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Telemedicine for chronic pain treatment during the COVID-19 pandemic: Do pain intensity and anxiousness correlate with patient acceptance?

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Running Title:

Telemedicine for chronic pain patients

Abstract

Introduction:
Recent recommendations for the treatment of chronic pain patients during the COVID-19 pandemic suggest using telemedicine instead of in-person consultations. Knowing whether chronic pain patients are receptive to the use of telemedicine during a pandemic might improve tailored care.

Objective:
The aims of the present study were to assess patients' acceptance of telemedicine during the COVID-19 pandemic in Switzerland and to examine the correlation of acceptance with pain intensity and anxiousness.

Methods:
An anonymous survey was conducted from 31/03/2020 to 30/07/2020 with 61 patients referred to the Pain Center at the Bern University Hospital Inselspital in Bern, Switzerland. Collected data was analyzed descriptively, and correlations were calculated between acceptance of telemedicine and mean levels of current pain, psychological distress, and fear of COVID-19.

Results:
Our main finding was an average level of acceptance of telemedicine, with a mean of 6.25 on a scale from 0 (not at all) to 10 (completely), with substantial variability and range (SD=3.56). The acceptance of telemedicine correlated negatively with current mean pain level (r=-0.44), worries (r=-0.42), and fear of COVID-19 (r=-0.4), as well as positively with the general condition (r=0.46).

Conclusions:
Using telemedicine for chronic pain treatment during the COVID-19 crisis was accepted to a sufficient degree by a considerable proportion of patients. However, the higher the mean levels of pain and anxiousness, the lower the acceptance, indicating that these

severely burdened patients may suffer most from treatment restrictions. For this subgroup, telemedicine might not suffice and in-person visits should be considered.

Background:

During the first wave of the COVID-19 pandemic, governments in many countries around the world implemented emergency plans, including the suspension of all non-urgent medical treatments. In Switzerland, the emergency measures ordered by the Federal Council included a temporary interruption of all ambulatory in-person hospital visits on March 16, 2020[1]. Furthermore, the European and American Societies for Regional Anesthesia issued recommendations for chronic pain practice, with suggestions for the classification of urgent and semi-urgent procedures[2]. Another recommendation was to switch from face-to-face consultations to telemedicine, to address the fact that many chronic pain patients were at risk of a severe course of COVID-19 in case of an infection with the virus. The International Association for the Study of Pain (IASP) also recommended the rapid introduction of remote services (eHealth) to provide chronic pain patients with specialized services during the COVID-19 outbreak[3]. Past experiences with telemedicine had already shown the potential of remote patient management for the treatment of osteoarthritis[4], chronic obstructive pulmonary disease[5], cardiac rehabilitation[6], musculoskeletal conditions[7] and – specifically – chronic pain[8].

To date, several forms of eHealth Services have been rapidly promoted during this crisis, with differing levels of effectiveness[9]. Some specialists have argued that chronic pain is likely to be magnified during the pandemic, due to current infections, logistical problems following shutdown of procedures, or increased psychological stress[10]. Increased levels of stress and psychological distress are considered important factors in the development and maintenance of chronic pain[11–14]. Due to the broad effect of the pandemic – involving, among other aspects, conflicting news reports and research, loss or reduction of employment, reduced access to healthcare services, and social disconnection – patients seem to be at increased risk for the development and worsening of conditions involving chronic pain [10,15]. This results in a conundrum for the pain specialist because patients have to be treated and protected at the same time. The scientific community is therefore urged to study strategies that could mitigate the consequences of the COVID-19 pandemic for patients with acute and chronic pain[16].

Following the order of the Swiss Federal Council, our Pain Center cancelled all non-urgent visits and implemented telemedicine for initial patient contacts. We hypothesized that remote consultations would be accepted, however we could not be sure whether remote counseling would be sufficient for patients suffering from chronic pain. In order to evaluate patients' acceptance of our service and to assess possible relationships between aspects of the COVID-19 pandemic and acceptance of telemedicine, we conducted an anonymous online survey.

