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UTILIZATION OF TELEMEDICINE

Final Manuscript

Utilization of Telemedicine for Follow Up Appointments in Radiation Oncology

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Abstract

Access to healthcare remains a problem for patients in the United States, especially those who live in remote areas, are immobile, immunocompromised, or are experiencing financial strain. These barriers can lead to missed appointments, putting financial strain on healthcare institutions, and contributing to productivity loss and underutilization of clinic resources. During the COVID-19 pandemic there was a rapid increase in the use telemedicine. Patients were surveyed on the quality of their telemedicine visit at the UCSD Health Moores Cancer Center Radiation Oncology department. The majority of patients would schedule telemedicine appointments in the future, which can reduce the burden on patients by allowing for a more convenient option for provider visits while maintaining quality of care.

Keywords: Telemedicine, Radiation Oncology, Barriers to Healthcare

Utilization of Telemedicine for Follow Up Appointments in Radiation Oncology

Telemedicine has transformed health care delivery in the United States since the COVID-19 pandemic. Telemedicine is a health care delivery system that offers healthcare remotely and has been successfully used in various specialties including family medicine, orthopedics, and solid and hematologic malignancies (Yajima et al., 2021). In the setting of oncology, patients are often immunocompromised, have multiple appointments, are immobile or face financial challenges. According to Yajima et al. (2021), telehealth interventions were found to be feasible and acceptable. The same study noted a positive impact on patient health through early symptom identification and management, remote nutritional support, and information gathering in the survivorship setting in adult patients with hematologic malignancies.

Telemedicine is associated with fewer missed appointments. A retrospective study conducted by Adepoju et al. (2022) showed patients with frequent medical visits or those with chronic conditions were less likely to miss telemedicine appointments compared with in-person appointments. Those living in metropolitan areas were also less likely to miss telemedicine appointments. While this study focused on underserved populations and community-based clinics and may not be generalizable to other clinics, it did show a significant decrease in missed appointments suggesting utilization of telemedicine as a potential method to reduce missed appointments.

In the radiation oncology department at the University of California San Diego Health Moore's Cancer Center, patients are seen for follow-up via telemedicine or in-person after completing radiation treatment. There was a rapid conversion of appointments to telemedicine during the pandemic, but now that patients are being offered in-person appointments, there is a high rate of missed in-person follow-up appointments. According to the National Academy of

Medicine, missed healthcare appointments cost the United States up to \$50 billion annually (Adepoju et al., 2021) and can lead to decreased clinic productivity and underutilization of department resources. Patients who miss appointments tend to experience poorer health outcomes due to a delay in rescheduling appointments. Specifically in the radiation oncology department, patients who miss follow-up appointments typically wait two to three months to reschedule due to lack of appointment availability. Providers often double book appointments leading to increasing wait times and delays for other patients ultimately leading to clinic inefficiency. Nurses often work overtime when appointments are double booked due to inadequate time to complete charting and various other case manager tasks, which leads to increased costs for the department.

In this quality improvement initiative, we explore the impact of telemedicine on our department by evaluating patient satisfaction during follow-up visits and if this continues to be an effective way to provide healthcare and decrease missed follow-up appointments.

Project Development

This project was developed using the the Iowa Model of evidence-based practice. This model provides guidance for clinicians to promote quality care in clinical and administrative practices (Melnik & Fineout-Overholt, 2018). The model provides a step-by-step approach in identifying areas of improvement and implementing processes to improve health outcomes. The feedback loop feature of the model allows for reassessment of the project at each step and determines if any revisions are necessary while supporting the team forward (Melnik & Fineout-Overholt, 2018). The main strength of this model is identifying a critical issue, which in this case is the high rate of missed follow up appointments in outpatient radiation oncology. Adepoju et. al (2022) found significant improvement in the rate of missed appointments with the use of

telemedicine among underserved patients. Another strength of the Iowa Model includes promoting a collaborative approach which is necessary when improving patient outcomes.

Methods and Materials

Patients within the Central Nervous System (CNS) clinic in the Department of Radiation Oncology at the Moore's Cancer Center were surveyed after completion of their telemedicine visit. Follow-up appointments for patients who have received radiation treatment to the brain typically involve reviewing recent imaging and often do not require physical examinations. Patients were selected to complete the survey based on the following criteria: age 18 and older, English speaking, completed radiation treatment, had at least one in-person and one telemedicine follow-up appointment. Patients completed the survey via telephone (see Figure 1). The survey used a 5-point Likert-type scale, ranging from "strongly disagree" to "strongly agree" and patients rated the quality of the visit through various questions, whether they experienced technical difficulties and if they would schedule a telemedicine visit in the future.

