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## Telehealth Education: Impact on Provider Experience and Adoption

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### Abstract

**Background:** COVID -19 propelled telehealth to the forefront of health care forcing many Advanced Practice Registered Nurses (APRNs) to incorporate telehealth into their practice without sufficient education. Lack of training has been cited as a barrier to telehealth adoption.

**Purpose:** This study evaluated provider adoption of telehealth based on the type of telehealth education received.

**Methods:** A quantitative survey of telehealth providers (n=224) was distributed through the listservs of 4 national organizations to determine whether there was a significant difference in provider levels of perceived usefulness, self-efficacy, perceived knowledge, satisfaction, and use of telehealth based on the type of telehealth education received.

**Results:** Telehealth adoption was significantly associated with the type of telehealth education received (vendor, online, written instructions only, on the spot).

**Conclusion:** With telehealth utilization expected to endure post-pandemic, faculty must incorporate the most effective telehealth education methods into APRN curricula, ensuring successful adoption by the future workforce.

### Keywords

Advanced Practice Registered Nurse; Nursing Education; Nurse Practitioner; Telehealth; Telemedicine

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Health care has advanced to include a wide variety of telehealth methods of care delivery including real-time audio-visual communications with the use of digital stethoscopes, otoscopes and exam cameras, asynchronous virtual visits, mobile health apps, remote monitoring devices, and more. Increasing capabilities of technologies over the years have led to significant growth and metamorphosis of the field of digital health.<sup>1</sup> Telehealth

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increases access to care, particularly for those living in rural underserved areas, improves health outcomes, and may reduce costs.<sup>2,3</sup> Despite its many benefits, adoption of telehealth remained lower than expected prior to the 2019 novel coronavirus (COVID-19) pandemic.<sup>4,5</sup> Telehealth concerns included reduced quality of care, reduced security and privacy, and risk of losing the interpersonal connection with patients.<sup>6</sup>

Stimulated by the COVID-19 pandemic, telehealth is becoming an integral part of health care rather than a unique method of care delivery. In 2016, it was estimated that 61% of health care institutions were using telehealth and between 40-50% of all United States hospitals had incorporated telehealth into their services.<sup>2</sup> During the 2020 COVID-19 outbreak many more facilities expedited mobilization of telehealth technology to facilitate patient screening, monitoring, and care as the Centers for Disease Control and Prevention recommended increased utilization of telehealth to reduce the volume of patients seeking care in person.<sup>7</sup> This resulted in a 154% increase in telehealth visits in March 2020.<sup>8</sup> During the pandemic, many payor policies, laws, regulations, and restrictions that had previously hindered telehealth adoption were modified at both the state and national level to reduce barriers to telehealth utilization. This contributed to the unprecedented increase in telehealth use.<sup>9</sup>

Though COVID-19 contributed to a 51% increase in telehealth use among health care providers, recent estimates are that it will remain at 21% post pandemic.<sup>10</sup> Provider acceptance, or willingness to use telehealth as an option for service delivery, is the key factor to the successful operation and continuation of telehealth services.<sup>11</sup> Lack of provider training has been identified as a barrier to telehealth adoption.<sup>12-14</sup> Another possible contributing factor to low utilization rates may be provider dissatisfaction with the telehealth encounter experience.<sup>15</sup> Technically challenged staff and resistance to change have been highlighted as the two most often cited barriers to telehealth adoption,<sup>3</sup> factors that may be overcome through education. Ensuring thorough telehealth education for APRNs may improve telehealth adoption and utilization. Sustaining telehealth programs that resulted from the pandemic will require education to ensure continued APRN acceptance and long-term adoption, as well as to ensure the necessary skills to enhance the patient-provider experience through telehealth.

