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Healthcare Professionals Perception of Telehealth Use in Primary and Specialty Care Settings

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### Abstract

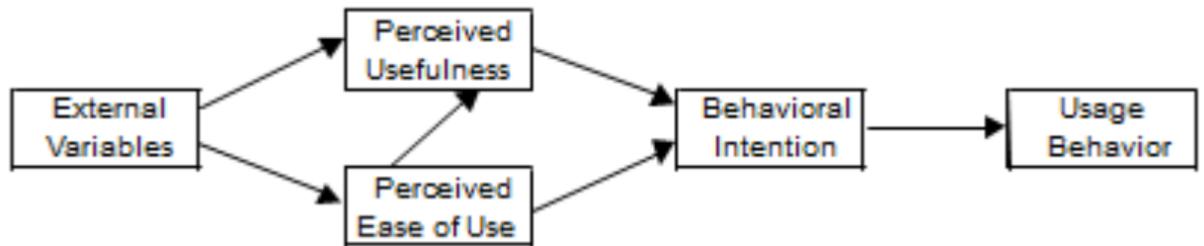
The advent of the Covid-19 pandemic at the onset of 2020 fundamentally altered and disrupted the health care industry. One key aspect of this disruption was the exponential use of telehealth. This explosion of telehealth use came mostly out of necessity. Therefore, it involves a lot of trial and error, so pinning down an optimal approach for using it during the pandemic and beyond becomes crucial.

In this paper, critical aspects of telehealth via a practitioner survey are explored. The in-depth analysis of the data proceeded by using descriptive statistics and a data mining approach. The material synthesis concludes that understanding the concept of provider connectedness may be the key to better care coordination within and among large health systems for varying degrees of case complexity and case sharing. Also, that provider setting is likely the most important driving factor in any future optimization of telehealth.

*Keywords:* Covid-19, Telehealth, Providers' satisfaction, and Quality of care

## Introduction

According to the Center for Medicare and Medicaid Services, “Telehealth, telemedicine, and related terms generally refer to the exchange of medical information from one site to another through electronic communication to improve a patient’s health” (CMS, 2020). Telemedicine services are developed based on the Technology Acceptance Model (TAM) proposed by Davis that includes two concepts of ease of use and perceived usefulness for patients and providers (Davis, 1989).



Technology Acceptance Model (Venkatech & Davis, 1996). Retrieved from: Lai, 2017.

The administration of telehealth services has numerous benefits when implemented in the primary and specialty healthcare sector. Among those, telehealth has shown to increase access to care, reduce appointment waiting time, reduce the cost of health maintenance and travel time, eliminate environmental hazards, reduce child or elder care issues, promote continuity and quality of care, improve communication between provider and patient, boost practice efficiency, provide better short and long-term care outcomes, and decrease no-show cancellations [(Vidal-Alaball et al. (2020); Northwest Regional Telehealth Resource Center (n d))].

## **Background**

Initially, telemedicine implementation focused on expanding access and improving care in rural communities (Rural Health Information Hub, n d). It gained popularity from 2014-2015, when telehealth guidelines were developed by the American Medical Association, The American Telemedicine Association, and the Institute of Medicine (AMA, 2020). Since the onset of the Covid-19 pandemic in 2020, telehealth became the main method for administering primary and specialty care to patients, which constitutes a significant transformation in the field. Providers are used to administering medical care at clinics in person and are hesitant to shift the administration of their care to telemedicine. However, in the Covid-19 pandemic case, many providers had little choice but to switch the administration of healthcare to the telemedicine route.

## **Significance**

Davis offered implementation of telehealth in 1989 when he proposed to use the Technology Acceptance Model. At that time, telehealth had minimal application due to a lack of information and communication technology in the healthcare sector. First, the broad implementation of telehealth was proposed in rural communities to narrow the gap in primary care provider shortages (Rural Health, n d). The American Medical Association and Institute of Medicine developed telehealth guidelines in 2014-2015 (2014). Since then, telemedicine has expanded through several initiatives of the Center of Medicare and Medicaid and the American College of Physicians who actively broadened the use of telehealth services to their beneficiaries [(CMS, 2020; Daniel & Sulmasy, 2015)]. Recently, with the COVID-19 pandemic, telehealth became the main method for administering healthcare in primary and specialty care settings

(Vidal-Alaball et al., 2020). From the literature about healthcare providers' attitudes, the authors identified that the healthcare providers' perspective is essential to ensure successful telemedicine adoption in primary and specialty care [(Phillips & Haase, 2018; Rai JJ, 2016; Vidal-Alaball et al., 2020)].

