The Impact and Feasibility of a Student-led Program to Connect Patients and Caregivers via Synchronous Audiovisual Technology During Restricted Visitation Policies

Journal of Medical Education and Curricular Development
Volume 11: 1–8

DOI: 10.1177/23821205241284381
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ABSTRACT

OBJECTIVE: During the SARS-CoV-2 pandemic, hospital visitation restrictions hindered patients' access to vital social support. This study explores the impact and feasibility of a student-led program facilitating audiovisual communication between inpatient rehabilitation patients and their caregivers.

METHODS: The study design employed a prospective observational approach, and convenience sampling enrolled 99 participants, including 33 patients, 33 caregivers, and 33 medical students. From September 2021 to March 2022, eligible patients admitted to an inpatient rehabilitation hospital identified a caregiver and participated in a 30-minute audiovisual call organized by a medical student. Post-visit surveys via RedCap were completed by all participants and covered limitations in video calls, program benefits, comfort levels in video conferencing, and overall program ratings. The study adopted a quantitative research paradigm for data analysis. Statistical analysis utilized pairwise McNemar's and Wilcoxon's test for inter-group comparison.

RESULTS: Patients, caregivers, and medical students all reported positive outcomes in program offerings including providing social support, decreasing feelings of isolation, and providing a feeling of connection. Patients rated the program 4.82 ± 0.47 on a Likert scale, with 97% recommending it to others, even beyond visitation restrictions. The most common diagnosis among patients was stroke (30%), highlighting the program's potential applicability across diverse patient populations. Caregivers rated the program 4.59 ± 0.87 and expressed a desire for its continuation post-restrictions (80%). Medical students (81%) recommended the program, citing benefits in reducing social isolation and gaining clinical experience. No statistical differences were observed between groups in emotional and humanistic domains.

CONCLUSION: This study highlights the potential for programs to utilize technology to address social isolation in the healthcare setting. When public health restrictions occur, medical educators should consider opportunities to support and foster innovation for student-led programs. Further research should explore broader impacts on healthcare outcomes and medical education.

KEYWORDS: social support, healthcare isolation, audiovisual, connection

RECEIVED: September 17, 2023. **ACCEPTED:** May 16, 2024

TYPE: Original Research Article

FUNDING: The authors received no financial support for the research, authorship, and/or publication of this article.

DECLARATION OF CONFLICTING INTERESTS: The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Introduction

During the SARS-CoV-2 pandemic, policies were set in place throughout U.S. hospitals that restricted visitors within clinical environments.[1,2] While there is consistent evidence showing that increased social support exerts beneficial effects on health and well-being,[3,4] patients were limited in their ability to communicate with their support system due to these restrictions. An integrative review across various healthcare settings demonstrated that visitor restrictions had negative consequences on a patient's health, the health and well-being of family members, and the overall provision of care.[5] For patients admitted to inpatient rehabilitation hospitals, family members and caregivers are necessary for the emotional and physical support needed when rehabilitating from an injury or illness and it has been shown that high levels of social support can enhance functional outcomes.[6] This type of external support is encouraged during rehabilitation, as it enables a patient's support system to be trained in both the medical and functional care needed as the patient transitions home. During visitation restrictions, these family training sessions were limited and often the only time a patient may have been exposed to their social support. The focus of these visits often centered around medical and physical considerations rather than the provision of socialization or emotional support.

The COVID-19 pandemic also provided the momentum for medical schools to develop innovations for learning as the curriculum was largely moved to virtual opportunities with limited clinical interactions.[7] Despite this shift, many students maintained a desire for in-person clinical training opportunities, highlighting that students were motivated to seek ways to engage in clinical encounters.[8] A known concern among medical students during pandemic restrictions included reports of increased rates of anxiety and depression, possibly exacerbated by reduced social interactions and the unknown long-term effects of the pandemic on career development.[9]

While the impact of visitation policies on in-person family interaction has been acknowledged, the broader consequences, including the discontinuation of community services and outreach initiative for medical students, remain underexplored.[10] This study addresses this gap by introducing a unique student-let program leveraging audiovisual technology within an inpatient rehabilitation setting. By assessing the program's feasibility and its impact on patients, caregivers, and participating medical students, the study aims to unravel the multifaceted implications of the pandemic's social effects on inpatient rehabilitation settings. Additionally, it explores the constraints on clinic interactions and educational experiences. For the purposes of this study, the term "caregiver" is inclusive of family members, or a support person identified by the patient. Secondary aims included understanding the feasibility of running a program that did not require any additional hospital resources as it was led entirely by medical students seeking clinical experiences and community outreach opportunities.

