Effects of Communication Media Choice on the Quality and Efficacy of Emergency Calls assisted by a Mobile Nursing Protocol Tool

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Conflicts of Interest

The authors do not have any conflict of interest to declare.

ABSTRACT

The transition from paper to electronic-based records in the healthcare industry has posed several challenges to conventional medical practices. The introduction of technology in day-to-day medical and nursing practices deserves careful consideration. In this work, we report the results of a controlled experiment to compare nurses' consultation in emergency calls in six different conditions. We studied the effect that the type of communication media (face-to-face, telephone, videoconference) and type of nursing protocol media (paper-based, electronic-based) can have upon consultation time, mistakes made, pauses during consultation, eye contact, and efficacy of the consultation. We found that the type of communication media has an effect on consultation time; on average, fewer mistakes were made during telephone-based consultations; for eye contact, there were significantly fewer eye contacts during face-to-face than during videoconference consultations; finally, the type of communication media or protocol media did not have any effect in the efficacy of the consultation.

KEYWORDS

Health informatics; Homecare nursing; Mobile information technology; Technology; Personal Digital Assistants.

INTRODUCTION

In the wake of new media, an aging population, an associated increase in chronic diseases, and limited healthcare infrastructure, several Public Health Organizations (PHOs) are seeking a good compromise between quality of care and cost, particularly in developing countries where the process of aging has been particularly fast[1, 2]. The use of communication media for medical assessment has given place to new areas such as Telemedicine, in which physicians and specialists can carry out consultations and critical care from a geographically distant location.

The recent transition from paper to electronic-based records in the health care industry is posing several challenges to conventional medical practices[3]. In some cases, medical staff have been resistant to change, hampering the adoption of new technologies in the workplace[4]. However, in some developed countries, having the physician use a computer while attending a patient is nowadays familiar. The introduction of this artifact into practices of this sort has been object of several studies[5, 6]. For example, previous research has focused on how a computer or electronic-based medical records may have some effect in the patient-health staff relationship. Several of these studies focus on the way digital devices might be affecting the quality of service provided by health staff[5, 7], whereas others focus on the overhead caused by the multi-tasking between computer systems and the patient[8]. Often, these new artifacts have posed serious challenges to work practices, as they continually demand the attention of the health staff. However, some studies have shown that risks can be minimized with effective computer training[5] or if technology is perceived as useful[9].

The work presented in this paper is part of a study coordinated by the Mexican Social Security Institute (IMSS)[*]. The ultimate goal of the study was to find innovative strategies to cater for the need of the growing older population in Mexico. The study aimed at comparing two different intervention schemes in in-home elderly health care during a nine-month period. The first two groups experienced a rather uncommon intervention in countries like Mexico. That is, nurses visited older adults in their homes on a weekly basis to assess their health conditions. From those two groups, one of them carried out the assessment using paper-based records (44 older adults). On the other hand, the second group involved 45 older adults who, in addition to weekly visits and assessment, had a technological component: the use of portable panic buttons by older adults and handheld electronic devices by nurses. Older adults had 24/7 access to their appointed nurse through the panic buttons (GH1202 by Teltonika) and each nurse carried a handheld electronic device (Ipod Touch by Apple) with a triage application consisting of a set of nursing protocols related to elderly patients, based on standard nursing protocols[10]. The application was designed to assist nurses in providing accurate, standardized diagnoses and recommending appropriate actions to be taken in the event of emergency calls by older adults. During their visits to the patients' households, nurses were in charge of checking the status of the panic buttons (e.g., battery, signal, use/disuse). The third group was a control which involved 44 older adults who continued with their conventional form of attention i.e., a monthly medical checkup at the clinic they were assigned to.

[*] The IMSS is a mandatory social security system offering a comprehensive package of benefits, including health care at all levels and economic benefits such as a retirement pension. The IMSS is one of the largest PHO in Latin America with around 55 million insured Mexicans.

Recent studies have reported that medical staff frequently relies on paper-based instruments to facilitate their work[11, 12]. In countries like Mexico, the use of paper-based records is still common, but the use of electronic records is increasing. Nonetheless, as mentioned, the introduction of computers and other type of technology might have had unintended side effects due to the attention demanded by the technological artifacts. In this sense, previous studies have shown that divided attention can have some negative impact on patient satisfaction as well as the perception of quality of care[13, 14]. Thus, the importance of better understanding those issues that influence patients' perception such as the use of computers in patient-doctor consultations. Also, eye contact has been previously reported to have a positive impact on health staff-patient consultations[13-15]. Moreover, pauses during patient-doctor consultations longer than 5s have been reported to disrupt the conversation by inappropriately deflecting it away from the current topic[6]

On the other hand, the limitations of some Information and Communication Technologies (ICT) can be decisive in the quality of patient-doctor communication as vagueness in communication can have serious consequences and it can alter patient-doctor rapport[16]. Media Richness Theory (MRT) highlights the different abilities that media have for reproducing information, based on the media capacity for feedback, the number of channels utilized, and language variety. In particular, MRT places media along a continuum in which face-to-face communication lies at one extreme (richer media) and unaddressed documents lie at the other (leaner media) such as flyers. The underlying principles of MRT is that the more cues you can convey during communication, the lesser the uncertainty and equivocality, and that some communication media are more suitable for some tasks than others[17].

