

RESEARCH ARTICLE

Factors Associated with Patient Willingness to Conduct a Remote Video Musculoskeletal Consultation

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Abstract

Background: Remote video consultations on musculoskeletal illness are relatively convenient and accessible, and use fewer resources. However, there are concerns about technological and privacy issues, the possibility of missing something important, and equal access to all patients. We measured patient characteristics associated with willingness to conduct a remote video musculoskeletal upper extremity consultation.

Methods: One hundred and five patients seeking specialty musculoskeletal care completed questionnaires addressing (1) demographics, (2) access to a device, internet, and space to conduct a remote video consultation, (3) health literacy, (4) pain intensity, (5) magnitude of limitations of the upper extremity, (6) self-efficacy, and (7) rated willingness to conduct a remote video musculoskeletal consultation (11-point ordinal scale). A multivariable linear regression analysis sought factors independently associated with patient willingness to conduct remote video musculoskeletal upper extremity consultations.

Results: Patient education level (4 years of college) and accessibility to a space suitable for remote video consultations were independently associated with interest in remote video consultations. Sociodemographic factors, health literacy, accessibility to a device or internet, and amount of perceived pain and disability were not.

Conclusion: We speculate that education level and suitable space might be surrogates for trust and privacy concerns. Future research might measure the ability of interventions to gain trust and ensure privacy to increase willingness to engage in remote video musculoskeletal consultations.

Level of evidence: II

Keywords: Musculoskeletal illness, Orthopedic surgery, Remote consultations, Virtual visits

Introduction

Remote video consultation is an expanding option for people that seek medical advice. Remote consultations offer potential advantages to patients, who are spared the costs and inconveniences of travel, parking and waiting, as well as to the healthcare system in terms of cost-effectiveness (reduced need for office space, front desk staff, and medical assistants). Remote video consultations have satisfactory outcomes

in orthopedic and trauma settings, but are not widely used (1–6). A previous qualitative study by our group on patient (n=27) and clinician (n=10) facilitators and barriers of musculoskeletal consultation, identified that remote video visits could improve patient (and clinician) convenience and accessibility, at potentially lower costs [unpublished data]. However, concerns were raised about technological and privacy issues, the

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lack of personal interaction and that something might be missed without a hands-on examination. Also, equitable access for all patients (e.g. different age, socio-economic background, insurance status, health literacy) may be an issue.

The current quantitative study addressed the primary null hypothesis that there are no factors associated with patient willingness to participate in remote video musculoskeletal consultations accounting for demographic (e.g. level of education) and psychosocial factors (e.g. health literacy).

Materials and Methods

This cross-sectional multi-center study was approved by the Institutional Review Board. Verbal informed consent was obtained from all patients participating in the study. Participants received no compensation.

Study design and measures

This study included English speaking new or returning patients aged 18 to 89 years seeking care for a musculoskeletal upper extremity problem (acute or chronic) at one of six ambulatory orthopedic surgery office in a large urban area in the United States. After the visit with the surgeon, a research assistant not involved in patient care completed the Newest Vital Sign (NVS) questionnaire with patients. Subsequently, the patient filled out demographic information (age, gender, marital status, race, highest level of education, work status and insurance status), PROMIS general self-efficacy computer adaptive test (CAT), PROMIS Physical Function Upper Extremity (PF UE), and the questions regarding feasibility of the remote video consultation ("Do you have access to a phone, tablet or computer?", "Do you have access to data or Wi-Fi?", "Do you have access to an appropriate space for remote video visits?"). Also, an 11-point numerical scale on willingness to do a virtual visit was filled out. The NVS questionnaire assesses general health literacy and numeracy, and consists of a nutrition label that is accompanied by six questions (7). Patients with more than four correct responses are categorized as adequately health literate, whereas fewer than four correct answers is categorized as likely limited health literacy. PROMIS general self-efficacy is a computer-adaptive test where patients rate their level of confidence with statements such as: "I can manage to solve difficult problems if I try hard enough" and "I can handle whatever comes my way" (8). The PROMIS PF UE questionnaire is a validated test that measures the magnitude of upper extremity specific limitations (9).