### **Purpose**

This paper presents a practice improvement project that aims to assess healthcare professionals' perceptions of telemedicine services at primary and specialty care clinics. The providers serve a crucial role in providing insights into technology use and telemedicine implementation at local organizations. A thorough assessment of healthcare providers' perceptions of usefulness, safety, and quality of care provided via telehealth communication is necessary to identify risks and benefits to providers and patients.

### **Methods**

A survey was built around a questionnaire adapted from the American Medical Association of Telehealth Guidelines and modified into 20 questions. An online survey platform was used to assess providers' perceptions and was open for four weeks for completion. The link to the survey was sent via email to other providers known to the University of Portland faculty and the primary investigator across the healthcare industry in Oregon and Washington. For the analysis, Weka was used, a data science machine with free software that does advanced data analysis by building a decision tree based on the answers (Appendix A, Figure 1). Weka was used to identify the most influential factors driving the perceptions, and based on these, the Influence Matrix was built (Appendix B, Table 7).

## Results

A total of 67 providers completed the survey. The descriptive statistics include independent variables that provide information about providers and include gender (Appendix B, Table 1), age (Appendix B, Table 2), the highest degree obtained (Appendix B, Table 3), years in clinical practice, and clinical settings (Appendix B, Table 4). The twelve dependent variables provide answers about the experience with telehealth use and are divided further into three categories provider-centric, patient-centric, and shared (Appendix B, Tables 5-6). For this paper, three representative questions were selected from each category to discuss.

First, the provider's connectedness to a patient reveals that female providers feel less connected (46.15%) than males (30.76%). Second, the providers' reflection on the quality of care, 50% of providers perceived quality of care as lower than usual clinic visits. Moreover, in urgent care settings, providers identified that the quality of medical care administered via telehealth is the lowest compared to other clinical settings. Third, for the technology aspect, younger providers (30-49 years old) identified ease of use in telehealth technology (more than 50%) compared to older providers (50 years old and above) who had difficulties in using telehealth technologies.

Furthermore, based on clinical settings, providers working in urgent care, family practice, and internal medicine identified ease of use in telehealth technology compared to geriatric specialty care that noted more difficulties in using telehealth technology. From the summary of the Influential Matrix, the clinical settings seem to be the most influential factor driving answers, followed by age, then equally by experience and degree.

### Discussion

The findings indicate that female providers felt less connected to patients (46.15%) than males (30.76%). It is possible that female providers respond emotionally and may be more involved in a partnership approach to address patients' physical and psychological issues as supported by Roter, Hall and Aoki (2002). Also, providers with a more advanced degree identified higher satisfaction and connectedness with patients by using telehealth, which can be linked to extensive use of technology while obtaining a degree (Gardenier, Schreibman, Herrich, 2017).

Empathy and communication play an important role in "connectedness" and the survey demonstrates that the providers surveyed voiced that sentiment. Providers likely perceived the quality of care administered via telemedicine as lower than usual clinic visits because patients feel less empathy from the provider due to a lack of face-to-face interaction and lower communication dynamics (Healthcare IT News, 2020). The urgent care has higher acuity of patients and more diagnostic lab/imaging is required to support the decision-making process (Ayers, n.d.).

Finally, the investigator concludes that middle and senior adults-providers identified technology as positive, and the older adults-providers identify it as negative. However, more than 50% of female providers view technology use as positive than male providers. Historically, younger adults are more experienced with technology than older adults who are not technology-savvy (Olson et al., 2011).

Also, based on clinical settings, providers who work in urgent care, family practice, or internal medicine identify the technology aspect more positively than those in geriatric specialty settings, which is most likely due to more challenges for older adults to utilize telehealth in

practice because of many barriers (Cohen-Mansfield & Biddison, 2007). Merrel (2015) reported that geriatric patients encountered numerous barriers to the use of technology due to hearing, vision deficit, and a general decline in cognitive and physical ability due to age and disease progression. Moreover, among difficulties with telehealth, 14 providers identified technology failure and connectivity problems, longer time to complete visits and charting, difficulty obtaining information technology (IT) to help before or during the visit.