Therefore, understanding how certain media can be used in health staff-patient communication is particularly important for the purposes of medical/nursing diagnosis and assessment, and patient-medical staff communication. In this work, we use media richness theory as our theoretical framework, through which we aim at understanding the effects that communication media choice (paper-based and electronic-based nursing protocols) can have on the quality of communication during nurse-patient consultations. That is, we study the effects of media choice on pauses, eye contact, consultation time, and efficacy of consultations.

METHODS

Amid the IMSS project, we conducted an experiment to compare the performance of nurses under six different conditions during nurse-patient consultations, using a combination of two main factors. The first factor (two conditions) is related to nurses interacting with technology while carrying out a patient consultation i.e., type of protocol media used to support consultation. On the other hand, the second factor (three conditions) pertains to nurse-patient consultations through technology i.e., the type of communication media used for the nurse-patient interaction.

The hypotheses were tested using a factorial design, using empirical data collected through a controlled experiment in the laboratory. Permission to conduct the study was obtained from the institutional ethical review board at the IMSS.

Research variables

Several hypotheses were tested during the experiment aimed at observing the effects of the two main factors in patient-care consultations. Some of the hypotheses were related to nurses interacting with technology, i.e., the type of protocol media used by the nurses when carrying out the consultation. Also, some of the hypotheses had to do with the communication media used for

the interaction between the nurse and the patient during the consultation. Furthermore, we tested some hypotheses related to the interaction of the protocol media and communication media. The independent and dependent variables we looked at are next described.

Independent variables

- **Nurses interacting with technology (Protocol Media)**. The type of protocol media used during the consultation: 1) Paper-based protocols, 2) Electronic-based protocols.
- **Nurses interacting through technology (Communication Media)**. The type of communication media used for consultation: 1) Face-to-face, 2) Telephone, 3) Videoconference.

Dependent variables

- **Consultation time**. Time in seconds from the beginning of the consultation until it ends
- **Navigation path**. The number of additional steps taken by the nurses when navigating the nursing protocol. Every additional step means a divergence from the optimal path of consultation using the standard nursing protocols.
- **Pauses**. Number of pauses during consultation (2s +) and aggregated time during pauses.
- **Eye contact**. The number of times in which patient and nurse engaged in eye contact as well as the aggregated time spent in eye contact (not applicable for consultations conducted over the telephone).
- **Efficacy**. A physician assessed the nurses' performance in terms of their final recommendation to patients.

Participants

From the group of nurses who were working in the aforementioned project, all of them participated in the experiment. In the end, we had twelve participants (nine females, three males).

The average age of the participants was 30 years old (SD=10.7), ranging from 23 to 51 years old. Also, six postgrad students (five males, one female) were invited to participate as patients. Previous research has shown benefits in using 'actors'[18]. At the time of the study, seven nurses from one of the intervention groups had been operating the handheld electronic device for approximately one month; all of them were internet users as well as mobile phone users.

Materials

In the experiment, for Communication Media, we used conventional telephones placed in different rooms within the same building. A videoconferencing room (TV set, cameras) was also used for the experiment. Finally, a meeting room was also used where for face-to-face consultations. For the Protocol Media, we created a mobile-based application where electronic-based protocols were installed (Figure 1), and print protocols ordered alphabetically in a folder. Both types of protocols, electronic and paper-based, were identical in content.

The mobile-based application (i.e., electronic-based protocols) includes twenty-seven protocols that focus on the most frequent symptoms or signs of geriatric patients. The application provides a clear-cut interface where the names of the patients assigned to the nurse are presented in the first screen. When a nurse selects one of them, the contact information of a member of the older adult's network becomes available so s/he can use it when needed. Then, the nurse selects the protocol that s/he considers to be the most appropriate based on personal criteria, professional experience, the medical record, and the symptom reported by the patient (Figure 1, left). Next, a set of questions are presented related to the symptom of the patient. These questions are used to assess the severity of the patient's condition, to which the nurse must respond with YES/NO answers in order to take the best clinical decision. The first set of questions presented to the nurse pertains to injuries or conditions that can put the patient at high risk and urgent

health care might be needed. The severity level decreases as the assessment process carries on. Should the nurse positively endorse one of the questions, a recommendation is displayed depending on the severity of the condition such as calling an ambulance (Figure 1, right). Ultimately, if the injury or condition represents no threat to the life of the patient, a set of home care recommendations is provided.

Experimental Design

A 2*3 (Communication Media*Protocol Media) ANOVA design was employed where Communication Media and Protocol Media were both within-subjects factors. For the experiment, six clinical cases were designed by a physician involving common afflictions of older patients such as diarrhea, headache, fatigue, and the like. The configuration of the experiment was as follows:

a) Three locations were set up: Location A was for consultation through videoconference, location B for face-to-face consultations, and location C for telephone consultations.
b) Prior to the experiment, nurses were given a 20-min explanation of the logistics and aims of the experiment as well as a 10-min training session on the use of the handheld electronic device (Ipod Touch), the electronic-based protocols, and the paper-based protocols provided. Also, nurses were provided with a two-page pamphlet explaining in detail the configuration of the experiment so they knew times and order of the consultations.
c) Each nurse consulted six different patients using a combination of the 2*3 levels of the main factors. For instance, nurse 1 consulted a patient experiencing depression using the paper-based protocols via videoconference. The consultations were programmed such that nurses only consulted each patient once using one combination of Communication Media and

Protocol Media. The order of presentation of the Communication Media and Protocol Media was counterbalanced across all participants to avoid threats to internal validity.

d) After the six consultations, nurses answered a survey about their perceptions on ease of use, usefulness, and attitudes towards the use of electronic-based protocols or paper-based protocols. Each consultation was recorded for posterior analysis.

e) Each of the six patients represented one disease. They were provided with a list of symptoms associated with their disease. They were asked to be precise, succinct, and consistent when answering the nurses' questions during each consultation.