Study population

The 105 subjects included 56 (53%) men and 49 (47%) women with a median age of 57 (interquartile range [IQR] 49-67 years; Table 1). The median score on the 11-point ordinal scale on willingness to do virtual visits was 7 (IQR 5-10). All patients (100%) had access to a device (smartphone, tablet, or computer), 99 (94%) patients had access to Wi-Fi, and 84 (80%) of the patients had access to a space to conduct remote video consultations.

Table 1. Patient and clinical characteristics

Variables	N = 105
Age in years	57 (49 – 67)
NVS	
Limited health literacy	17 (16)
Adequate health literacy	88 (84)
Race/Ethnicity	
Caucasian	76 (72)
Non-Caucasian	29 (28)
Marital status	
Married/Couple	67 (64)
Separated/Widowed	20 (19)
Single	18 (17)
Level of education	
High school or less	18 (17)
2-year college	19 (18)
4-year college	32 (30)
Post-college graduate degree	36 (34)
Work status	
Employed	66 (63)
Retired	29 (28)
Unemployed/Unable to work	10 (9.5)
Insurance	
Private	61 (58)
Medicare	31 (30)
Other	13 (12)
Access to a device (tablet, phone, computer)	105 (100)
Access to Wi-Fi	99 (94)
Access to space	84 (80)
Pain intensity	5 (2 – 6)
PROMIS GSE	51 (47 – 56)
PROMIS PF UE	45 (38 – 50)
Willingness to do a virtual visit	7 (5-10)

Continuous variables as median (interquartile range); discrete variables as number (percentage). PROMIS = Patient-Reported Outcomes Measurement Information System; PF UE = Physical Function Upper Extremity; GSE = General Self-Efficacy; NVS = Newest Vital Sign.

Statistical analysis

Histograms and Shapiro-Wilk tests of normality showed non-normal distributions of the data. Continuous variables are described as median and IQR and discrete variables as proportions. We used Spearman correlation tests for the relationships between continuous variables, Mann-Whitney U tests for differences between continuous and dichotomous variables, and Kruskal Wallis tests for differences between continuous and categorical data. We created a multivariable linear regression model to

determine factors independently associated with patient willingness to do virtual visits. All with $P < 0.10$ in bivariate analysis were included in the multivariable model. Results are reported as regression coefficients (β) with 95% confidence intervals (CI). A two-sided P -value of < 0.05 was considered to indicate statistical significance.

An a priori power calculation determined that a sample size of 95 patients was needed to answer our primary study question with 80% statistical power (with alpha at = 0.05) to detect a medium effect size (0.30) for the correlation of factors associated with willingness to do remote video musculoskeletal consultations. We enrolled 105 patients to account for 10% withdrawal or incompleteness of data.

Results

Multivariable analysis demonstrated that access to an appropriate space for conducting a virtual visit (β 3.7, 95% CI 2.1 to 5.3, $P < 0.001$) and four years of college (β 2.4, 95% CI 0.54 to 4.2, $P = 0.012$) were independently associated with increased willingness to do a remote video musculoskeletal visit [Table 2].

Discussion

Remote video consultations offer potential advantages to people seeking and providing care, but they are new and unfamiliar to many. Some of the hindrances to wide adoption of remote video visits identified in qualitative studies include concerns about the technology and privacy, and the concern that something might be overlooked if not evaluated in person (6). In addition, evidence suggests there are continued disparities in access to technology by socioeconomic status, race, and ethnicity (10). In this study, we sought factors associated with willingness to participate in a remote video musculoskeletal consultation.

A few limitations to this study should be acknowledged. First, the people in our offices were largely middle-aged, relatively highly educated, middle to upper socioeconomic class, and Caucasian, which may not represent the general population. Second, a few patients with limited health literacy withdrew initially when they struggled with the NVS questionnaire, but this was not as common when we adjusted the way we introduced and delivered the test. Third, current or previous experience with remote video consultations might have influenced patient willingness

to conduct remote visits with their clinician, but were not recorded. However, virtual (musculoskeletal) visits are still very uncommon in our Central Texas area. Fourth, we made no distinction between initial and return video visit. However, we suspect that most people assumed we were posing a first evaluation for a new problem, as that is most typical in musculoskeletal specialty care. In addition, most patients were new to the offices where the study was performed.

