RESEARCH ARTICLE

PHYSICIAN PERCEPTIONS OF STRESS AND TELEMEDICINE

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ABSTRACT:

Introduction: Telemedicine is an emerging field in which physicians can interact electronically with patients to improve health. During the COVID-19 pandemic, the use of telemedicine has grown exponentially. As physicians work to provide equally high-quality care for their patients remotely, their experiences must be considered.

Methods: This study utilized an online anonymous survey of physicians to assess their satisfaction, comfort level and student involvement when using telemedicine for patient care.

Results: Overall, physicians' experiences with the integration of telemedicine into their practices varied based on gender, the presence of medical students, age and prior experience with telemedicine. Physicians are more comfortable with telemedicine now than they had been prior to the start of the COVID-19 pandemic, and physicians who had prior experience were less likely to find it stressful to incorporate. Physicians in both the youngest (30–39 years old) and oldest (60 and older) categories reported the highest levels of satisfaction with telemedicine. Female physicians indicated they will be more likely to incorporate more telemedicine into practice in the future, beyond the COVID-19 pandemic. Of the specialties surveyed, family physicians report the lowest levels of comfort and satisfaction with telemedicine.

Conclusion: Physician respondents of this survey provided valuable data on the perceptions of the widespread incorporation of telemedicine during the COVID-19 pandemic. Further research can follow which physicians choose to keep telemedicine integrated into their practices and how the demand for these virtual visits may change in the coming months.

BACKGROUND

Telemedicine, also called telehealth, is an emerging field in which physicians are able to interact electronically with patients to improve health. Telemedicine can be performed through virtual platforms such as email, telephone and video, and can provide or augment care to a multitude of patients.[1] The benefits of telemedicine include increasing access to care in areas where there are provider shortages, decreasing travel burden on patients and assisting in diagnosis when utilizing video consultations.[2] In recent years, telemedicine has been implemented in all facets of health—from monitoring dialysis and diabetes outcomes to primary care and ophthalmology.[3,4,5,6] During the novel coronavirus (COVID-19) pandemic, the use of telemedicine has grown exponentially in an effort to continue to see patients and manage their care.[7] The unprecedented era of social distancing and overloaded hospital systems has led many primary care providers and specialists to rapidly develop these capabilities in their practices.[8] As we have seen with other natural disasters and emergency situations, the increased use of telemedicine and tele–mental health helps clinicians provide quality care remotely and safely.[9]

As physicians work to provide equally high-quality care for their patients remotely, patient outcomes and satisfaction in response to these changes must be considered. Though its use was encouraged by the pandemic, telehealth plays the role of improving patient care despite extenuating environmental circumstances. Studies of post-traumatic stress disorder treatment delivered through telehealth and in-person services found that patient satisfaction levels were equivalent.[10] For diseases like type 1 diabetes, regular check-ins with patients about their challenges and goals are important for preventing acute illness and hospitalizations. One

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way to increase the consistency of patient-reported outcomes is to deliver more patient-centered care through methods such as telehealth visits.[11]

Recently, more research has focused on assessing perceptions of telemedicine from the perspective of the provider teams, primary care offices, specialists and office staff. Physicians have been noted to feel positively toward the incorporation of telemedicine into their practices, citing benefits such as improved access to services and increased care delivery, quality control of screening programs, and reduced health care costs.[12,13] During the pandemic, a study of rheumatologists found that telerheumatology is helpful for increasing access to care and quality of care, but more helpful for management of rheumatologic conditions than for initial diagnosis. Another study found that switching to telemedicine was well accepted in rheumatologists' practice, and not making the switch could have deprived approximately three-quarters of these patients of proper medical care, leading to self-medication or stopping of their drugs.[14] Other studies assessing provider perceptions of telemedicine in palliative care demonstrated positive perceptions, with providers reporting that they felt telemedicine was safest when care was delivered by an experienced provider, patients had access to a reliable caregiver and the patient was assessed at least once.