Statistical Analysis

The data were computed and analyzed in IBM SPSS Statistics 20 (IBM, Armonk, NY). Dependent variables were evaluated across the twelve participants under six different conditions. Repeated-measures analysis of variance (ANOVA) was used to examine the performance of some of the dependent variables: total time for the consultation, navigation path, pauses during consultation, and nurse-patient eye contact. Finally, we used the McNemar test for repeated measures for efficacy of the consultation, as it was a dichotomous variable indicating whether the nurse correctly assessed the patient according to standard nursing protocols.

RESULTS

Consultation time

The results of the repeated-measures experiments using the different combination of the two main factors were analyzed. The main effect of Protocol Media was significant: $F(1,11)=10.820$, $p=.007$, partial $\eta^2=.496$. The main effect of Communication Media was not significant: $F(1,11)=0.076$, $p=.788$, partial $\eta^2=.007$. Finally, there was no significant interaction between

Protocol Media and Communication Media: $F(1,11)=1.261$, $p=.285$, partial $\eta^2=.103$. This interaction is displayed in Figure 2 (left), showing that the consultation time was shorter (mean=223.3, SE=40.7) when using electronic-based protocols than using paper-based protocols (mean=310.8, SE=53.3) during face-to-face consultations, and that this effect of Communication Media was reduced for videoconference consultations.

Navigation path

The navigation path is the number of steps taken by the nurse to get to the final recommendation. We computed the optimal path derived from the standard nursing protocols, meaning that the path taken goes to the final recommendation without considering alternative conditions. We compared the optimal path to the observed path. Each divergence from the optimal path was penalized with 1 point, meaning that the closer to zero, the better the navigation path i.e., a nurse did not take any additional steps.

The results of the repeated-measures experiments using the different combination of the two main factors were analyzed. The main effect of Protocol Media was not significant: $F(1,11)=0.299$, $p=.298$, partial $\eta^2=.026$. The main effect of Communication Media was not significant either: $F(1,11)=0.039$, $p=.424$, partial $\eta^2=.004$. However, there was a significant interaction between Protocol Media and Communication Media: $F(1,11)=5.108$, $p=.023$, partial $\eta^2=.317$. This interaction is displayed in Figure 2 (left), showing that the navigation path was shorter (mean=1.2, SE=0.4) when using electronic-based protocols in face-to-face consultations and longer (mean=3.4, SE=1.4) during videoconference consultations. The opposite happens with paper-based protocols, in which the navigation path is shorter (mean=0.8, SE=0.2) during videoconference consultations than face-to-face consultations (mean=3.4, SE=1.1). The effect is reduced during telephone-based consultations.

Eye contact

Eye contact was measured in two different ways. First, we counted the number of occurrences i.e., the number of times in which nurse and patient established eye contact for more than 2 consecutive seconds. In addition, we measured the total time spent in this behavior during the consultation. For eye contact, the main effect of Protocol Media was not significant: $F(1,11)=0.751$, $p=.405$, partial $\eta^2=.064$. The main effect of Communication Media was significant: $F(1,11)=3.294$, $p=.049$, partial $\eta^2=.230$. The interaction between Protocol Media and Communication Media was not significant: $F(1,11)=.264$, $p=.618$, partial $\eta^2=.023$. The Communication Media effect can be observed in Figure 3 (left), showing that the average number of eye contacts was higher when using Paper-based protocols (mean=24.3, SE=3.7) than when using electronic-based protocols (mean=21.6, SE=2.1). Furthermore, the combination of paper-based protocols and videoconference seems to influence the number of eye contacts between nurse and patient, although this interaction is not statistically significant.

We also measured the total amount of time in which the patient-nurse engaged in eye-contact during a consultation (Figure 3, right). The main effect of Protocol Media was not significant: $F(1,11)=0.589$, $p=.459$, partial $\eta^2=.051$. The main effect of Communication Media was not significant either: $F(1,11)=.193$, $p=.669$, partial $\eta^2=.017$. Finally, the interaction between Protocol Media and Communication Media was not significant: $F(1,11)=.462$, $p=.511$, partial $\eta^2=.040$. In this case, none of the factors had an effect in the aggregated time spent in eye contact between the nurse and patients.

Pauses during consultation

Pauses during consultation were also considered as well as the aggregated time spent in those pauses. For the number of pauses, the results are as follows: The main effect of Protocol Media was not significant: $F(1,11)=0.034$, $p=.857$, partial $\eta^2=.003$. The main effect of Communication

Media was not significant either: F(1,11)=.069, p=.798, partial η^2=.006. However, there was a significant interaction between Protocol Media and Communication Media: F(1,11)=3.302, p=.049, partial η^2=.231. This interaction is displayed in Figure 4 (left), showing that the number of pauses were fewer when using electronic-based protocols in face-to-face consultations (mean=3.8, SE=0.7), and more during videoconference consultations (mean=5.8, SE=1.3). The opposite happens with paper-based protocols, in which the number of pauses were fewer during videoconference consultations (mean=4.1, SE=1.0) than in face-to-face consultations (mean=5.4, SE=1.9). The effect is reduced during telephone consultations, having the fewest number of pauses in paper and electronic-based consultations.