Since the clinical setting was identified as one of the influential factors, telehealth software may be enhanced by adapting it to different clinics serving varied populations (Tuckson, Edmunds, Hodgkins, 2017). For pediatric provider's a telehealth platform that utilizes Virtual or Augmented Reality to create a visual picture of a favorite animal can potentially decrease a child's anxiety and improve communication. In geriatric settings, the use of medical Alexa (voice commands) can make it easier for patients to use telehealth (M-Health Intelligence. n d). Also, the use of high-resolution software can improve the quality of pictures in a Dermatology practice.

Regardless of COVID-19 future evolution and context, telehealth will gain momentum and sophistication going forward. Assimilating the crucial yet straightforward idea that no one size fits all for telehealth software may make the difference between success and failure for medical device companies targeting this domain.

### **Limitations**

This project had limitations such as sample size, location and time. Only 67 providers participated in the survey. A larger sample size is needed to generalize the findings. The survey was conducted in the Pacific Northwest and only a small number of providers participated. A larger survey involving providers in national professional organizations, large healthcare

organizations, and community clinics would provide more data for descriptive and inferential statistical analysis. Time was also a factor as the survey was accessible to providers only during a four-week period and clearly that was not enough time.

### **Conclusion**

This project provided the results of healthcare professionals' perception of telehealth use via a survey. For the telehealth platforms, no one size fits all, and to maximize the patients' and providers' experience, the software should be adapted differently based on the clinical settings. That would attract more patients, reduce the health system's burden, and create more revenue for the clinics. Telehealth training material should be custom-made and consider providers' characteristics, such as age, provider's degree, and experience. The providers with higher education seemed to have less difficulties with telehealth. Incorporating telehealth into provider education may encourage its use and ease of adoption for future providers. Future provider surveys should include questions regarding clinical settings in order to determine factors that play a role in improving telehealth administration.

Since the onset of the COVID-19 pandemic, telehealth has taken on a significant role. It is clear that telehealth is here to stay and may increase in the future. Medical providers will need support to improve their ability to provide care through the use of this technology. Finally, medical schools and nursing schools will need to incorporate telehealth into their curriculum to prepare future providers.

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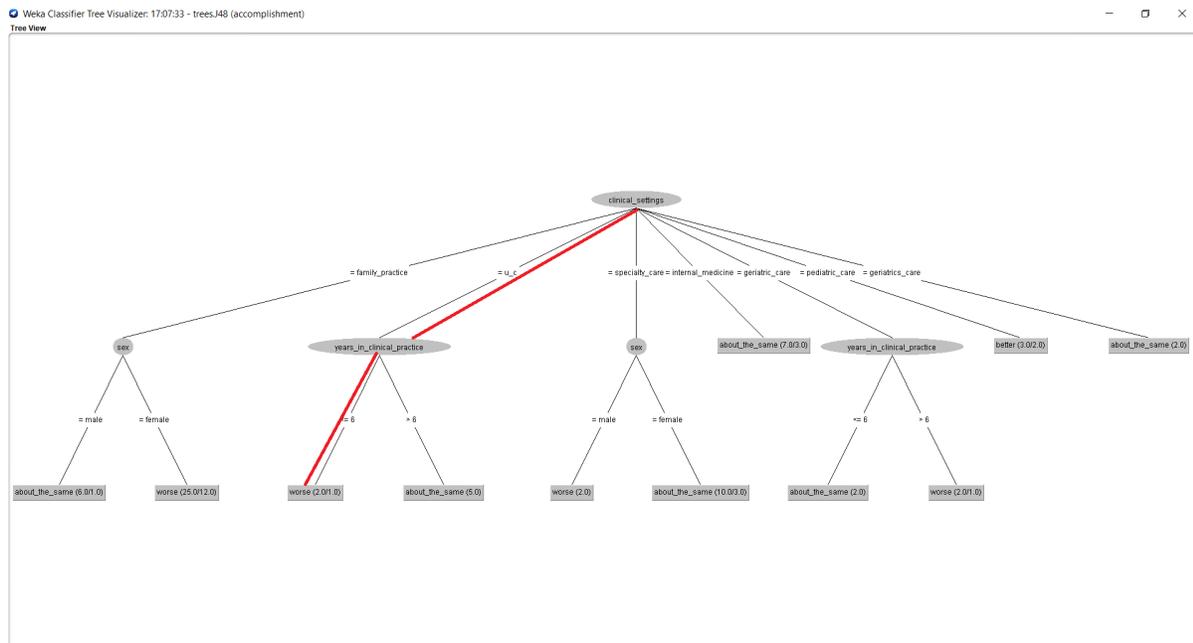
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## Appendix A