Methods

Sample

This anonymous, voluntary survey was conducted between March 31 and July 30, 2020, at the Pain Center of the Bern University Hospital Inselspital in Bern, Switzerland. Referred patients who received a phone consultation instead of an in-person visit during the shutdown period were asked to participate in the study. Patients older than 18 years of age with chronic pain conditions were included, irrespective of the pain condition they were suffering from. Only emergency patients—who did not receive an initial phone consultation—were excluded. Incomplete questionnaires were not included in the analysis.

Procedure and study design

Our approach to using telemedicine for initial contacts was a standardized procedure. First, all chronic pain patients who had been referred to the Pain Center at the Bern University Hospital were separated into urgent, semi-urgent, and non-urgent cases and were then scheduled by urgency according to current recommendations[2]. Second, urgent and semi-urgent patients received treatment as usual (immediate examination and treatment by physicians in the Pain Center), while non-urgent patients were informed that we could not offer an inpatient visit but a telephone consultation would be available. Simultaneously, all patients filled out a preclinical screening survey containing questions about demographics, pain and psychometric scores. The non-urgent patients were then scheduled for a telephone interview with one of the physicians in the Pain Center in order to collect the patient history, review the current treatments, and establish a therapeutic relationship. Patients later received a follow-up telephone call or were scheduled for an appointment at the Pain Clinic when it reopened, depending on the urgency of their condition. The follow-up consultation was a clinical examination and/or interventional procedure after the temporary shutdown.

To evaluate patients' acceptance of our service, and also – as previously hypothesized – to assess a possible relationship between the COVID-19 pandemic and acceptance of telemedicine, a cross-sectional online survey was conducted. Patients had the opportunity to complete this survey either online or in paper-pencil form. After the first

phone call, patients received either the link to the survey or the survey by mail. Additionally, patients had the choice of either submitting the survey anonymously or revealing their identity in order to participate in a follow-up study at a later time. The Cantonal Ethics Committee (KEK) of Bern, Switzerland, waived ethical approval for this study other than the informed consent given at enrolment in the study. Financial support was provided solely by departmental sources.

Materials

The survey was developed by the investigators in the two weeks before the study began, and consisted of a total of 21 items. First, demographic and clinical data regarding gender, age, pain duration, opioid medication and previous interventional pain treatments was collected (Table 1).

To evaluate acceptance of telemedicine, patients were asked to rank the feasibility and appropriateness of the telephone consultation for them in the actual situation. Subsequently, they were asked about various aspects of their pain disorder (e.g., average pain intensity, long-term improvement, confidence in dealing with the pain), previous pain treatment (adequate treatment in the past) and the COVID-19 pandemic (confidence regarding the pandemic, impression regarding political and medical steps). All 15 items (Table 3) were assessed using an 11-point numeric rating scale (NRS) ranging from 0 (not at all) to 10 (completely). Exceptions were made for average pain intensity within the past 24 hours, which was assessed on a scale ranging from 0 (no pain) to 10 (absolutely unbearable), and for the current general condition (0 = very poor, 10 = excellent).

Statistical analysis

First, data was evaluated descriptively and summarized (demographic data in Table 1, descriptive analysis in Table 2). The emphasis was on the acceptance of telemedicine in times of COVID-19 and the patient's current pain situation. In a second step, Spearman correlations between the items listed in Table 3 were calculated. The main focus was on the correlations between acceptance of telemedicine, current mean pain, worries, anxiousness and fear of COVID-19. A correlation of 0.2-0.4 was considered weak, 0.4-0.6 moderate, and 0.6-0.8 strong[17]. Finally, demographic data of the respondents who had voluntarily revealed their identity was compared to the other patients who had been referred during the study period. P values were calculated with a Chi square test for categorical data and with a t-test for continuous data.

Descriptive analysis was performed with IBM SPSS Statistics for Windows, Version 25.0. Visualization of frequency distribution was performed using GraphPad Prism version 8.0.0 for Windows, GraphPad Software, San Diego, California, USA. For Spearman

correlations and graphical analysis, RStudio Team (2020) was used. Statistical significance was set at a p value of <0.001.