For the total time of the consultation spent in apparent waiting time i.e., pauses, we obtained the results observed in Figure 4 (right). The main effect of Protocol Media was not significant: F(1,11)=0.234, p=.638, partial η^2=.021. The main effect of Communication Media was not significant: F(1,11)=.677, p=.428, partial η^2=.058. The interaction between Protocol Media and Communication Media was not significant either: F(1,11)=1.805, p=.206, partial η^2=.141.

Efficacy of the consultation

The efficacy of the consultation was measured by comparing the performance of nurses in comparison to the type of nursing protocol and the subsequent final recommendation. The McNemar test using the binomial distribution did not show a significant difference in the number of correct assessments, between the two conditions of Type of protocol used in face-to-face consultations (N=12, exact p=1.000), audio-only consultations (N=12, exact p=1.000), and audio-video consultations (N=12, exact p=.687).

DISCUSSION

This study offers preliminary evidence on some of the advantages and disadvantages of conventional vs. technologically-enabled consultations. The reported results (Table 1) do not point to one approach being clearly better than the other. For instance, one would expect that having some technology at our disposal can have some positive impacts on work practices. However, if nurses do not receive adequate training, like our participants, any technological device can potentially become a burden and its effect on health staff-patient communication/rapport becomes not easily predictable[15]. For instance, having the nurses interact with a mobile device at the same time that they interact with a patient through technology as in the case of videoconference, can result in delayed consultations, with nurses focusing more on the handheld electronic device, video camera, and TV set and less on the patients.

Consultation time

As observed in Figure 2 (left), consultation time was significantly lower in the electronic-based protocols than in the paper-based nursing protocols. Therefore, Protocol Media has an important effect when it comes to carrying out consultations. The observed difference can be due to search time, which is the time taken to seek an adequate nursing protocol, according to the patients' accounts of symptoms or nuisances. On the other hand, when comparing the means across the different types of Communication Media used for the consultation, the largest mean difference (84.5s) was observed in face-to-face consultations. However, this difference was reduced to 26.1s when nurses were interacting with their patients through videoconference. It is hard to draw definite conclusions from these observations but we think that the difference can be due to various phenomena. First, interacting with an electronic device such as the Ipod Touch can demand considerable effort from the nurse, let alone her focus of attention. If, on top of that,

the nurse has to interact through another device, like in the case of videoconference (i.e., TV set and camera), their performance in terms of time could be disturbed. This behavior was also observed in the telephone consultations which also demands attention from the nurse, but not to the point where they must be continuously shifting attention to the camera, TV, and the handheld device.

Navigation path

Taking an appropriate course of action in emergency calls is of paramount importance for adequate patient care. Therefore, when assessing a patient, the navigation path taken from the initial question to the final recommendation can be crucial should the condition of the patient be serious. That is, taking additional steps when asking questions or confounding one symptom with another can have a significant impact on the older adult's wellbeing or condition. Therefore, it is desirable that the nurse in turn can reach to the appointed recommendation or course of action in the fewest possible steps (i.e., the shortest navigation path) as this could mean shorter response time. Ultimately, it could also be argued that the fewer the steps, the higher the probability of having an accurate recommendation.

From the results (Figure 2, right), we cannot conclude that either the Protocol Media or Communication Media used has a significant effect in the navigation path. However, the interplay of these factors does provide a significant finding: It took the nurses more steps when they were using the electronic-based protocols and having the consultation through videoconference. Again, this could be due to the fact that they were constantly switching their attention from one media (the Ipod) to the other (TV set and camera). On the other hand, the use of the telephone for consultation seems to explain the reduced number of steps as they might not

have to shift their attention to various media and instead focus their attention on their current task in the handheld electronic device. This is not definite, but it certainly can lead to further studies.

Eye contact

Following Figure 4, as expected, paper-based consultations had the largest number of eye contacts in contrast to nurses using the electronic-based protocols, which might be due to the attention demanded by the handheld device from the nurse. However, the effect of Protocol Media was not statistically significant. As opposed to what one would expect, face-to-face consultations seem to have little effect in the number of eye contacts (1.2 eye contacts) as opposed to videoconference-based consultations, which had the largest mean difference (4.2 eye contacts). This in turn leads to having a statistically significant effect of Communication Media, meaning that the type of media used for consultation has an effect in eye contact behavior.

On the other hand, it is important to note that the overall time spent in eye contact during consultations seems to be lower in electronic-based protocols than in paper-based ones, as illustrated in Figure 3 (left). This means that we did not find any strong indicator that the aggregated time in eye contacts during consultations was influenced by any of the main factors or a combination of them. However, following figure 3, it can be seen that, on average, there were some consultations in which there were fewer but longer eye contacts during face-to-face consultations and using paper-based protocols i.e., no technology involved. This effect seems to be reversed for consultation that took place through videoconference.