**Figure 1.** Decision Tree for Independent and Dependent Variable



**Appendix B****Table 1.** Provider's gender

| Gender | How many | Percent (%) |
|--------|----------|-------------|
| Male   | 13       | 19.40       |
| Female | 54       | 80.60       |
| Other  | 0        | 0%          |

**Table 2.** Provider's Age and Corresponding Categorical Variables

| Age range | Categorical   | How many | Percent (%) |
|-----------|---------------|----------|-------------|
| <30       | Young adults  | 1        | 1.49        |
| 30-39     | Middle adults | 20       | 29.85       |
| 40-49     | Mature adults | 18       | 26.87       |
| 50-59     | Older adults  | 17       | 25.37       |
| >60       | Senior adults | 11       | 16.42       |

**Table 3.** The Highest Degree Obtained by Provider

| Graduate Degree | How many | Percent (%) |
|-----------------|----------|-------------|
| Master's        | 25       | 37.31       |
| Doctorate       | 36       | 53.73       |
| Ph.D            | 6        | 8.95        |

**Table 4.** The Clinical Settings

| Clinical settings | How many | Percent (%) |
|-------------------|----------|-------------|
| Internal Medicine | 7        | 10.60       |
| Family Practice   | 31       | 46.36       |
| Pediatrics        | 3        | 4.54        |
| Geriatrics        | 4        | 6.06        |
| Specialty Care    | 12       | 18          |
| Urgent Care       | 7        | 10.60       |

**Table 5. Dependent Variables**

| Dependent variable           | Description   | Question categories  |
|------------------------------|---|--|
| Technology                   | <p>The question here was formulated as:<br/>How would you rate the technology aspect of telehealth? (reliable communication, software complexity, video, and audio)?</p> <p>The possible answers are:<br/>Excellent<br/>Good<br/>Average<br/>Poor<br/>Very poor</p> | <p>This question is categorized as a common concern because technology overlaps and concerns both provider and patient.</p>  |
| Frequency                    | <p>How often do you have telehealth consultations?</p> <p>The possible answers are:<br/>Every day<br/>At least once a week<br/>At least once a month<br/>At least yearly<br/>Never</p>  | <p>This question was categorized as common because telehealth visits' frequency depends on providers' and patients' agreement to visit via telehealth mode. Some patients might have barriers and refuse the virtual appointment</p> |
| Quality of care              | <p>How would you rate the quality of care delivered by telehealth to improve the health outcomes of my patients in comparison to usual care?</p> <p>The possible answers are:<br/>Much better<br/>Better<br/>About the same<br/>Worse<br/>Much worse</p>            | <p>This question was categorized as patient's centric because the mode of visit might directly affect the patient's health status</p>  |
| Cost of care for the patient | <p>How would you rate the cost of care to the patient delivered by telehealth compared to usual care?</p> <p>The possible answers are:<br/>Much better<br/>Better<br/>About the same<br/>Worse<br/>Much worse</p>   | <p>This question was categorized as patient's centric because the mode of visit mode dictates the patient's visit cost.</p>  |
| Timeliness of                | How would you rate the quality of care  | Question categorized as  |