Telehealth education incorporated into health care professional education and trainee education is scarce.<sup>16,17</sup> Recent studies highlight the importance of incorporating telehealth education into nursing programs<sup>16,18</sup> and medical student education.<sup>9,19,20</sup> The inclusion of telehealth in medical school curriculum increased significantly from 2013 through 2017 but plateaued after the 2015-2016 academic year.<sup>20</sup> A systematic review by Chike-Harris et al<sup>17</sup> found limited published information about telehealth integration into the curricula for APRNs, physician assistants, or physicians and a lack of consistency among the content and modalities implemented. Nurses and allied health professionals such as dietitians, speech language pathologists, licensed clinical social workers, physical therapists, occupational therapists, dental hygienists, and dentists provide care virtually in various settings, yet little is known about telehealth education for these professions.

Few studies have evaluated telehealth education for practicing providers, yet most providers currently delivering care via telehealth did not receive telehealth education as part of their formal academic education. Providers, including APRNs, are often expected to receive telehealth education in their clinical setting or through professional certification programs.<sup>21</sup>

A literature review by Edirippulige and Armfield,<sup>22</sup> related to education and training of current and future providers, identified 5 articles that described short continuing education programs and four that described formal university courses. The subject matter included topics related to defining telehealth and related terminology, clinical applications, evidence for clinical practice, telehealth design and implementation, technology, legal issues, and national strategies. Modalities in the described courses included theory, didactic, and hands-on practical skill development. Universities and professional organizations provided the education. Recent studies also support the effectiveness of telehealth simulation experiences in developing necessary telehealth skills.<sup>23,24</sup>

Though communication-related attributes have been noted to be important to patient perceived quality during a telehealth encounter,<sup>15</sup> there is little research on telehealth etiquette. Gustin et al<sup>25</sup> emphasize the importance of developing these soft skills to enhance the telehealth interaction and have found that the telehealth etiquette skills necessary to conduct a successful telehealth encounter can be gained through didactic, discussion and interactive modalities in a relatively brief period.

The aim of this study was to identify the type of telehealth education providers receive and whether there is a significant difference in provider levels of perceived usefulness, self-efficacy, perceived knowledge, satisfaction, and frequency of actual use of telehealth based on the type of telehealth education received. These factors are believed to reflect attributes of provider telehealth adoption.

## Methods

To evaluate the type of telehealth education received by health care providers of various types, a researcher developed electronic survey was disseminated through the listservs of 4 national organizations during the summer of 2020: The National Consortium of Telehealth Resource Centers (NCTRCs), Supporting Pediatric Research Outcomes and Utilization of Telehealth (SPROUT), the Center for Telehealth and e-Health Law (CTeL), and the School-Based Health Alliance (SBHA). A link to the RedCap survey was sent via email to telehealth providers identified through the listservs, along with an introductory statement which included information about the study and informed consent. The survey included a statement at the top indicating that if the participant had received the invitation to participate more than once, they should only complete the survey one time. Participants were invited to complete the anonymous survey within a 2-week time period. Reminder emails were sent at 1 week and 2 weeks after the initial email. Based on the response rate, 1 additional reminder was sent to members of the SPROUT listserv 1 week later. Eligible provider types included physicians, APRNs, physician assistants, licensed clinical social workers, dietitians, psychologists, physical therapists, dentists, dental hygienists, occupational therapists, and speech language pathologists who have ever practiced via

telehealth. Institutional Review Board approval was granted as exempt by the authors' University and the American Academy of Pediatrics.

### Instrument

The background variables of telehealth education type and modality were assessed through researcher-developed survey questions. The type of telehealth education received included none, formal education (College, University), telehealth vendor provided education and on the spot orientation. The type of telehealth education modality received included didactic (lecture), experiential simulation, clinical/hands on training, telehealth project development, and written instructions (handouts) only. Respondents were invited to select all that apply.

The provider levels of perceived usefulness, self-efficacy, perceived knowledge, satisfaction, and frequency of actual use of telehealth were measured by 4 separate sets of survey questions. Provider perception of telehealth usefulness and self-efficacy was measured by the Technology Acceptance Model (TAM) revised by Lewis<sup>26</sup> to reflect actual user experience rather than theoretical perceived usefulness and ease of use.