Results

Demographic and pain-related clinical data

Between 03/31/2020 and 07/30/2020, 213 non-urgent, chronic pain patients were referred to the Pain Center. After two months of nearly complete shutdown, the Pain Center slowly reopened, offering in-person consultations from 06/05/2020 for patients who were considered to be at low risk of developing severe COVID-19. While 120 patients were scheduled outside the study period or received an in-person visit in the wake of the easing of the shutdown measures, a telemedicine consultation was finally performed with 93 patients. All of them were invited to participate in the survey, and 72 patients responded by 07/30/2020. Of those, 11 withdrew without completing the survey. As we included only complete questionnaires in our analysis, this resulted in an analysis of 61 surveys (return rate 65.6%). The study flow chart prepared according to the STROBE statement[18] can be seen in Figure 1.

The majority of patients were male (57%) and on average 56.9 years old (*SD* = 16.2, range 22-80). They described their current general condition as moderate (Table 2, *M* = 4.3, *SD* = 2.4). The average pain intensity was 5.9 (*SD* = 2.3), and almost all participants (85.2%) had been experiencing chronic pain for several years (mean pain duration 7.37 years). Roughly one quarter (23%) were currently being treated with opioids. Almost two-thirds (62.3%) of the sample had previously received one or more infiltrations. Of these, a large majority (31 of 38, 81.5%) reported either no or only short-term pain relief after the intervention. Table 1 shows the demographic data, the mean values and standard deviations, median and interquartile range (where appropriate). Thirty respondents (49%) revealed their identity during their in-person consultation in order to register for follow-up at a later date. Their demographic data was compared with data of all other patients who had been referred to the Pain Center during the study period, and can be seen in the Supplemental Table. It showed no statistically significant differences in terms of gender, age or BMI (p>0.05).

Acceptance of telemedicine

Patients reported a mean level of acceptance (i.e., feasibility and appropriateness) for this approach (*M* = 6.3, *SD* = 3.6), with a very broad range (*IQR* = 2 to 10), indicating that patient acceptance of telemedicine was very heterogeneous. This is graphically displayed

in a violin plot: Most responses favored the upper third, which reflects higher acceptance, however there was a wide distribution over the whole available scale (Figure 2).

Affective state and affective processing of pain and the COVID-19 pandemic

Patients reported low anxiousness (M = 2.6, SD = 2.8) and infrequent worries (M = 3.2, SD = 3.0). Adequacy of previous pain treatment was rated as moderate (M = 5.1, SD = 3.3). The fear of inadequate treatment of pain in the future, however, was rated slightly lower (M = 4.3, SD = 3.3).

Asked about their confidence that their pain would improve over the long term and whether they would be able to successfully manage their pain, patients also showed medium scores (long-term improvement of pain: M = 5.1, SD = 3.0; confidence in dealing with pain: M = 5.3, SD = 3.0). In addition, the feeling that the pain might get out of control and the possibility that their condition could deteriorate was rather less pronounced (M = 4.1, SD = 3.2).

Regarding the COVID-19 pandemic, patients reported a low level of fear of a severe infection with the coronavirus (M = 2.5, SD = 3.1) and were confident that they would easily cope with the COVID-19 pandemic, with all its consequences (M = 7.4, SD = 2.7). Furthermore, patients were quite content with the steps taken by the medical (M = 7.9, SD = 2.7) and political authorities (M = 7.4, SD = 2.5). Table 2 shows the mean values and standard deviations, median and interquartile range (where appropriate) of all obtained answers.

Correlation analysis

All correlations of acceptance of telemedicine with other items were moderate and ranged from r =-0.40 to 0.54 (p < .001). Patients who reported lower average pain intensity (r = -0.44, p < .001), less worries (r = -0.42, p < .001), and a lower level of fear of a severe COVID infection (r = -0.40, p < .001) showed higher acceptance of telemedicine. Inversely, higher scores in the items "general condition" (r=0.46, p < .001), "previous sufficiently treated pain" (r = 0.44, p < .001), "confidence in dealing with pain" (r=0.54, p < .001) and "confidence in dealing with the Corona Pandemic" (r = 0.44, p < .001) were correlated significantly with higher acceptance.