|                           |  |  |
|---------------------------|--|--|
| care                      | <p>delivered by telehealth to address the timeliness of concerns for my patients compared to usual care?</p> <p>The possible answers are:<br/>         Much better<br/>         Better<br/>         About the same<br/>         Worse<br/>         Much worse</p>  | <p>common because it concerns both the provider and the patient. The provider for efficiency, and the patient for urgency.</p>   |
| Equity in access to care  | <p>How would you rate telehealth in addressing the equity in access among your patients (more access to care for hard to reach patients) in comparison to usual care?</p> <p>The possible answers are:<br/>         Much better<br/>         Better<br/>         About the same<br/>         Worse<br/>         Much worse</p> | <p>The question was categorized as common because it provides a sense of fulfillment for the provider and allows the patient to feel fairness in provided care.</p>                    |
| Sense of accomplishment   | <p>How would you rate the sense of accomplishment from your work via the telehealth approach compared to usual care?</p> <p>The possible answers are:<br/>         Much better<br/>         Better<br/>         About the same<br/>         Worse<br/>         Much worse</p>  | <p>The question is categorized as a provider's centric because it assessed the provider's feelings of accomplishment with provided care.</p>   |
| Feelings of connectedness | <p>How would you rate the feeling of connectedness from your work via the telehealth approach compared to usual care?</p> <p>The possible answers are:<br/>         Much better<br/>         Better<br/>         About the same<br/>         Worse<br/>         Much worse</p>   | <p>The question is categorized as a provider's centric because it assessed the provider's feelings of connectedness with the patient while providing care via the telehealth mode.</p> |
| Continuity of care        | <p>How would you rate continuity of care from your work via the telehealth approach compared to usual care?</p>  | <p>The question is categorized as a provider's centric because it assessed the provider's</p>  |

|                           |  |   |
|---------------------------|--|---|
|                           | <p>The possible answers are:<br/> Much better<br/> Better<br/> About the same<br/> Worse<br/> Much worse</p>   | <p>feelings toward continuity of care provided to the patients.</p>   |
| Finances for practice     | <p>How would you rate the financial situation of your practice to compare to usual care (reduced no-show rates, helps to meet quality measures, etc.)?<br/> The possible answers are:<br/> Much better<br/> Better<br/> About the same<br/> Worse<br/> Much worse</p>                | <p>The question is categorized as common because it might affect both providers and patients.</p>   |
| Patient's health status   | <p>Do you feel that the telehealth consultation service may influence the health status of your patients?<br/> The possible answers are:<br/> Greatly improve health<br/> Moderately improve health<br/> Minor health improvements<br/> No change<br/> Negative effect on health</p> | <p>The question is categorized as patient's centric because the patient's health might be directly affected by the mode of services provided (office visits versus telehealth).</p> |
| Provider's satisfaction   | <p>How would you rate your satisfaction with using telehealth and care provided in comparison to usual care?<br/> The possible answers are:<br/> Very satisfy<br/> Somewhat satisfy<br/> Neither satisfies<br/> Somewhat satisfy<br/> Very dissatisfy</p>                            | <p>The question is categorized as a provider's centric because it assesses a provider's feelings toward telehealth or office visits.</p>  |
| Deliver high-quality care | <p>Do you believe that telehealth is helping deliver high-quality care to your patient?<br/> The possible answers are:<br/> Always<br/> Often<br/> Sometimes<br/> Rarely<br/> Never</p>  | <p>The question is categorized as patient's centric because the visit mode can directly influence a patient's health.</p>   |

**Table 6. Categories of Dependent Variable**

| Category         | Dependent variables  |
|------------------|--|
| Provider centric | Provider satisfaction, sense of accomplishment, feeling of connectedness, and continuity of care compared to telehealth and usual care |
| Patient-centric  | Quality of care, health status influence, healthcare outcomes, and care cost compared to telehealth and standard care                  |
| Common           | Technology use rating, practice financial situation, equity in access, and frequency of use compared to telehealth and usual care.     |

**Table 7: Influence Matrix**

| Independent var/Dependent | Sex | Age | Clinical setting | Years in clinical practice | Highest Degree |
|---------------------------|-----|-----|------------------|----------------------------|----------------|
| Accomplishment            | 2   |     | 1                | 3                          |                |
| Connectedness             |     | 2   | 1                | 3                          |                |
| Continuity                |     |     | 2                | 1                          | 3              |
| Cost                      |     | 2   | 1                | 3                          |                |
| Equity                    |     |     | 1                | 3                          | 2              |
| Financial                 |     | 1   | 3                | 2                          |                |
| Frequency                 | 3   |     | 2                |                            | 1              |
| Health status             |     | 1   |                  | 2                          | 3              |
| High quality              |     | 2   | 1                | 3                          |                |
| Quality of care           |     | 2   | 1                | 3                          |                |
| Technology                | 3   |     |                  | 2                          | 1              |
| Compare to usual care     |     | 1   | 3                |                            | 2              |