Willingness to utilize remote video consultations was greater with more education and better accessibility to a space suitable to conduct a remote video visit, but did not relate to health literacy. The prior association of greater education and interest in remote consultations was thought to be related to greater health literacy among the more educated (4, 5, 10). The lack of correspondence between health literacy and interest in remote video visits suggests that other factors, perhaps relative trust of clinicians and technology, may explain the association of education. Indeed, in previous qualitative studies, patients mention concerns about lack of trust in physicians, difficulty developing rapport, and inadequate diagnosis and treatment when the clinician is not in the same room as the patient (4). One study among 6,369 persons that were part of the Health Information National Trend Survey, found that despite newly available sources of online health information, physicians remain the source patients trust most, with 62% of adults expressing a lot of trust in their physicians (on a 4-point ordinal scale ranging from "no trust" to "a lot of trust") (6). A recent systematic review investigated 19 publications on factors associated with patient and public engagement to digital health interventions (4). The study concluded that personal recommendations from trusted people helped patients engage with and register for technology, whereas those with less support were less likely to sign up for digital health platforms. We speculate that utilization of remote video consultations might expand across levels of education and socioeconomic status if clinicians can improve trust and confidence. Of note, patient satisfaction levels after remote visits are often higher than satisfaction after conventional face-to-face visits in an orthopedic setting, suggesting that increased experience with remote video musculoskeletal consultation alone may lead to adequate

Table 2. Multivariable linear regression analysis of factors associated with willingness to do a virtual visit

Variables	Regression coefficient [β], 95% Confidence Interval [CI]	Standard Error (SE)	P value	Semi partial R-squared (R^2)	Adjusted R^2
Level of education					
High school or less	<i>Reference value</i>				
2-year college	1.4 (-0.58 to 3.5)	1.0	0.161		
4-year college	2.4 (0.54 to 4.2)	0.92	0.012	0.05	
Post-college degree	2.4 (0.54 to 4.2)	0.92	0.059		
Access to Wi-Fi	0.10 (-2.8 to 3.0)	1.4	0.945		0.24
Access to space	3.7 (2.1 to 5.3)	0.83	<0.001	0.15	

Bold indicates statistically significant difference.

trust and confidence (11, 12).

The finding that a suitable space rather than accessibility of a device or the internet affected enthusiasm for remote video consultation, likely reflects the fact that these devices and internet are increasingly available even among the people of lower socioeconomic status. While evidence suggests continued socioeconomic and racial disparities in access to technology (13–16), our study did not find differences in willingness to conduct remote video visits according to age, race, or socioeconomic status. In contrast, a national cross-sectional study with 3,677 participants found that younger respondents (<50 years), Hispanics, those from higher-income households, and those perceiving access to personal health information as important, were more likely to be interested in online patient-physician communication (10). Another population-based cross-sectional study with 1,793 participants found that young people with a medium-high educational level tended to use the internet for health-related purposes (17).

The need for a suitable space may be another reflection of trust and privacy concerns rather than an issue of access to the technology needed to participate in a remote video visit. A systematic review found that one of the barriers to patient engagement in digital health interventions, was concerns raised about privacy and security of personal health information, as they could be compromised online and potentially disclosed to a partner, family, friend, co-worker, or employer (4). Interestingly, patient concerns about online privacy do not translate to a decrease in online patient portal use (18).

People seem relatively open to remote video musculoskeletal consultation. The adoption of remote video musculoskeletal consultations may improve with better understanding of patient factors associated with interest in virtual visits. We interpret our findings to indicate that the acceptability of remote video consultation might be improved by measures to gain trust

and ensure privacy. We propose to study interventions that inform patients of the advantages and disadvantages of remote video consultations. Advantages include less time investment, no transportation difficulties, a comfortable and familiar setting, no work or daycare arrangements, easier participation of family, and other factors. People also need to understand that the video visit does not replace an in person visit, and people can be seen in person if the diagnosis is not clear. This should help reassure people that nothing will be overlooked. Finally, we can help people with the technological requirements and help them understand that the remote video visit is secure and private.

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