Participants responded to a 7-point Likert scale ranging from 1 (extreme disagreement) to 7 (extreme agreement). The first 6 questions reflected the participants perception of actual usefulness of telehealth while the second 6 questions reflected their perception of actual telehealth ease of use (self-efficacy). The sum of the ratings from the first 6 items provides an overall score of perceived usefulness of telehealth that can range from 6 to 42 with higher scores indicating higher perceived usefulness. The sum of items 7 through 12 provide an overall score of perceived ease of use of telehealth ranging from 7 to 42 with higher scores indicating higher perceived ease of use. This score reflects the provider's level of self-efficacy. The results of these 2 sections are expected to predict intention to use telehealth.

The original refined TAM scale exhibited convergent and discriminant validity as well as factorial validity.<sup>27</sup> The Cronbach alpha reliability for perceived usefulness was 0.97 and 0.98 in the first two studies respectively and the reliability for the perceived ease of use was 0.91 and 0.94. The TAM modified to reflect user experience was shown to produce the same alignment of items with the perceived usefulness and perceived ease of use factors consistent with the alignment in the original TAM.<sup>26</sup>

Each of the 3 researcher developed tools (perceived knowledge, frequency of actual use, and satisfaction with telehealth) was evaluated by 5 telehealth experts from across the United States for face and content validity as well as readability. Perceived telehealth knowledge was assessed using a 20-question researcher developed questionnaire designed to determine how familiar respondents were with various components of telehealth. Participants rated their level of familiarity with 20 aspects of telehealth knowledge on a 5-point Likert scale ranging from 1 (extremely unfamiliar) to 5 (extremely familiar). The total of the scores can range from 20 to 100 with higher scores indicating more perceived telehealth knowledge. The Cronbach's alpha for the perceived knowledge scale was .97, indicating high reliability and internal consistency.

The frequency of actual telehealth use was assessed using a 6-question researcher developed tool. Respondents rated the frequency of their own utilization of various types of telehealth modalities over the previous 12 months using a 4-point Likert scale where 1 indicated never having used the modality and 4 indicated frequently having used the modality. The overall score can range from 6 to 24 if all modalities are included, with higher scores indicating higher utilization of telehealth. The total score was used after the tool was established to have internal consistency using Cronbach's alpha (.73).

The provider's level of satisfaction with telehealth was assessed using 2 researcher-developed sets of questions. The first is a 4-question Likert scale designed to assess provider satisfaction in 4 specific domains: accuracy of assessment via telehealth, confidence in diagnosis made via telehealth, efficiency of telehealth, and provider-patient relationship. Participants rated each of these domains on a 6-point Likert scale, ranging from 1 (strongly disagree) to 6 (strongly agree). The total score can range from 4 to 24 with higher scores indicating higher satisfaction. One additional question was included to assess the overall level of satisfaction with telehealth. The participant rated their satisfaction with telehealth on a 4-point Likert scale ranging from 1 (extremely dissatisfied) to 4 (extremely satisfied). Internal consistency was established using Cronbach's alpha (.89).

## Data Analysis

Descriptive statistics, including sums and percentages, were used to identify the portion of study participants that received each of the listed types of telehealth education and telehealth education modalities. To determine if there is a significant difference in provider level of perceived usefulness, self-efficacy, perceived knowledge, satisfaction, and frequency of actual use of telehealth based on the type of telehealth education received the data was collapsed to no telehealth education, vendor education, on the spot education, written instructions only and online education. Formal university education was excluded from the analysis as the sample size was too small to draw generalizability. Difference testing using the independent t-test with equal variances not assumed was completed to compare the mean scores on each of the 5 scales (usefulness, self-efficacy, knowledge, use, satisfaction) for each type of telehealth education to mean scores for no education.