Results

Fifteen patients were identified who met the criteria and 10 patients agreed to participate. Responses were collected over two weeks. Overall, patients were satisfied with their visit with 80 percent of patients agreeing they would schedule a future telemedicine follow-up appointment (see Figure 3). Eighty percent of patients agreed that they were less likely to miss their appointment because it was a telemedicine appointment (see Figure 2) and 70 percent agreed that it was a more convenient option compared with an in-person appointment (see Figure 4). While the majority of patients were satisfied with a virtual visit, 80 percent reported technological difficulty, specifically interrupted connection due to unstable internet connection or cellular

service issues. Scores related to the quality of the visit were generally high, with at least 70 percent of patients agreeing that the provider listened to and addressed their questions and concerns and that they had adequate time with the provider.

Discussion

This study evaluated patient satisfaction during follow-up visits in an outpatient setting. Telemedicine was a convenient option, with 80 percent of patients opting to use it again in the future. The majority of patients were less likely to miss an appointment if offered telemedicine compared with an in-person visit. This would likely decrease the rate of missed appointments. Decreased missed appointments translates to continuity of care and helps close gaps in care (Adepoju et al., 2022). Missed appointments equals lost revenue and decreased productivity and efficiency of a healthcare system. By utilizing telemedicine, we can reverse the negative impacts of missed appointments. Patients often do not live near academic institutions where they receive care and this can place an increased burden on patients, especially in oncology where they have multiple appointments. Results from the survey did not show a decrease in the quality of the visit with their provider. Telemedicine offers an alternative way to receive healthcare without compromising patient health care outcomes. While telemedicine has many benefits, it also has challenges including technological difficulties. Of the patients surveyed, 80 percent had technological difficulties with either internet connection or issues with software. It is important to consider disparities among patients with lower income who may not have access to the internet or video capabilities or the elder population where technology may be difficult to use (Gutkin et al., 2020). Overall, the results are consistent with telemedicine being an effective, quality way to deliver healthcare and potentially reduce rates of missed appointments.

Limitations

While these findings are encouraging, there are limitations to this study. The small sample size of this study and focusing on only one disease site prevents the results from being generalizable across all disease sites. This study evaluated only follow-up appointments and did not account for different visit types such as consultations or on-treatment visits, which could have displayed different findings. Another limitation was the challenge of obtaining data related to missed appointments in the radiation oncology department. Having this data would have allowed for a more realistic understanding of the impact of telemedicine on the rate of missed follow-up appointments and potential revenue that could have been generated.

Conclusion

Telemedicine offers an alternative way for patients to receive healthcare and can address barriers including transportation, financial strain, and compromised immune systems. Although telemedicine would not be ideal for situations requiring a physical examination or discussing difficult news, it can be a useful tool to supplement patient care. Telemedicine offers good clinical care and the impact on patient care on a larger scale can be further explored in radiation oncology.

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Figure 1

Telemedicine Survey

When answering the following questions, please compare your last in-person follow-up visit to your previous telemedicine follow-up visit.

The provider listened to my concerns.

Strongly Disagree Disagree Neutral Agree Strongly Agree

I had adequate time with the provider.

Strongly Disagree Disagree Neutral Agree Strongly Agree

The provider answered my questions.

Strongly Disagree Disagree Neutral Agree Strongly Agree

The provider addressed my concerns.

Strongly Disagree Disagree Neutral Agree Strongly Agree

I had no technological difficulties during the visit.

Strongly Disagree Disagree Neutral Agree Strongly Agree

The telemedicine visit instructions were easy to follow.

Strongly Disagree Disagree Neutral Agree Strongly Agree

Telemedicine was a more convenient option than an in-person appointment.