Methods

This study employed a prospective observational design to assess the impact and feasibility of a student-led program facilitating audiovisual communication between patients in an inpatient rehabilitation setting and their caregivers. The program aimed to provide social support and address feelings of isolation among patients in the inpatient setting. It was initiated as a response to the challenges posed by the SARS-CoV-2 pandemic and subsequent restrictions on inpatient visitation policies.

This program included three groups of participants: patients, caregivers, and medical students. Convenience sampling was used to enroll a total of 99 participants between September 2021 and March 2022. Eligibility criteria for patients included age 18 and older and admission to the inpatient rehabilitation hospital. Caregivers were defined as any support persons greater than 18 years of age, including siblings, parents, grandparents, or friends, with whom the patient desired audiovisual communication. Medical students constituted students primarily in their first or second year of medical school who had an interest in leading patient and caregiver visits. Volunteer positions were prioritized for first- and second-year students due to their more flexible schedules. Exclusion criteria included participants under 18 years of age, patients in active isolation with COVID-19, and caregivers without internet access or email capability. The reporting of this study conforms to the COREQ guidelines.[11]

Volunteer medical students offered patients participation in a scheduled audiovisual call with a caregiver, a call that was planned and organized by the medical student based on the schedules of the patient and the caregiver. Each medical student received an orientation sheet and watched a short video on how to set up an audiovisual visit. The visits were scheduled for a time after the completion of therapies and meals to prevent interference with medical treatment. Information regarding the visit and a link to the scheduled video conference were sent via email to the caregiver. The medical student was peripherally present during the session for technology support and logistics. Students did not provide medical advice regarding the patient's care and were not instructed to ask questions or engage in the visit unless asked to by the patient. An online survey was sent through RedCap to each study participant immediately following the visit. An electronic consent form was furnished to respondents for review and signature prior to filling out the survey, and this mode of obtaining consent was approved by the Penn State University Institutional Review Board approved (STUDY00017489).

Since there are no universal tools to assess the performance of this program, a Likert scale survey was developed by the

Table 1. Survey response *P* values.

REPORTED OFFERINGS FROM THIS PROGRAM	PATIENT/STUDENT COMPARISON	CAREGIVER/PATIENT COMPARISON	STUDENT/CAREGIVER COMPARISON
Provided emotional support	1.000	0.688	0.625
Provided physical support	0.581	**0.022**	**0.004**
Provided reduced feelings of isolation	0.625	0.508	0.125
Provided a feeling of connection	0.500	0.219	**0.031**
Provided distraction from negative feelings	0.791	0.405	0.180
Provided enhanced motivation	1.000	0.607	0.629
Provided something to look forward to	0.344	1.000	0.581
Provided sense of normality	0.285	1.000	0.248
Provided other	1.000	0.625	0.625
Recommend program without restrictions	0.508	1.000	1.000

study team, drawing on previous research studies utilizing Likert scale questions.[12] The survey consisted of four sections and participants were asked a set of questions tailored to their roles. The Impairment Group Code was recorded for each patient. No demographic information was collected for the caregiver or medical student. The first section asked patients about limitations in video calls with their family or support person and caregivers were queried about limitations in video calls with their hospitalized family member. Answers to these questions included: I have been able to connect with the family/caregiver/patient previously via video with limited challenges, I do not have access to a smart phone or internet, my family/caregiver/the patient does not have access to a smart phone, I do not feel comfortable using a device for video by myself, physical limitations, or other. The second section listed 10 potential humanistic offerings from this program (Table 1) and patients were asked, "Did this program provide you any of the following? Check all that apply," while caregivers and students were asked "Do you feel that you were able to provide any of the following by participating in this program? Check all that apply." In the third section, patients and caregivers were both asked about their comfort levels during the video conferencing. All participants were asked if they would recommend this program to others. Students were asked about the benefits and impact of the program on their knowledge and attitude toward the importance of social support in the inpatient setting. In the final section, all participants were asked to rate the overall program on a Likert scale from 1 to 5, with 1 being poor and 5 being excellent. Additionally, survey participants were able to leave open comments related to their experience.