Moderate to strong correlations were observed between average pain intensity and other items: fear of inadequate pain treatment in the future (r = 0.61, *p* < .001), fear of pain getting out of control (r = 0.57, *p* < .001), belief in future deterioration of the general condition (r = 0.57, *p* < .001) and frequent worries (r = 0.46, *p* < .001) were all significantly positively correlated with current pain levels. General condition (r = -0.77, *p* < .001), belief in long-term improvement of pain (r = -0.62, *p* < .001) and confidence in successful coping with pain (r = -0.73, *p* < .001) were all strongly negatively correlated with pain intensity. Hence, higher pain intensity was associated with worries about future pain development and more worrying in general.

Apart from the correlation with acceptance of telemedicine, fear of a severe infection with the coronavirus showed moderate positive correlations with fear of pain getting out of control (r = .49, *p* < .001) and worrying (*r* = .57, *p* < .001), as well as negative correlations with the confidence to overcome the Corona pandemic (r = -.72, *p* < .001) and satisfaction with political measures taken (r = -.54, *p* < .001). Consequently, greater anxiousness in connection with severe COVID infection was also associated with greater worrying and inversely correlated with confidence in being able to deal successfully with the pandemic.

Correlations between acceptance of telemedicine and anxiousness were found, but were not statistically significant. The strongest positive correlation overall was found between general condition and mean pain levels (*r* = -.77, *p* < .001).

All correlations for the chosen significance level are displayed in Figure 3.

Discussion:

This study assessed the feasibility and appropriateness of telemedicine as perceived by a sample of chronic pain patients being referred to a tertiary pain clinic. Our primary outcome showed a medium level of acceptance with a wide variety of responses, which could be an indication that the assessed group is quite heterogeneous, e.g., subgroups with different levels of acceptance may exist. This might also reflect the inclusion of **all** chronic pain conditions in the current survey, which mirrors the clinical reality in a pain center. The mixed results are in line with a systematic review concluding that satisfaction

with telemedicine is good as long as patients' expectations are met[19]. Overall, there seems to be high satisfaction with telemedicine in general[20] among patients and caregivers, which led to a recent recommendation to implement video and telephone consultations in musculoskeletal practice[21]. Based on our findings of patients' acceptance, this suggestion can only be partially supported in a cohort of chronic pain patients.

The Spearman analysis revealed mostly moderate correlations between the items overall. Surprisingly, the item "fear of a severe infection with coronavirus" was only moderately correlated with acceptance of telemedicine. Before conducting the study, we had hypothesized that the severe measures during the shutdown period would strongly contribute to very high acceptance in patients who are worried about a severe infection (because telemedicine acts as a protective measure). The Spearman analysis did not support this theory. But interestingly, lower pain levels, higher scores for general condition, and satisfaction with previous treatments were significantly correlated with acceptance of telemedicine. This may indicate in turn that the combination of several factors (high levels of pain and unsuccessful previous pain treatment) might lead to lower acceptance of telemedicine and eHealth. To further investigate whether in-person consultations would be preferred and perceived as more adequate, we have already set up another survey to administer during the second and third waves of the COVID-19 pandemic.

The strong correlation between mean pain levels and general condition confirms the expected connection between these two items. We hypothesize that for our current patient sample, perception of general well-being is strongly dependent on the pain experienced. Other strongly pain-correlated items (e.g., "belief in long-term improvement" or "confidence in successful coping with pain") are a further sign of the great influence of mean pain levels on other categories of perception.

Not surprisingly, with respect to the COVID-19 pandemic items, the strongest correlation was found between the fear of a severe corona-virus infection and the confidence to successfully cope with the pandemic ($r = -.72$), meaning that patients who were less

afraid of a severe infection were also more confident that they could effectively deal with the pandemic.

A main limitation of our study is the small sample size, which resulted from limited inclusion of chronic pain patients currently treated by a tertiary center during the shutdown period in one region of Switzerland. The interpretation of the results is therefore limited to this selected sub-population, which renders this study prone to selection bias. This is also a possible explanation for the heterogeneity of the responses. Interestingly, we saw much higher homogeneity if respondents were divided according to current level of pain (two groups, NRS 0-4 and NRS 5-10). Since these groups were very small and had not been defined a priori, we did not include this analysis in our paper. Further, as this is a cross-sectional study, no firm conclusions can be drawn about the factors influencing the observed correlations. The response rate was satisfactory. The comparison between the respondents and all patients referred between 03/31/2020 and 07/30/2020 (see Supplemental Table) showed no significant differences in terms of age, gender or BMI. This can be seen as an argument that our results may be generalizable to the whole population during the study period.