## Results

Of the 224 respondents, the majority (79.5%) were female, and the mean age was 49 years. Most held master's degrees (56.3%) and the majority were behavioral health providers (38.4%) or APRNs (21%) though a variety of healthcare provider roles were represented. Most of the providers reported working in school-based health (39.7%) with the second most common practice site being the hospital setting (24.1%). The majority (68.3%) of the respondents reported having practiced via telehealth for less than 1 year with only 7.6% conducting virtual care for more than 10 years. Demographic data for respondents are shown in Supplemental Digital Content, Table.

Most respondents had received telehealth education (n=160, 71.4%) with the majority reporting on the spot education (n=98, 43.8%), followed by vendor education (n=82, 36.6%). Only 16 respondents (7.1%) reported having received formal university education.

A variety of telehealth education modalities were reported with the most common modalities being clinical hands-on training (n=80, 35.7%) and online continuing education programs (n=80, 35.7%). Other modalities are reported in Table 1.

The largest percent of the study population had practiced via telehealth for less than 1 year, despite distributing the survey through 3 telehealth specific organizations. This emphasizes the expansion of telehealth during the pandemic as the study was completed in the summer of 2020. Results indicate that any education, regardless of the type, was significantly better than no education at increasing provider levels of perceived usefulness, self-efficacy, perceived knowledge, use, and satisfaction with telehealth (Table 2). Those that received education from vendors or online scored better in all categories than those that received only written handouts or on the spot education. There was no significant difference between those that did not receive education and those that received education through written materials only and their frequency of actual telehealth use, suggesting that written instructions alone do not enhance provider adoption.

## Discussion

While telehealth use has grown significantly since the advent of the COVID-19 pandemic, little attention has been directed at educating health care providers on the necessary skills for conducting telehealth visits. Whether this is related to a lack of perceived necessity, lack of resources or time, it is essential that this important information be integrated into existing and future telehealth practice and academic programs. Findings indicate that few health care professionals are educated on telehealth during their formal academic education. Lack of faculty expertise, technology and/or opportunities for clinical experiences may have contributed to the limited inclusion of telehealth education in various health professions programs. This study underscores the need to integrate telehealth education into health care provider curriculums, including those of graduate nursing programs, and to educate the current workforce.

Given the expansion of telehealth in recent years, the need for established competencies for APRNs has become clear. The National Organization of Nurse Practitioner Faculties (NONPF) supports the integration of telehealth into nurse practitioner (NP) education and provides a suggested list of competencies, yet they are not required to be included in NP curricula.<sup>28</sup> A Health Resources and Services Administration funded workgroup recently used the Four P's of Telehealth framework to develop a comprehensive list of competencies for APRN telehealth education and practice.<sup>29</sup> Using the Delphi method, the group aligned existing and new competencies under 4 domains: Planning: identifying necessary information to initiate a telehealth program, Preparing: establishing a telehealth program, Providing: delivering care via telehealth, and Performance evaluation: using data to assess, analyze, and refine telehealth programs.<sup>29</sup> Though these competencies have been well received, they have not yet been adopted. The recently released *Essentials: Core Competencies for Professional Nursing Education* by the American Association of Colleges of Nursing includes informatics and health care technologies as the eighth domain and establishes competencies for entry-level and advanced-level nursing education.<sup>30</sup> These competencies, however, do not specifically address key components necessary for a

successful telehealth encounter such as telehealth etiquette and webside manner or the necessary skills to complete a thorough assessment virtually.

As central figures in telehealth visits, health care providers hold much of the responsibility for the success of a telehealth encounter. Evaluations of patient experience of care are a critical component of many federal, state, and private value-based programs. It is anticipated that by 2023 measures of patient experience will be weighted higher than clinical outcome measures in Centers for Medicare and Medicaid Services star ratings for Medicare Advantage plans.<sup>31</sup> Providers who received telehealth education had significantly higher scores than those who had no education on perceived usefulness, self-efficacy, perceived knowledge, frequency of actual telehealth use and satisfaction with telehealth. Each of these components reflects key characteristics that may directly affect the patient and provider experience during a telehealth encounter. Participants who received education from vendors or online scored better in all categories than those that received only written handouts or On the Spot education.