Statistical analysis

The study adopted a quantitative research paradigm for data analysis, given the use of survey-based data collection, numerical data, and Likert scales. Statistical analysis of survey responses was completed with pairwise McNemar's test and Wilcoxon's signed rank test to make comparisons between groups. Pairwise comparisons were aimed at elucidating relative disparities or consensus in subjects' opinion of program impact, thereby characterizing which impacts were universally perceived as program benefits and highlighting potential areas for targeted program improvement. A formal sample size calculation was not performed for this study. The decision on sample size was influenced by the availability of participants within the specified timeframe.

Results

CMS impairment codes of patients

Thirty-three patients enrolled between September 2021 and March 2022. Patients were classified under impairment codes which included: stroke, brain dysfunction, neurologic condition, spinal cord dysfunction, amputation, arthritis, pain syndrome, orthopedic disorder, cardiac, pulmonary disorders, burns, congenital deformities, major multiple traumas, developmental disability, debility, medical complex, and other. The most common diagnosis was stroke at 30% of patient participants, followed by cardiac at 12%, and pulmonary disorders, debility, and spinal cord injury each accounting for 9% (Figure 1). No patients were classified as medically complex or as having a developmental disability, congenital deformities, burns, or pain syndromes.

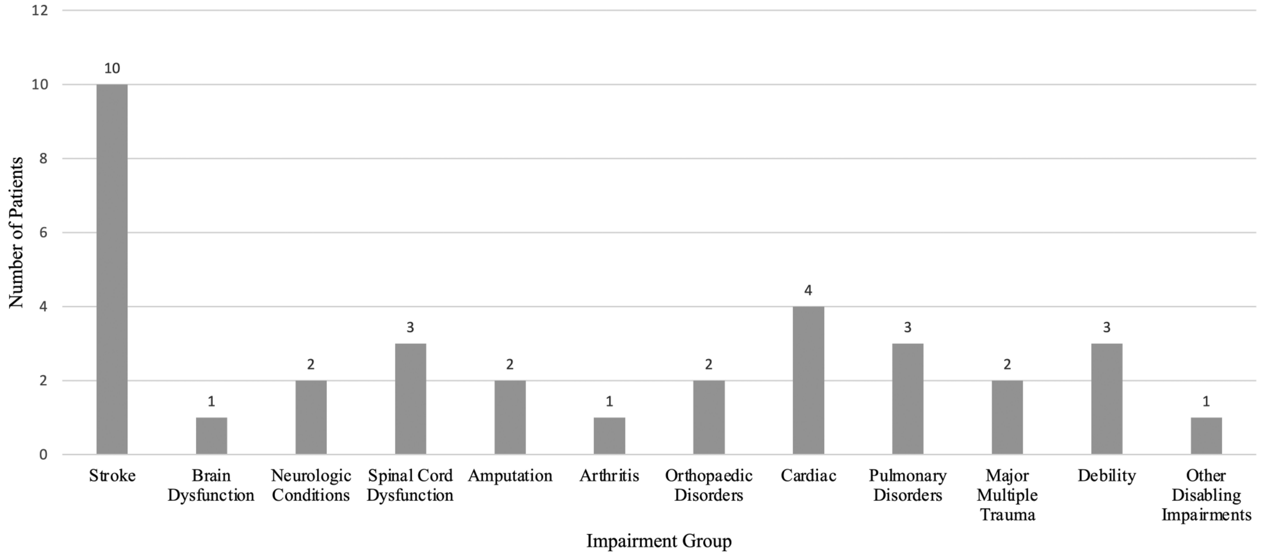

Figure 1. Diagnoses of enrolled patients, per CMS impairment group codes.
CMS = Centers for Medicare and Medicaid Services.

Patient survey responses

When rating the overall program on a Likert scale from 1 to 5, with 1 being poor and 5 being excellent, patients rated the program 4.83 ± 0.47. When asked if they would recommend this program to others, 97% of all patients recommended the program to others and 72% of those patients recommended the program even when visitation restrictions are not in place. When reviewing the impact of the program on the patient, 91% of patients felt the program provided emotional support, 91% reported a feeling of connection, and 88% felt their participation resulted in reduced feelings of isolation. For 73% of patients, the program gave them something to look forward to, and for 69%, the program provided enhanced motivation. Lastly, 64% felt a distraction from negative feelings, and 61% thought the program gave them a sense of normality (Figure 2). Three patients (9%) answered “other,” and provided comments including: “happy,” “nice seeing my tree and dogs,” and “not needed.”