A mitigating factor of our methodological limitations might be the strength that our survey mirrors real-life clinical data from the first wave of COVID-19, after it had been declared a pandemic by the World Health Organization (WHO) on March 11, 2020, and right after shutdown measures took place in Switzerland on March 16, 2020. Despite the stressful and turbulent times at the beginning of the pandemic in Europe, our data show not only unidimensional assessments of simple pain scores, but also a multitude of patient perspectives of telemedicine during the intense first months of severe shutdown measures.

Questions remain with regard to whether acceptance of telemedicine will change over the course of the pandemic, and how eHealth is perceived after the multiple waves of COVID-19. The results from this pilot study encourage large-scale multicenter studies to address whether acceptance of telemedicine differs by subgroups (e.g., high pain levels vs. low pain levels) and whether this influences the kind of consultation chronic pain patients prefer.

Conclusions:

Telemedicine for chronic pain treatment during the COVID-19 crisis was deemed feasible and appropriate to a sufficient degree and therefore accepted by a considerable proportion of patients. However, the higher the mean levels of pain and anxiousness, the lower the level of acceptance, indicating that these severely burdened patients may suffer most from the treatment restrictions. For this subgroup, telemedicine might not suffice.

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Table 1: Demographics

	n	(%)	M (SD)	MED	IQR
Age (in years)			56.89 (16.16)	63	23 to 80
Gender					
male	26	(42.6)			
female	35	(57.4)			
Pain duration in years			7.37 (7.30)	5	2 to 10
Use of opioids					
yes	14	(23.0)			
no	42	(68.9)			
not specified	5	(8.2)			
Infiltrations					
no	21	(34.4)			
yes, w/o success	15	(24.6)			
yes, successful over the short term	16	(26.2)			
yes, successful over the long term	7	(11.5)			
not specified	2	(3.3)			

Abbreviations: n = numbers of patients, M = mean, SD = standard deviation, MED = median, IQR = interquartile range.

Table 2: Descriptive analysis

	M (SD)	MED	IQR
General condition	4.26 (2.38)	4	2 to 6
Average pain intensity	5.90 (2.32)	6	5 to 8
Acceptance of telemedicine	6.25 (3.56)	7	2 to 10
Anxiousness	2.56 (2.78)	2	0 to 4
Frequent worries	3.18 (2.95)	2	1 to 4
Adequate treatment of pain	5.11 (3.29)	5	2 to 8
Anxiety regarding inadequate treatment of pain the future	4.25 (3.26)	3	2 to 7
Long-term improvement of pain	5.07 (2.99)	5	2 to 7
Confidence in dealing with pain	5.25 (2.94)	5	3 to 7
Feeling of pain getting out of control	4.07 (3.17)	4	1 to 6
General condition will deteriorate	4.00 (3.15)	4	1 to 6
Fear of severe coronavirus infection	2.54 (3.11)	1	0 to 4
Confidence regarding Corona pandemic	7.39 (2.68)	8	6 to 10
Correct medical steps	7.87 (2.43)	9	7 to 10
Correct political steps	7.44 (2.45)	8	6 to 10

Abbreviations: M = mean, SD = standard deviation, MED = median, IQR = interquartile range.

Table 3: Questionnaire

Acceptance of telemedicine [Accept]

I consider telephone consultations to be feasible and appropriate for me in the current situation. (0 = not at all, 10 = completely)

General condition [GenCon]

My current general condition is… (0 = very poor, 10 = excellent)

Average pain intensity [MeanPain]

Over the last 24 hours my pain intensity was on average… (0 =no pain, 10 = absolutely unbearable)

Adequate treatment of pain [AdTreat]

My pain has been treated sufficiently. (0 = not at all, 10 = completely)

Long-term improvement of pain [Improv]

I think my pain will improve over the long term. (0 = not at all, 10 = completely)

Confidence in dealing with pain [PainCope]

I am confident that I will cope with my pain. (0 = not at all, 10 = completely)

Confidence regarding Corona Pandemic [PandCope]

I am confident that I will overcome the Corona Pandemic with all its consequences. (0 = not at all, 10 = completely)