Physicians have also cited drawbacks and barriers to providing care. Lack of a comprehensive physical exam is often cited as the biggest barrier.[15] Though this issue can be somewhat mitigated through detailed descriptions of techniques, and osteopathic physicians would do well to know that osteopathic manipulative treatment can still occur through similar descriptions,[16] this often involves reliance on caretakers or family members of the patients. Other drawbacks cited include a breakdown in the relationship between health professional and patient, a breakdown in the relationships among health professionals, issues concerning the quality of health information, organizational and bureaucratic difficulties, and difficulty implementing new technologies and associated training.[12,17,18] While research has been conducted assessing telehealth in the past, our project uniquely surveyed physicians during the widespread rapid shift into telehealth, where some providers were left with this as their only option to see patients. During this time, some physicians might have made the personal choice to switch to conducting telehealth visits, while others were directed to do so by their employer or group. Our project aimed to better assess the perception, comfort level and experiences of physicians using telehealth during the onset of the COVID-19 pandemic. By gathering more data on physicians' experiences with telehealth, we can improve the experience for both physicians and patients to ultimately provide better care.

METHODS

This study used an online anonymous survey developed by the researchers (Appendix A). The perceived stress scale[19] (PSS) was included as well to assess stress levels of study participants. PSS is the most widely used instrument for measuring the perception of stress. It is a measure of the degree to which situations in one's life are appraised as stressful and can evaluate the degree to which individuals believe their life has been unpredictable, uncontrollable and overloaded. The assessed items are general in nature rather than focusing on specific events or experiences.[20] It is based on the transactional theory of stress—a theoretical approach that focuses on how individuals perceive stress, which is seen as the result of an imbalance between situational demands and coping resources. A higher score on the PSS indicates a higher stress level, and the score has been associated with health outcomes such as hormonal changes, cardiometabolic disease, insomnia and decreased cognition.[21] Given the impact of the pandemic and its global effects on mental health, we felt this was an appropriate tool for measuring the stress of the survey respondents. Most, if not all, respondents would likely label the COVID-19 pandemic as a "stressful event"; however, how each person internalizes, copes with and is impacted by that stress will differ. The questions in the PSS ask about feelings and thoughts during the previous month. In each case, respondents are asked how often they felt a certain way. PSS scores are obtained by reversing responses. Positively stated items on the PSS scale (statements 28, 29, 31 and 31 in Appendix A) are reversed (1=5, 2=4, 3=3, 4=2 and 5=1), then summing across all scale items.

The survey was distributed online via Qualtrics and was sent via email invitation to all physician members of the New Jersey Association of Osteopathic Physicians and Surgeons (NJAOPS) with permission of the NJAOPS executive director. It was distributed in May and June 2020, approximately 2–3 months into the stay-at-home orders resulting from the COVID-19 pandemic. The survey was in multiple-choice format, allowing for objective data. Using five-point Likert scale responses, subjects were asked about their satisfaction with and comfort using telemedicine for patient care. There are 5 levels of satisfaction: very satisfied (a 5 on the Likert scale), satisfied (4), neutral (3), dissatisfied (2) and very dissatisfied (1). Similarly, there are 5 comfort levels: very comfortable (a 5 on the Likert scale), comfortable (4), neutral (3), uncomfortable (2) and very uncomfortable (1). Therefore, a higher score means the participant is more satisfied and comfortable with telemedicine. Participants were also asked about their perceptions of medical student involvement in telemedicine. This study was approved by the Rowan University IRB.

Respondents were also asked demographic questions including age (categorized into age groups of 30–39, 40–49, 50–59, 60–69, or 70–79 years old), race and specialty. Additional questions included whether the respondents had any experience with telemedicine prior to the COVID-19 pandemic, whether medical students had been included in their telemedicine visits, and what percentage of patients were seen via telemedicine.