After participating in the program, 32 participants indicated they felt comfortable with communicating with their caregivers via video (Figure 3). When patients considered video calls with caregivers prior to participation in the program, most patients (52%) had used video to communicate with caregivers with limited to no challenges, 39% of patients did not feel confident using a device for video by themselves, 27% did not have access to a smartphone or internet, 12% had a physical limitation, and 6% indicated that their family/caregivers did not have access to a smartphone or internet. Other limitations described by patients included “time/scheduling limitations” and “poor Wi-Fi connection with their personal devices.”

Caregiver survey responses

When caregivers evaluated the overall program on a Likert scale of 1 to 5, they rated the program 4.59 ± 0.87. When considering future implementation of the program, 80% would recommend the program even when visitation restrictions are lifted. When caregivers were asked what they felt they were able to provide to the hospitalized individual with whom they connected, 85% felt that they were able to provide emotional support, 79% felt that they were able to reduce the patient’s feeling of isolation, and 79% reported being able to offer a feeling of connection to others. Twenty-three caregivers (70%) believed that they were able to give the patient something to look forward to, while 20 caregivers (61%) believed that they were able to provide a sense of

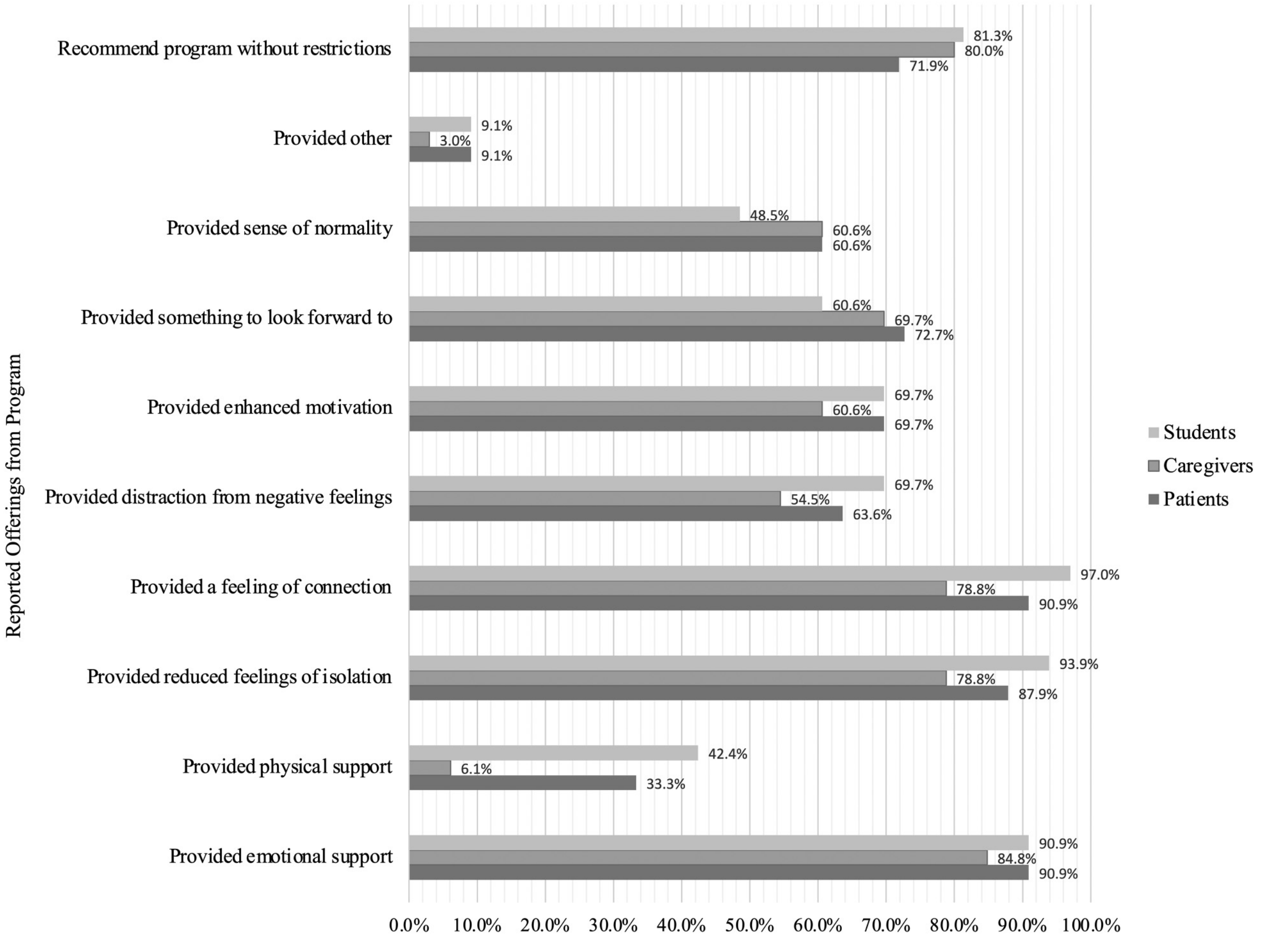

Figure 2. Survey responses from participants regarding the impact of the program.

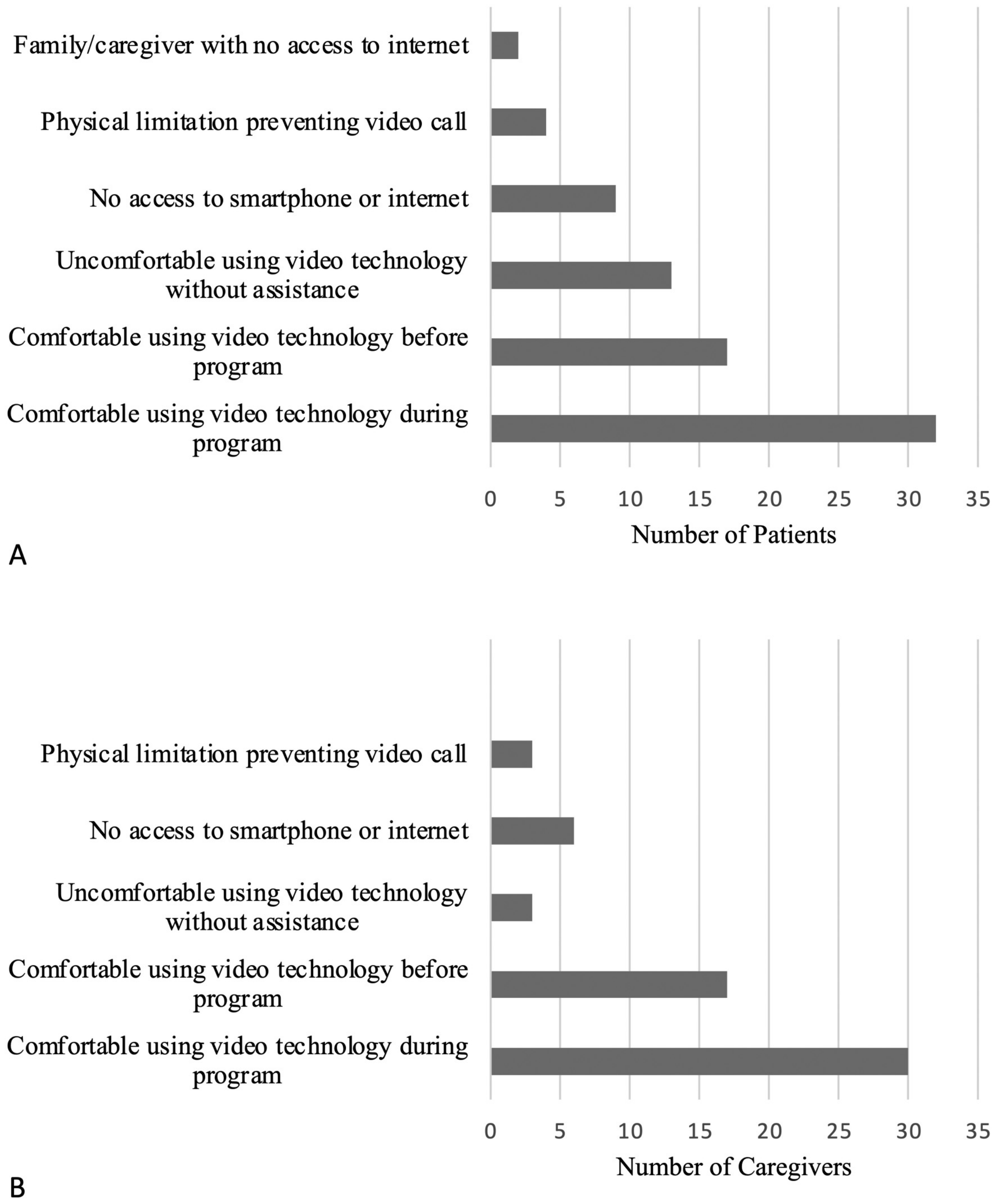

Figure 3. (a) Number of patients and comfort using technology. (b) Number of caregivers and comfort using technology.

normality for the patient. Eighteen caregivers (55%) felt that they were able to provide a distraction from negative feelings, 61% felt that they were able to enhance the patient's motivation, and 6% believed that they were able to provide physical support (Figure 2).