Strongly Disagree Disagree Neutral Agree Strongly Agree

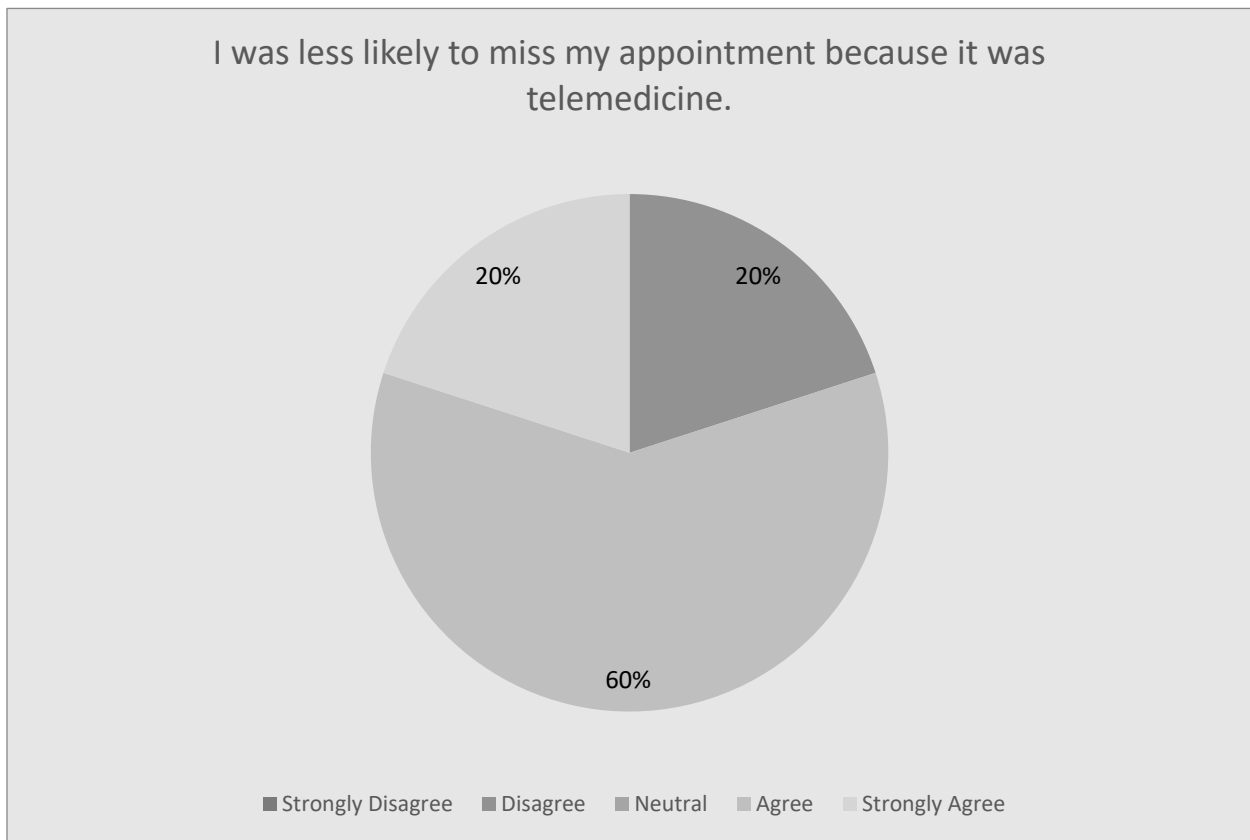
I was less likely to miss my appointment because it was telemedicine.

Strongly Disagree Disagree Neutral Agree Strongly Agree

I would schedule a telemedicine visit in the future.

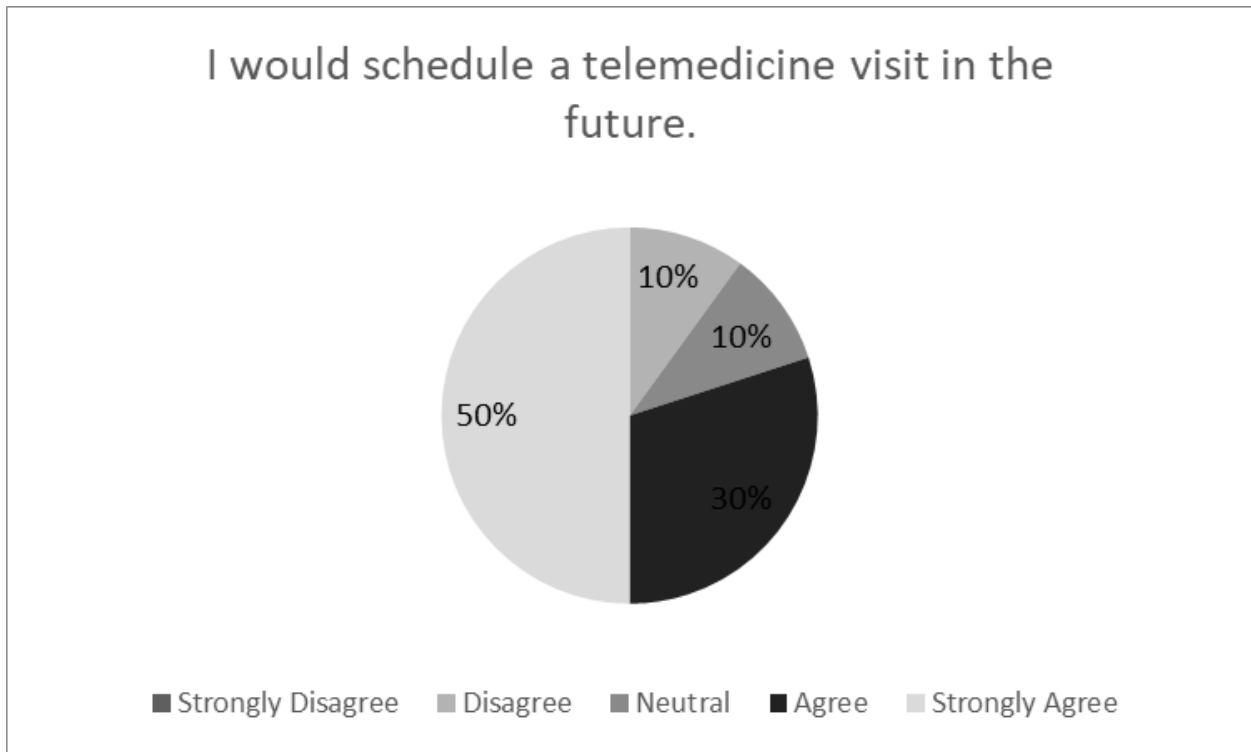
Strongly Disagree Disagree Neutral Agree Strongly Agree