Pauses during consultation

We considered a pause a timeframe of at least 2 consecutive seconds during which none of the interlocutors was speaking i.e., silence. We counted the number of pauses as well as the accumulated time spent in pauses during consultations. The behavior observed in figure 4 is

similar to that of the navigation path during the consultation (Figure 2, right), which are positively correlated i.e., the more pauses, the longer the navigation path ($r=.447$, $N=72$, $p<.01$, one-tailed). It is a fairly moderate correlation explaining around 20% of the variation. Overall, pauses during consultations over the telephone were fewer when compared to face-to-face and videoconference. This can be explained by visual cues conveyed through those types of media, in which patients can see, for instance, that the nurse is busy consulting the protocol. The aggregated time spent in pauses did not provide any significant results but it seems interesting that on average the use of paper-based nursing protocols in face-to-face consultations had the largest pauses (see Figure 4).

One interesting aspect that the entire set of tests unearths is a debate of whether interacting with and through technology can be appropriate when working with patients. What's more, the type of Communication Media used during the consultation had a significant effect in the number of eye contacts, having more eye contact when interacting via videoconference than in face-to-face consultations. This can be due to a compensation of the media richness[17] i.e., the more body cues conveyed between interlocutors, as in face-to-face, the more effective the communication. In this sense, nurses seem to be compensating by eye contacting more their patients during consultations via videoconference, than during face-to-face.

Efficacy of the consultation

We did not find any strong indication that any of the main factors can have an influence on the efficacy of the consultation. This means that in practice the type of protocol used for patient assessment did not have an effect in the outcome of the consultation.

In general, the findings reported in this paper suggest that having some form of technology while consulting with patients can be potentially detrimental to patients' perception of quality of

communication[19]. This is consistent with previous studies where patients report a perception of the clinician being distracted from attending them when looking at a computer monitor[5, 6, 19]. For instance, the observations showed that the length of the navigation path was positively correlated to the number of pauses. Still, the causality of this behavior cannot be determined; it could be that an increased number of pauses can be ascribed to various factors such as the type of technology, the training of the nurse in medical or technological terms, or that the additional steps taken made the nurse to slow down and find out what was going on before proceeding. In any case, this sole correlation can be an interesting issue to study in an additional study; therefore, further studies involving a larger number of participants can be required to find definite answers to some of the concerns raised in this work.

The study is limited by the small number of participants and the fact that the simulated patients in some instances were unable to elaborate on questions asked by the nurses.

CONCLUSIONS

The inclusion of mobile devices or other form of technology to mediate patient-nurse communication merit careful consideration as it may disrupt conventional forms of interaction between patients and nurses. In this work, we presented the results of a controlled experiment carried out to compare nurses' performance during consultations under various conditions. From our observations, it can be concluded that nurses can carry out a consultation faster using electronic-based protocols rather than paper-based. However, this does not imply that the interaction will be more effective, as there was no difference in the final recommendation given to patients. Also, we observed that nurses generally performed worse (i.e., additional steps taken, more pauses) when they were conducting the consultations using the handheld electronic

protocols through videoconference. More training sessions and sustained use of both technologies could perhaps alleviate the problem.

This was an early attempt to compare the performance of medical staff under six different conditions. This work offers empirical evidence that technology can have some effects in various aspects of interpersonal communication, like in patient-doctor consultations. Our findings are promising but further studies are required to better understand these effects.

AUTHORS' CONTRIBUTIONS

The work presented here was carried out in collaboration between all authors. CGP defined the overall project. JF and LC designed methods and experiments, and carried out the laboratory experiments. LC analyzed the data and wrote the paper; LC and JF interpreted the results. All authors have contributed to, seen, and approved the manuscript.

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LIST OF FIGURE LEGENDS

Figure 1. Screenshot of the electronic-based protocols

Figure 2. Consultation time (left); Navigation path (right)

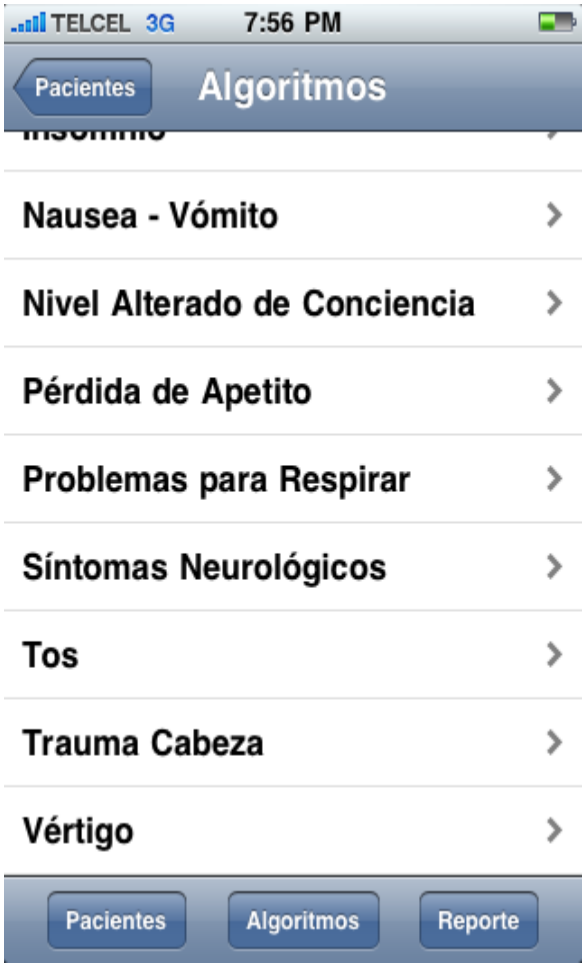
Figure 3. Eye contacts between nurses and patients: Number of eye contact (left); Time spent in eye contacts (right)