The most effective methods of education for increasing a provider's score on perceived usefulness and perceived knowledge were vendor education and online education. It would be important to understand what characteristics of vendor or online education make them most effective. Both methods require greater preparation for delivery and may potentially provide for more interaction between the learner and the equipment. A multimodal framework for APRN telehealth education has been recommended that includes didactic education, experiential simulation, projects, and formal clinical telehealth experiences.<sup>16</sup> Understanding which of these components are reflected in the online and vendor education may further support the importance of a multimodal approach. Formal education could not be thoroughly evaluated in this study due to the low number of providers that had received it. The number of years in practice was not assessed. It is possible that respondents had graduated from their academic programs prior to the expansion of telehealth, which would have limited the number of programs offering telehealth in the university setting. This may contribute to underestimating the number of current or recent students who received formal academic education in telehealth.

Given the large number of surveys distributed to health care providers during the pandemic, the response rate may have been lower than if it had been distributed at a different time. The total number of contacts who received the invitation to participate through the listservs of the organizations is not known. Therefore, the overall response rate cannot be calculated. As a result, the sample may or may not be representative. Furthermore, extrapolation to all health care professions is limited by the small number of participants from certain health care occupations. Additionally, the study measures perceived knowledge rather than actual knowledge. Participants may have a higher perception of their telehealth knowledge than is accurate. Considering COVID-19, participation in telehealth initiatives may have been required. As such, the actual utilization reported may not reflect true provider adoption of telehealth.

## Conclusions

This is the first study undertaken to identify the type of telehealth education practicing telehealth providers receive and how this education relates to provider adoption. While most respondents did report having received telehealth education, few received formal university education. Telehealth education of any type is significantly better at increasing provider levels of perceived usefulness, self-efficacy, knowledge, use and satisfaction with telehealth. Those who received education from vendors or online scored better in all categories than those that received only written or on the spot education. Future exploration of the data will focus on characteristics of the education that are most effective. Identifying best practices for telehealth education that contribute to provider adoption will enhance the quality of virtual care by strengthening the patient and provider experience. Incorporating this information into the development of telehealth education and training models is necessary to ensure successful implementation of telehealth programs, increased telehealth utilization, and to enhance the quality of the telehealth encounter from both the APRN and patient perspectives. This information may be used to guide the establishment and refinement of core competencies for telehealth education among APRN students and providers. Future replication of this study, as more academic programs integrate telehealth education into their curriculums, will contribute to further refining the most effective methods of education to enhance APRN adoption of telehealth.

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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**Table 1.**

## Education Modality Received

<b>Modality</b>	<b>n (%)</b>
Clinical Hands-On Training	80 (35.7)
Online Continuing Education Program	80 (35.7)
Written Instructions Only (handout)	67 (29.9)
Didactic	57 (25.4)
Experiential Simulation	48 (21.4)
Telehealth Project Development	45 (20.1)

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**Table 2.**

Mean Provider Scores on Each Scale by Education Type

<b>Outcomes</b>	<b>No Education M (SD)</b>	<b>Vendor M (SD)</b>	<b>On the Spot M (SD)</b>	<b>Written M (SD)</b>	<b>Online M (SD)</b>
Usefulness	24.9 (10.5)	31.3 (8.8)	29.3 (8.3)	29.7 (8.9)	30.5 (9)
Self-Efficacy	26.7 (10.7)	31.6 (8.2)	30.7 (8.2)	31.1 (8.3)	31.6 (8.4)
Knowledge	57.3 (21.8)	72.9 (15.4)	68.2 (17.3)	70.6 (17.5)	72.3(17.1)
Use	9.9 (4.1)	11.9 (4.8)	11.3 (3.9)	11.1 (4.5)	11.9 (4.4)
Satisfaction	15 (5.4)	18.2 (4.1)	17.6 (4.2)	17.7 (4.6)	18.5(3.8)

Differences (*t-test*) between types of education versus no education were significant at  $p < .05$  for all outcomes for all types of education except written instructions only related to frequency of telehealth use.