Figure 2



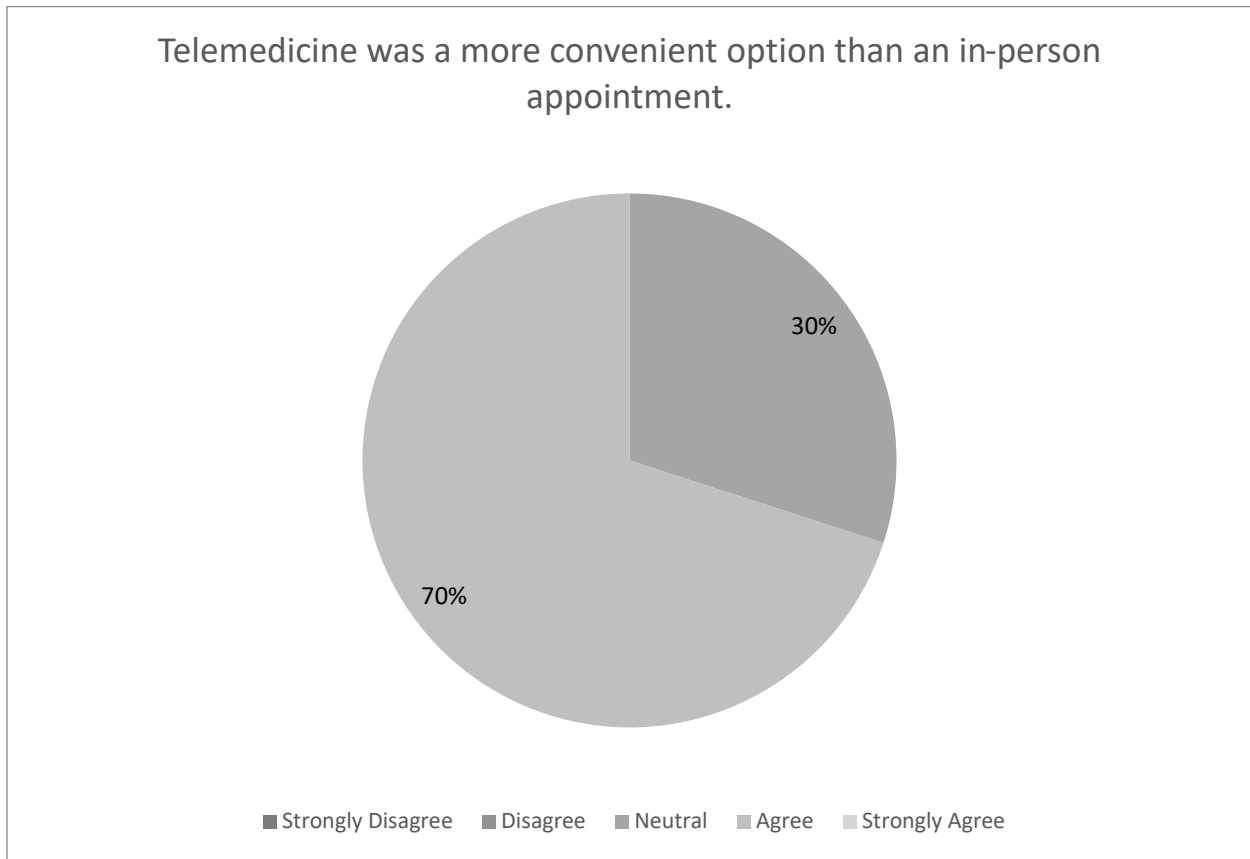
Note. Sixty percent of patients strongly agreed and 20 percent agreed that they were less likely to miss an appointment because it was telemedicine, while 20 percent disagreed.

Figure 3



Note. Eighty percent of patients agreed that they would schedule a telemedicine visit in the future. Ten percent of patients were neutral and ten percent would not schedule a telemedicine follow up appointment in the future.

Figure 4



Note. According to 70 percent of patients, telemedicine was a more convenient option than an in-person appointment, while 30 percent were neutral.