Correct medical steps [SatMed]

I have the general impression that the healthcare sector has taken the right steps so far during the pandemic. (0 = not at all, 10 = completely)

Correct political steps [SatPol]

I have the impression that our political leaders have taken the right steps so far during the pandemic. (0 = not at all, 10 = completely)

Anxiety regarding inadequate treatment of pain in the future [InsuffTreat]

I fear my pain won't be treated sufficiently in the future. (0 = not at all, 10 = completely)

Perception that pain will get out of control [PainControl]

I fear my pain could get out of control and take a bad course. (0 = not at all, 10 = completely)

General condition will deteriorate [DetGenCon]

I believe my general condition will deteriorate in the future. (0 = not at all, 10 = completely)

Fear of severe coronavirus infection [FearCOVID]

I'm afraid of becoming seriously ill due to COVID-19. (0 = not at all, 10 = completely)

Frequent worries [GenWorr]

I tend to worry. (0 = not at all, 10 = completely)

Anxiousness [GenAnx]

I tend to be anxious. (0 = not at all, 10 = completely)

Figure 1: Study Flow Chart

Referred to the Pain Center
(n = 213)

Scheduled outside of study period
or received in-person visits later
(n = 120)

Received a telephone consultation, invited to
participate
(n = 93)

Didn't participate
(n = 21)

Responded to survey
(n = 72)

Cancelled survey during
completion
(n = 11)