Figure 4. Pauses during nurse-patient consultation: Number of pauses (left); Aggregated time spent in pauses (right)

LIST OF TABLE LEGENDS

Table 1. The effects of media choice: Communication Media, Protocol Media, and their Interaction (Protocol Media * Communication Media)

Figure 1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7:56 PM
Pacientes
Algoritmos
Nausea - Vómito
Nivel Alterado de Conciencia
Pérdida de Apetito
Problemas para Respirar
Síntomas Neurológicos
Tos
Trauma Cabeza
Vértigo
Pacientes
Algoritmos
Reporte

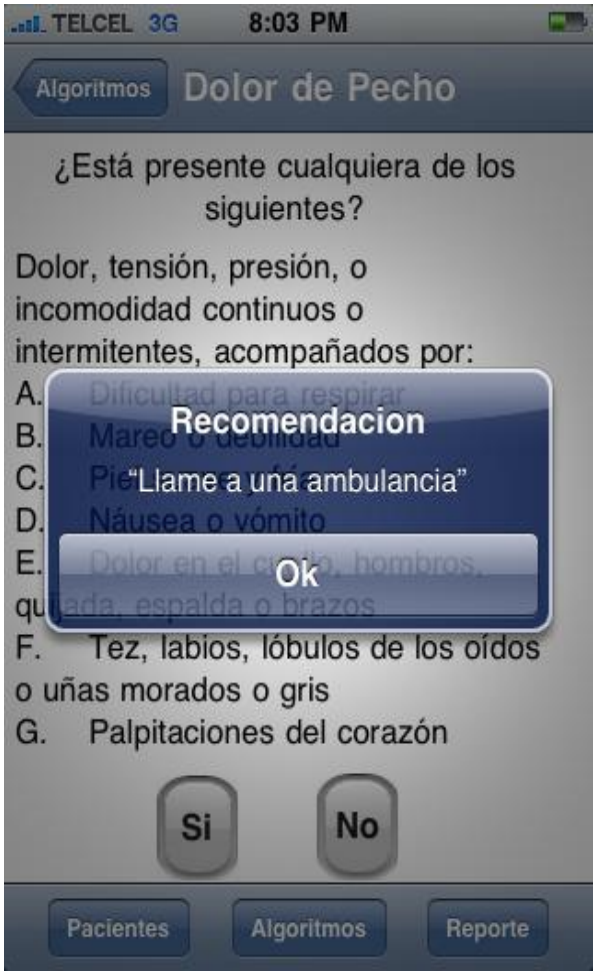
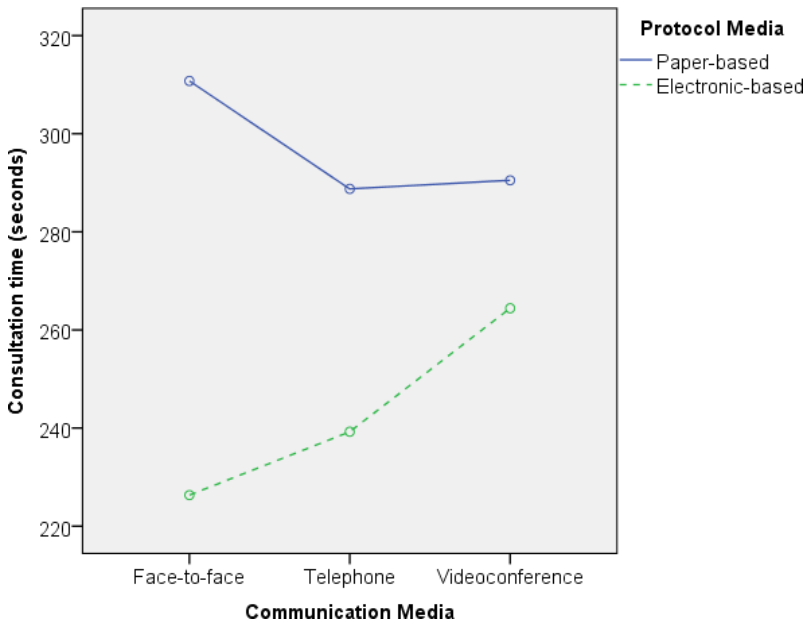

TELCEL 3G
8:03 PM
Algoritmos
Dolor de Pecho
¿Está presente cualquiera de los siguientes?
Dolor, tensión, presión, o incomodidad continuos o intermitentes, acompañados por:
A.
B.
C.
D.
E.
F. Tez, labios, lóbulos de los oídos o uñas morados o gris
G. Palpitaciones del corazón
Recomendacion
"Llame a una ambulancia"
Ok
Si
No
Pacientes
Algoritmos
Reporte

Figure 2


Protocol Media
Paper-based
Electronic-based
Consultation time (seconds)
320
300
280
260
240
220
Face-to-face
Telephone
Videoconference
Communication Media