After participating in the program, 91% of caregivers felt comfortable utilizing video conferencing during these visits. Prior to this program, 52% of caregivers had previously been able to communicate with the hospitalized individual. However, 18% did not have access to a smartphone or internet connection. Three caregivers (9%) stated that they did not feel confident using a device without assistance. In addition, three caregivers (9%) cited "physical" or "other" limitations when trying to communicate with audio or visual technology (Figure 3).

Medical student survey responses

Eighty-one percent of student participants would recommend this program even when visitation restrictions are not in place. Given the students' role in facilitating the patient–caregiver visit, they were also surveyed on what they felt the program offered to the participants. Thirty-two (97%) students felt this program provided a connection with others, 94% felt the program reduced feelings of isolation, and 91% felt that the program provided emotional support. Additionally, 70% reported distraction from negative feelings, and 70% reported enhanced motivation. Twenty students (60%) felt that this program gave them something to look forward to, 48% felt that participating in this program provided them a sense of normalcy, and 42% felt this program provided physical support to others (Figure 2).

When assessing their perspective on social support, 100% of student participants affirmed that social support is important for hospitalized patients. Students also documented various comments surrounding the impact they felt on socialization, service to others, and humanistic domains. These comments can be found in Appendix A in the supplemental materials.

Comparisons between groups

There was no statistical significance between groups regarding what the program offered to each participant when reviewing emotional support, reduced isolation, distraction, motivation, something to look forward to, or a sense of normality (Table 1). Patients noted significantly more physical support compared to what caregivers felt they provided ($P = .022$), and significantly more students felt they provided physical support compared to caregivers ($P = .004$). Statistically more students felt the program provided a feeling of connection when compared to caregivers ($P = .031$). There was no significant difference in the proportion of participants in each group who would recommend the program when restrictions are not in place. Table 1 summarizes the statistical comparisons between groups.

Discussion

Our study indicates that a video conferencing program led by students, which enabled patients in the hospital to communicate with caregivers at a scheduled, pre-arranged visit, yielded significant benefits for not only the patients but also their caregivers and the participating medical students. There was no statistical significance between groups regarding what the program offered to each participant in the humanistic domains, apart from the greater physical support patients and students noted compared to caregivers. This demonstrates the consensus of program benefits on social and humanistic domains, while the differences observed regarding physical support are likely due to colocation of patients and students, only. The high ratings from patients, caregivers, and medical students suggest a favorable reception of the program.

These findings are consistent with similar programs used to mitigate stress and enhance connection between support persons and hospitalized patients.[13,14] Our study is unique in that it not only addresses the immediate concern of the patient well-being but also highlights the role of medical education in fostering innovative solutions during times of crisis. Our study confirms that video-based technology has become an effective way of reducing feelings of isolation during COVID-19 in hospitalized patients.[15] Additionally, our program's unique advantage was the ability to provide in-person contact between students and patients during a time when in-person community and outreach activities were largely limited for medical students due to restrictions imposed by the pandemic. This program not only facilitated social connections between patients and their caregivers, but also served as a means for students to combat their own social isolation and engage in a meaningful role within the healing process of the patients. Unlike other studies, the present analysis includes effects of this program on students. By arranging video calls for patients with caregivers, the program enabled students to practice their communication skills and assist patients in overcoming logistical barriers related to technology and scheduling that may arise in an inpatient rehabilitation setting. Since the majority of participating students were in their first two years of medical school, the program served as an introduction to the clinical setting, offering them firsthand experience interacting with patients and navigating the healthcare system.