RESULTS

Of the approximately 5,000 physicians potentially reached through the NJAOPS mailing list, only 83 completed the survey. Of the respondents who identified their gender, 35 identified as female and 34 identified as male. Of the physicians who responded to the question about specialty, the breakdown was: 31 in family medicine, 1 in dermatology, 9 in internal medicine or a subspecialty, 7 in pediatrics or a subspecialty, 1 in physical

medicine and rehabilitation, 11 in psychiatry, 1 in surgery or a subspecialty, and 11 in other fields not indicated. Overall, physicians' experiences with the integration of telemedicine into their practices varied based on gender, the presence of medical students, age and prior experience with telemedicine. To test the statistical significance in terms of mean PSS scores among these groups, the data was analyzed using *t* tests (if there were 2 categories) and one-way analysis of variance (if there were more than 2 categories), assuming all the physicians are independent. Significance level α=0.1 was used through the study. Statistical Software R and JMP were used for the analyses. The results show that different age groups have significant levels of perceived stress, yet PSS scores are not significantly different among variations in gender, race, prior experience with telemedicine, the presence of medical students or telemedicine volume. Table 1 summarizes the PSS scores across the demographics of the physicians who responded.

TABLE 1:

Summary of Perceived Stress Scores

Category	N	Mean	Standard Deviation
Gender			
Female	35	14.94	5.49
Male	34	14.97	9.47
Race			
White	62	15.38	7.64
Black	2	13.2	1.41
Other	5	6	7.69
Age			
30–39	10	17.5	6.87
40–49	15	14.53	7.62
50–59	15	18.4	9.60
60–69	11	11.18	5.90
70–79	4	4.5	1
Prior Telemedicine Experience			
No	55	15.58	7.76
Yes	14	12.5	6.95
Medical Students			
No	28	15.10	6.71
Yes	39	14.10	8.00
Telemedicine Volume			
<25%	16	18.5	9.05
25%–49%	8	14.25	6.04
50%–74%	5	15.2	5.36
75%–99%	14	14.86	8.50
100%	20	15.55	5.32

Regarding the perception of telemedicine, the primary results of this study show physicians aged 30–59 years old had the highest levels of perceived stress, with age group 50–59 years old ranking first in that category. Physicians aged 70–79 years had the lowest levels of perceived stress. Interestingly, it was both the youngest (30–39 years old) and oldest (60 and older) who reported the highest levels of satisfaction with telemedicine (*P*=.0374). While they reported high levels of satisfaction with telemedicine, physicians age 30–49 were more likely to find the pandemic stressful, and physicians aged 60 and older were less likely to find the pandemic stressful (*P*=.0024).

Perhaps not surprisingly, physicians who had not previously used telemedicine were more likely to find it stressful to incorporate (*P*=.0702). Along those same lines, physicians were more comfortable with telemedicine at the time of the survey than prior to the pandemic (*P*<.0001). This was further explored by gender and it was found that, while not statistically significant, female physicians were more comfortable with telemedicine than male physicians (*P*=.0862). Female physicians also indicated they will be more likely to incorporate more telemedicine into practice in the future, beyond the COVID-19 pandemic (*P*=.007).

Finally, among the differences in specialties, family physicians indicated the lowest levels of satisfaction (*P*=.0172) and lowest levels of comfort (*P*=.0282) regarding use of telemedicine.

DISCUSSION

Overall, physicians' experiences with the integration of telemedicine into their practices varied based on gender, the presence of medical students, age and prior experience with telemedicine. Physicians are more comfortable with telemedicine now than they had been prior to the start of the COVID-19 pandemic. This may not be surprising, but it is important, as many physicians worked to rapidly integrate telemedicine into their practices, and, in doing so, their offices made meaningful, long-term changes. Newly comfortable with this modality to provide care to patients, many physicians may continue to utilize telemedicine after the resolution of the COVID-19 pandemic. This idea of continued use of telemedicine is supported by physician responses indicating that those who have utilized telemedicine are more likely to incorporate telemedicine into their practice in the future after the COVID-19 pandemic, and those who are satisfied with telemedicine are more likely to use it again in the future.