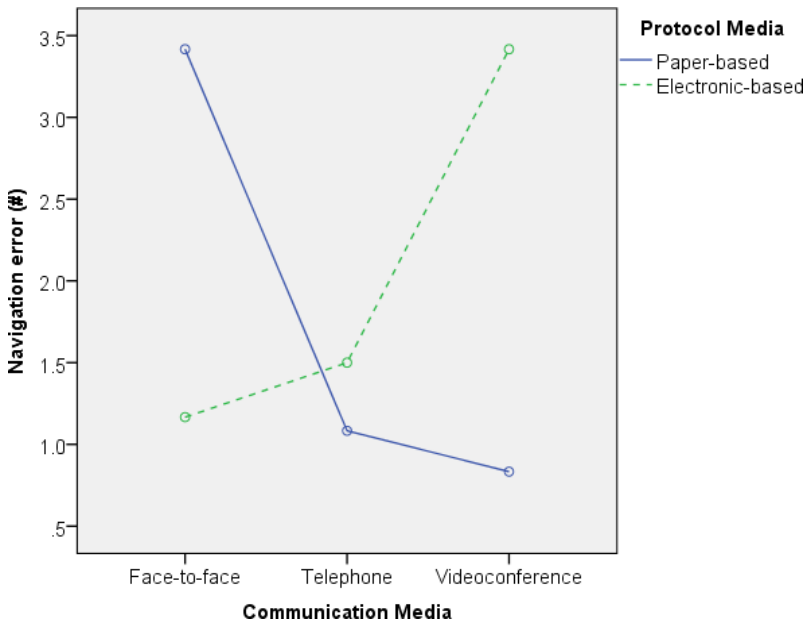

Protocol Media
Paper-based
Electronic-based
Navigation error (#)
3.5
3.0
2.5
2.0
1.5
1.0
.5
Face-to-face
Telephone
Videoconference
Communication Media

Figure 3

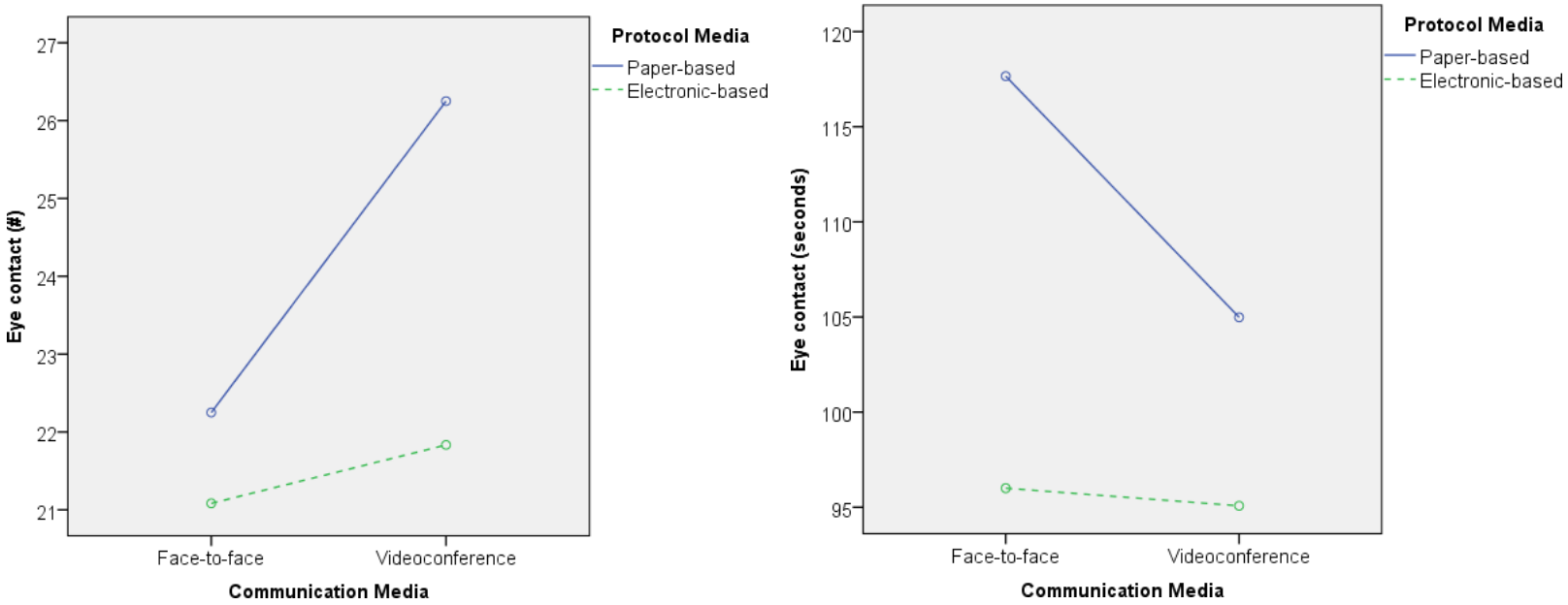

Eye contact (#)
27
26
25
24
23
22
21
Face-to-face
Videoconference
Communication Media
Protocol Media
Paper-based
Electronic-based
Eye contact (seconds)
120
115
110
105
100
95
Face-to-face
Videoconference
Communication Media
Protocol Media
Paper-based
Electronic-based