Students were able to familiarize themselves with the hospital setting, communicate effectively with healthcare professionals, and advocate for the social needs of their patients. Numerous studies have investigated the outcomes and benefits of providing early clinical experiences for medical students, revealing that early clinical exposure can significantly enhance students' communication skills, performance in assessments, and general clinical skills.[16] This underscores the need to create innovative and simple ways for medical students to engage in service to their community. Comments provided by students, as noted in Appendix A, provide additional insight into the various ways this program enhanced the medical student experience. The qualitative data from the open-ended question contribute to our understanding of social support, patient-centered care, and medical education. The responses from patients, caregivers, and medical students shed light on the emotional, social, and educational aspects of the program. For example, the themes identified in the qualitative data support the theoretical notion that social support plays a crucial role in patients' well-being and recovery, as well as the importance of practice clinical experiences in medical education. It should be noted that third- and fourth-year medical students were not excluded from participation in this study. However, there were no volunteers from these classes, likely due to their hospital duties during these years.

Additionally, the enrolled patients included a diverse range of impairment group codes, suggesting the potential applicability of the program to other patient populations seeking social support. Further research is needed to evaluate accommodations for communication and language needs, as well as physical impairments, which were not assessed in this study.

Several limitations should be acknowledged. Our sample size served as a pilot to assess the impact and feasibility of the program for potential continuation beyond the pandemic restrictions. Due to concerns over the spread of COVID-19 transmission among participants, enrollment was limited and ultimately study enrollment ceased as soon as visitation restrictions were lifted. While efforts were made to enroll a diverse range of participants, the lack of a formal sample size calculation may affect generalizability of the findings. Future studies should aim to incorporate robust sample size calculations to enhance statistical power and validity. Additionally, this study did not employ validated measures to assess its outcomes, but rather relied on self-reported feedback across a range of emotional and humanistic domains considered lacking by these groups during the pandemic. Potential confounding factors such as the medical condition of the patients and prior communication between the patient and caregiver were not considered. Furthermore, our study did not specifically gather data on cultural backgrounds, beliefs, or preferences, and we acknowledge that this represents a limitation in our exploration of the full spectrum of the patient and caregiver. Future research should explore how diverse cultural backgrounds may shape the expectations, preferences, and experiences of patients, caregivers, and medical students participating in similar programs.

Conclusion

Our study highlights the substantial positive impact of this program on patients in an inpatient rehabilitation setting, emphasizing the significance of fostering connections between patients and their caregivers. We provide valuable insights into the practical implications of leveraging technology for patient care and medical education. The observed benefits, including enhanced emotional support, reduced feelings of isolation, and a sense of connection, demonstrate the potential of such intervention in contributing to patient-centered care. The involvement of medical students as facilitators not only bridged the communication gap during visitation restrictions but also provided valuable clinical exposure for student. The positive responses from students indicate the potential of similar student-led programs to address the dual challenges for social isolation for patients and the need for practical clinical experiences for medical trainees. The program's success, achieved without additional strain on hospital resources, suggest its feasibility within resource-constrained healthcare environments. Additionally, the positive outcomes reported by participants, coupled with medical student's affirmation of the program on their learning experiences, signify the adaptability of this model across diverse healthcare settings. While our study provides valuable insights, there are avenues for further exploration. Further research could dive deeper into the long-term effects of similar programs, asses their scalability, and explore variations across different patient populations and cultural contexts.

Acknowledgments

Erik B. Lehman, Department of Public Health Sciences, Penn State College of Medicine, for statistical support.

Authors contributions

Authorship was granted only to those individuals who contributed substantially to the research and manuscript.
Ms. Hoskins, Mr Levine, Ms. Lokey, and Dr Romanoski conceptualized and designed the study.
Ms. Hoskins, Mr Levine, Mr Yedigarian, Mr Ceasar, Mr Cannon, Mr Feiertag, and Mr Mellon collected data, reviewed the analysis, and drafted the manuscript.

Ms. Hoskins, Mr Ceasar, Mr Feiertag, and Mr Mellon created the figures within the manuscript.

Mr Levine, Ms. Hoskins, Mr Yedigarian, Mr Cannon, Dr Romanoski, and Ms. Lowkey reviewed, edited, and finalized the manuscript.

Consent

An electronic consent form was furnished to respondents for review and signature prior to filling out the survey.

Data availability statement

All data generated or analyzed during this study are included in this article.

Ethical approval

The Penn State University Institutional Review Board approved this study (STUDY00017489) on 04/15/2022.

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Previous presentation

This work was presented as a poster presentation at the Association of Academic Physiatrists 2023 in Anaheim, California.

Supplemental material

Supplemental material for this article is available online.

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