Physicians who have not previously used telemedicine are more likely to find utilizing telemedicine more stressful. This can be attributed to the myriad of stressors and new variables associated with converting to a virtual practice. The challenges faced by switching to telemedicine visits impact all aspects of patient care and office efficiency; such challenges include difficulty building and maintaining relationships with patients; difficulty assessing the patient; technological difficulties for patients, families, office staff and physicians; lack of continuity of care; and need for additional technological training. These changes and challenges pose a large learning curve for physicians and their practices, and it becomes

clear how prior experience would mitigate this stress. By further examining some of these stressors and variables, we can learn how to most efficiently incorporate and maintain telemedicine in practices to provide efficient and patient-centered care.

The survey found that female physicians are more comfortable with telemedicine than male physicians, and female physicians were also more likely to incorporate telemedicine into their practices in the future. This pattern is consistent with data acquired by Doximity, where female physicians were adopting telemedicine at a much higher rate (25%) than male physicians.[22] This could be related to female physicians being more likely to work part time[23] and more likely to be interested in the idea of seeing patients from home or somewhere other than the traditional medical office. Though some physicians partake in their telemedicine visits in their traditional offices, many of them are able to participate in these visits from the comfort of their own homes. This allows them to expand their hours, eliminate their commute times and better accommodate their lifestyles. It is also an attractive option for physicians who are parents or caregivers, have burdensome commutes, or also work in academic medicine. Though this survey only reflected a preference for female physicians, it has implications for benefits for many physicians to achieve balance in their career, as well as improved work-life balance and integration.

Physicians who had medical students with them during the integration of telemedicine reported less stress than those who did not have students, though this difference was not found to be significant. This could be attributed to offices that utilized medical students as a resource during times of rapid change in their offices. Medical students have utility in helping office staff contact patients, setting up video or phone appointments, scribing, triaging, and waiting with patients virtually before their visit.[24,25] A shorter wait time, more assistance and more virtual human contact for patients may also be associated with higher patient satisfaction, which could extend to an improved experience for the physician. The added component of teaching via telemedicine may provide teaching attending physicians with a sense of normalcy and opportunity for mentorship, something that may boost overall satisfaction and decrease stress for teaching attending physicians. Though the educational experience is vastly different and can be lacking in areas such as physical diagnostic skills, patient volume and diversity of pathologies, it provides other unique learning opportunities such as triaging patients, developing virtual diagnostic skills and building patient rapport virtually, making for a potentially unique experience for both the physician and the student.

Physicians ages 30–49 are more likely to find the pandemic stressful, according to our findings. Physicians who are 60 years and older are less likely to find the pandemic stressful. This is consistent with data on anxiety, depression and emotional response during the pandemic stratified by age group. A study using PSS, General Anxiety Disorder-7 and Patient Health Questionnaire-9 scales found the highest response among those aged 25 years or younger and lowest among those aged 60 years or older, with prevalence rates and the mean scores for stress, anxiety and depression on standardized scales decreasing from younger to older individuals.[26] Similar results were found examining symptoms of anxiety disorder or depressive disorder, COVID-19–related trauma- and stressor-related disorder, initiation of or increase in substance use to cope with COVID-19–associated stress, and serious suicidal ideation.[27] This could be due to younger adults experiencing more coronavirus-related daily stressors, having lower perceived coping efficacy, having a higher likelihood of being a parent or caregiver, or having a higher prevalence and/or willingness to report anxiety.[28]

Finally, perhaps the most interesting finding of this study is that family physicians report the lowest levels of comfort and satisfaction with telemedicine. While we did not investigate a cause for this, one could attribute a number of potential etiologies. The rapid transition to telemedicine at the start of the COVID-19 pandemic was likely difficult for most physicians, but family physicians often have long-standing relationships with their patients, and switching to a more physically distant, remote type of interaction may be challenging for some. Additionally, the physicians surveyed practice in a location which had higher-than-average rates of COVID-19 cases at the time of the study. Many physicians likely felt a great deal of pressure to accurately triage and diagnose their patients via telemedicine encounters. While these causes are speculative, one can assume the pandemic played a major role in the physicians' feelings toward telemedicine. Further research is needed in this area.