Figure 4

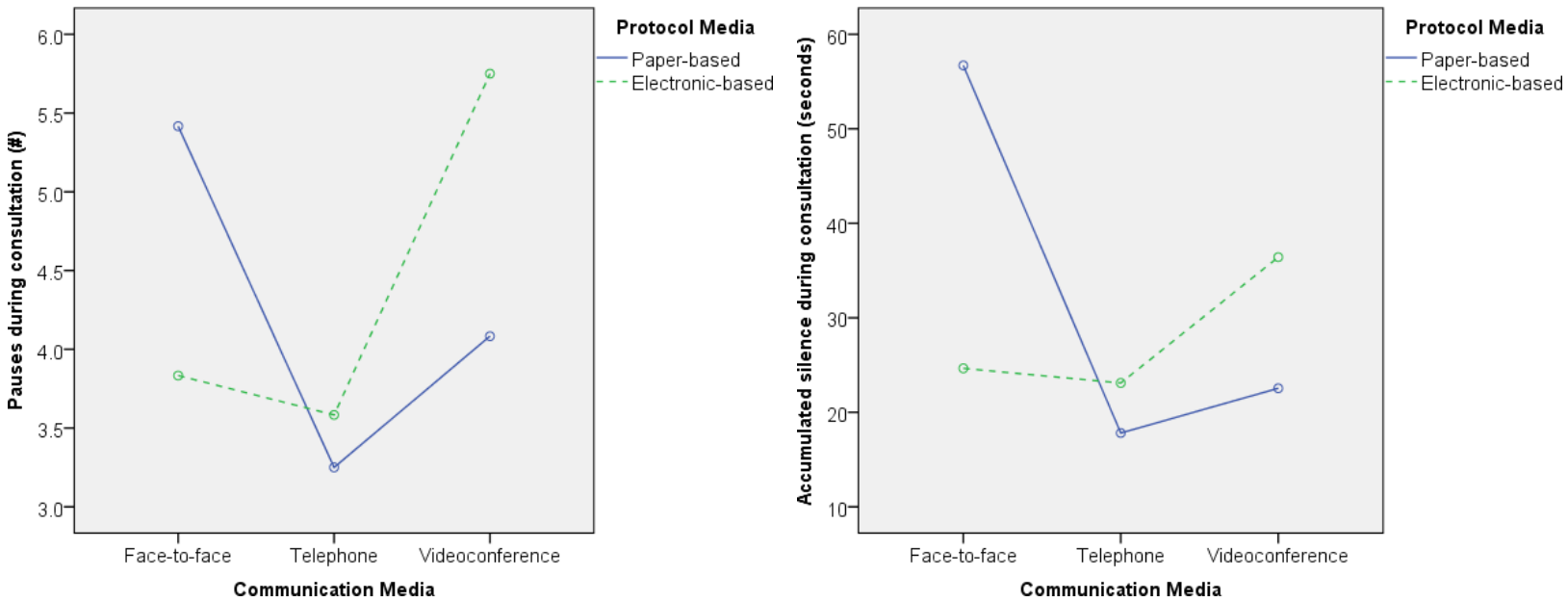

Pauses during consultation (#)
6.0
5.5
5.0
4.5
4.0
3.5
3.0
Face-to-face
Telephone
Videoconference
Communication Media
Protocol Media
Paper-based
Electronic-based
Accumulated silence during consultation (seconds)
60
50
40
30
20
10
Face-to-face
Telephone
Videoconference
Communication Media
Protocol Media
Paper-based
Electronic-based

Table 1

Communication Media	Face-to-face		Telephone		Videoconference		Effects of Media Choice		
Protocol Media	Paper	Electronic	Paper	Electronic	Paper	Electronic	Protocol Media	Communication Media	Protocol * Communication
Consultation time: seconds*	310.75 (53.26)	226.33 (40.68)	288.75 (45.87)	239.25 (33.78)	290.50 (34.27)	264.42 (18.57)	**p=.007 *****	p=.788	p=.285
Navigation path: divergences*	3.42 (1.15)	1.17 (0.44)	1.08 (0.54)	1.50 (0.66)	0.83 (0.27)	3.42 (1.42)	p=.298	p=.424	**p=.023 *****
Eye contact: N*	22.25 (4.16)	21.08 (2.77)	-	-	26.25 (4.31)	21.83 (2.17)	p=.405	**p=.049 *****	p=.618
Eye contact: seconds*	117.66 (33.18)	96.00 (18.60)	-	-	104.98 (23.86)	95.08 (14.81)	p=.459	p=.669	p=.511
Pauses: N*	5.42 (1.87)	3.83 (0.67)	3.25 (0.74)	3.58 (0.92)	4.08 (1.04)	5.75 (1.33)	p=.857	p=.798	**p=.049 *****
Pauses: seconds*	56.71 (32.56)	24.65 (7.26)	17.81 (6.56)	23.10 (8.27)	22.54 (6.75)	36.42 (9.72)	p=.638	p=.428	p=.206
Efficacy of consultation: N**	C=7 I=5	C=8 I=4	C=9 I=3	C=8 I=4	C=8 I=4	C=6 I=6	p=1.000	p=1.000	p=.687

* Mean (standard error)

** C=Correct recommendation; I=Incorrect recommendation

*** Statistically significant