine and the COVID-19 pandemic, lessons for the future. *Telemed J E Health* [Internet]. 2020;26(5):571–3. Available from: <http://dx.doi.org/10.1089/tmj.2020.29040.rb>
63. Pasco PM. Physician perspectives in the practice of telemedicine in the Philippines. *J Int Soc Telemed eHealth*. 2016;4:e26.
64. Kumar P, Huda F, Basu S. Telemedicine in the COVID-19 era: the new normal. *Eur Surg* [Internet]. 2020;52(6):300–1. Available from: <http://dx.doi.org/10.1007/s10353-020-00666-9>
65. Luz PL da. Telemedicine and the doctor/patient relationship. *Arq Bras Cardiol* [Internet]. 2019;113(1):100–2. Available from: <http://dx.doi.org/10.5935/abc.20190117>
66. Silverman J, Kinnersley P. Doctors' non-verbal behaviour in consultations: look at the patient before you look at the computer. *Br J Gen Pract*. 2010;60(571):76–8.
67. Messer NG. Professional-patient relationships and informed consent. *Postgrad Med J* [Internet]. 2004;80(943):277–83. Available from: <http://dx.doi.org/10.1136/pgmj.2003.012799>
68. Terry C, Cain J. The emerging issue of digital empathy. *Am J Pharm Educ* [Internet]. 2016;80(4):58. Available from: <http://dx.doi.org/10.5688/ajpe80458>



**Open Access** This article is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License, which permits use, share — copy and redistribute the material in any medium or format, adapt — remix, transform, and build upon the material, as long as you give appropriate credit, provide a link to the license, and indicate if changes were made. You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use. You may not use the material for commercial purposes. If you remix, transform, or build upon the material, you must distribute your contributions under the same license as the original. You may not apply legal terms or technological measures that legally restrict others from doing anything the license permits. The images or other third party material in this article are included in the article's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this license, visit <https://creativecommons.org/licenses/by-nc-sa/4.0/>.