This study is limited by the number of responses and the limited geographical location of those who responded. Further research could extend into other states to compare the use of telemedicine across other regions. Further research should also evaluate the causes of some of these findings, such as why family physicians are less comfortable and satisfied with telemedicine and why female physicians overall seem more comfortable with telemedicine. Additionally, it would benefit medical schools to examine why physicians with students seem to view telemedicine more positively than physicians without students. This could serve as an important factor in preceptor recruitment and training. It will be worth examining how these perspectives change as the need for socially distanced learning decreases.

Telemedicine has provided a unique opportunity for both patients and physicians to engage in care remotely that might be preferable for some. Further research could follow which physicians choose to keep telemedicine integrated into their practices, as well as how and why they make that choice. Further research can also follow how the demand for these virtual visits changes as the need for social distancing decreases in the coming months.

CONCLUSION

In summary, physician respondents of this survey provided valuable data on the perceptions of the widespread incorporation of telemedicine during the COVID-19 pandemic. There are many factors in determining one's comfort, satisfaction and stress, and this study serves as a first step in determining some of these dynamics.

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AUTHOR DISCLOSURE(S)

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APPENDIX A:

PHYSICIAN PERCEPTION OF TELEMEDICINE SURVEY

** Indicates question logic was used based on prior responses*

1. Have you utilized telemedicine for patient care?
   1. Yes
   2. No

2. *If so, how recently did you first use telemedicine?
   1. <2 weeks ago
   2. 2–6 weeks ago
   3. 7–12 weeks ago
   4. 3–6 months ago
   5. >6 months ago

3. *If so, what percentage of your typical patient volume are you currently seeing via telemedicine?
   1. 100%
   2. 75%–99%
   3. 50%–74%
   4. 25%–49%
   5. <25%

4. *If using telemedicine, please rate your overall level of satisfaction with your experience with telemedicine.
   1. Very dissatisfied
   2. Dissatisfied
   3. Neutral
   4. Satisfied
   5. Very satisfied

5. In the past 2 years, have you had any medical students work with you in your practice?
   1. Yes
   2. No

6. *If using telemedicine, have you had any medical students working with you using telemedicine?
   1. Yes
   2. No

7. *If so, please rate your level of satisfaction with the student(s) and their participation in telemedicine.
   1. Very dissatisfied
   2. Dissatisfied
   3. Neutral
   4. Satisfied
   5. Very satisfied

8. Prior to the COVID-19 pandemic, did you have any experience with telemedicine as a physician?
   1. Yes
   2. No

9. Please rate your level of comfort with telemedicine prior to the COVID-19 pandemic.
   1. Very uncomfortable
   2. Uncomfortable
   3. Neutral
   4. Comfortable
   5. Very comfortable

10. Please rate your current level of comfort with telemedicine.
    1. Very uncomfortable
    2. Uncomfortable
    3. Neutral
    4. Comfortable
    5. Very comfortable

11. *Please rate your level of comfort in having a student present a case to you via telemedicine.
    1. Very uncomfortable
    2. Uncomfortable
    3. Neutral
    4. Comfortable
    5. Very comfortable

12. *I feel a telemedicine clerkship is equal to the traditional in-person clerkship experience for medical students.
    1. Strongly agree
    2. Agree
    3. Neutral
    4. Disagree
    5. Strongly disagree

13. I feel that telemedicine can serve as an effective replacement for in-person clerkships for medical students during the COVID-19 pandemic.
    1. Strongly agree
    2. Agree
    3. Neutral
    4. Disagree
    5. Strongly disagree

14. I feel that telemedicine is an effective replacement for in-person clerkships regardless of the COVID-19 pandemic.
    1. Strongly agree
    2. Agree
    3. Neutral
    4. Disagree
    5. Strongly disagree

15. I feel that telemedicine should be a required part of medical school curricula.
    1. Strongly agree
    2. Agree
    3. Neutral
    4. Disagree
    5. Strongly disagree

16. Do you feel more comfortable interacting with patients in person or via telemedicine?
    1. Telemedicine
    2. In person
    3. No difference
    4. I don't know

17. *Do you feel more comfortable interacting with medical students in person or via telemedicine?
    1. Telemedicine
    2. In person
    3. No difference
    4. I don't know