Completed the survey, included in analysis
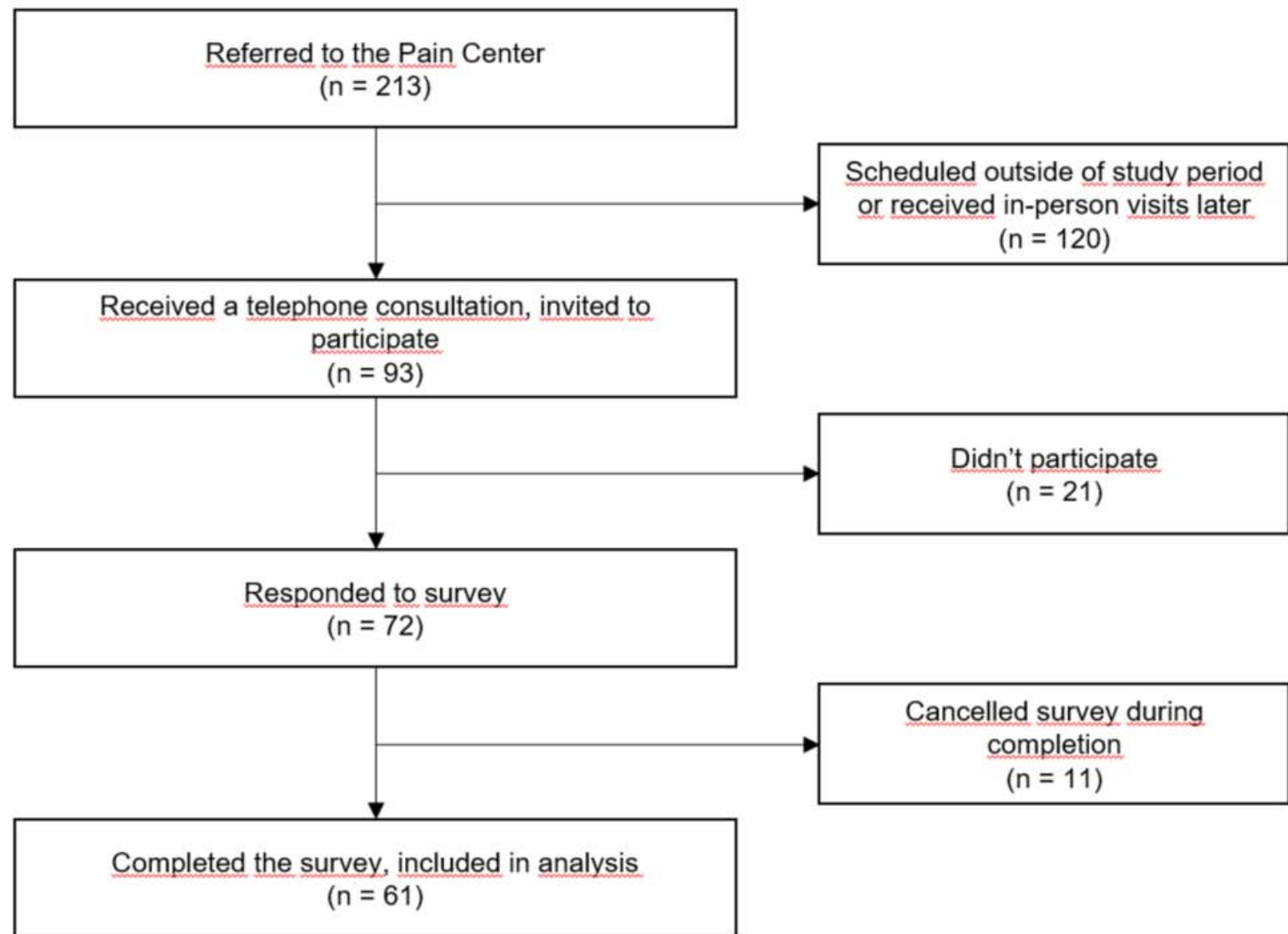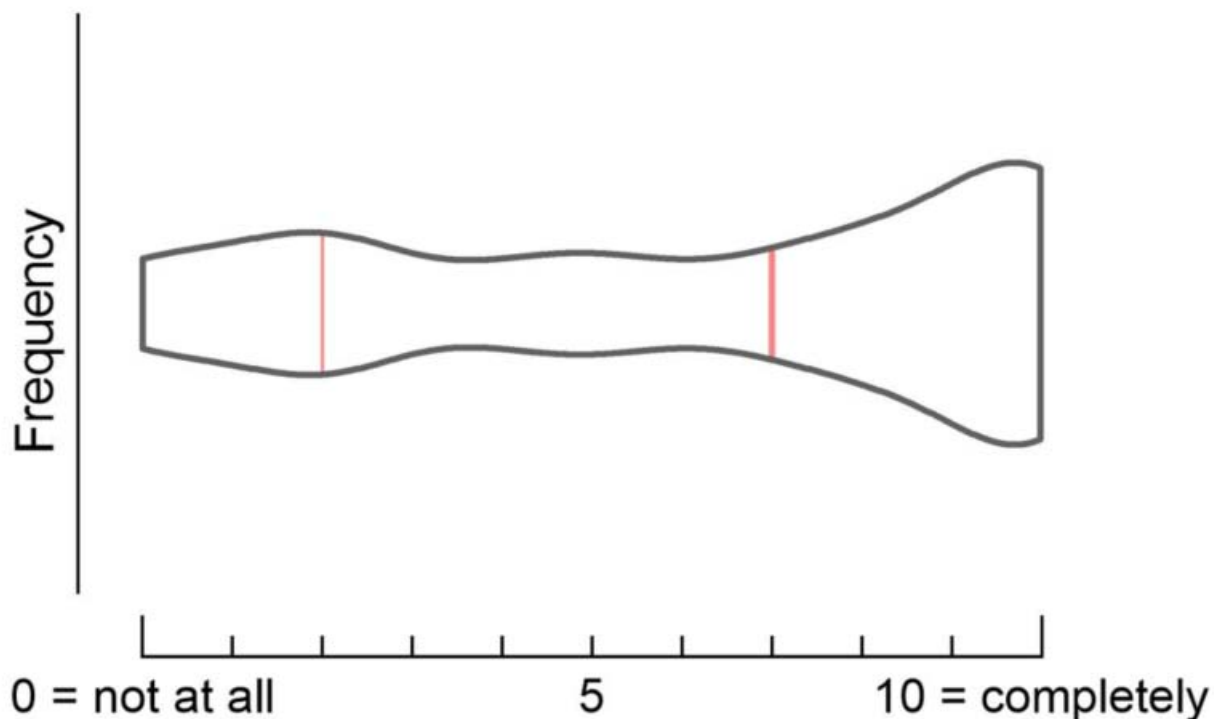(n = 61)

Figure 2: Violin plot

Acceptance of telemedicine

"I consider telephone consultations to be feasible and appropriate for me in the current situation."

Figure 3: Spearman correlation plot