18. I am likely to incorporate more telemedicine into my practice in the future.
    1. Strongly agree
    2. Agree
    3. Neutral
    4. Disagree
    5. Strongly disagree

19. The COVID-19 pandemic has been stressful for me.
    1. Strongly agree
    2. Agree
    3. Neutral
    4. Disagree
    5. Strongly disagree

20. Incorporating telemedicine into my practice has been stressful.
    1. Strongly agree
    2. Agree
    3. Neutral
    4. Disagree
    5. Strongly disagree

21. I feel my patients have the appropriate technology and access necessary for telemedicine.
    1. Strongly agree
    2. Agree
    3. Neutral
    4. Disagree
    5. Strongly disagree

22. I feel I have the appropriate technology and access necessary for telemedicine.
    1. Strongly agree
    2. Agree
    3. Neutral
    4. Disagree
    5. Strongly disagree

23. I feel access to telemedicine should remain a priority following the COVID-19 pandemic.
    1. Strongly agree
    2. Agree
    3. Neutral
    4. Disagree
    5. Strongly disagree

24. Have you had to furlough or lay off any staff members as a result of the pandemic?
    1. Yes
    2. No
    3. Not my decision

The questions in this scale ask you about your feelings and thoughts during the last month. In each case, you will be asked to indicate *how often* you felt or thought a certain way.

25. In the last month, how often have you been upset because of something that happened unexpectedly?
    1. Never
    2. Almost never
    3. Sometimes
    4. Fairly often
    5. Often

26. In the last month, how often have you felt that you were unable to control the important things in your life?
    1. Never
    2. Almost never
    3. Sometimes
    4. Fairly often
    5. Often

27. In the last month, how often have you felt nervous and "stressed"?
    1. Never
    2. Almost never
    3. Sometimes
    4. Fairly often
    5. Often

28. In the last month, how often have you felt confident about your ability to handle your personal problems?
    1. Never
    2. Almost never
    3. Sometimes
    4. Fairly often
    5. Often

29. In the last month, how often have you felt that things were going your way?
    1. Never
    2. Almost never
    3. Sometimes
    4. Fairly often
    5. Often

30. In the last month, how often have you found that you could not cope with all the things that you had to do?
    1. Never
    2. Almost never
    3. Sometimes
    4. Fairly often
    5. Often

31. In the last month, how often have you been able to control irritations in your life?
    1. Never
    2. Almost never
    3. Sometimes
    4. Fairly often
    5. Often

32. In the last month, how often have you felt that you were on top of things?
    1. Never
    2. Almost never
    3. Sometimes
    4. Fairly often
    5. Often

33. In the last month, how often have you been angered because of things that were outside of your control?
    1. Never
    2. Almost never
    3. Sometimes
    4. Fairly often
    5. Often

34. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?
    1. Never
    2. Almost never
    3. Sometimes
    4. Fairly often
    5. Often

35. Please indicate your age ____

36. Which gender do you identify with most?
    1. Male
    2. Female
    3. Other

37. How do you describe yourself?
    1. Asian
    2. Black or African American
    3. Native American or Alaska Native
    4. Pacific Islander
    5. White/Caucasian
    6. Other

38. Are you of Hispanic, Latino or Spanish origin?
    1. Yes
    2. No

39. Which of the following best describes your practice setting?
    1. 100% inpatient and 0% outpatient
    2. 75% inpatient and 25% outpatient
    3. 50% inpatient and 50% outpatient
    4. 25% inpatient and 75% outpatient
    5. 0% inpatient and 100% outpatient

40. Which of the following best describes the community in which you practice?
    1. Urban
    2. Suburban
    3. Rural

41. Please indicate your specialty.
    1. Family medicine
    2. Internal medicine or subspecialty
    3. Surgery or subspecialty
    4. Anesthesia
    5. Dermatology
    6. ENT
    7. Ophthalmology
    8. Orthopedics
    9. Physical medicine and rehab
    10. Neurology
    11. Neurosurgery
    12. Urology
    13. Pediatrics or subspecialty
    14. Psychiatry
    15. Emergency medicine
    16. Other