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Maintaining the Link Between Patients and Their Families During the COVID Pandemic Using Visio: Iterative Development and Evaluation

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Abstract. Access to hospitals has been dramatically restricted during the COVID 19 pandemic. As a result, the patients were unable to communicate with their families other than through virtual communication channels. A still significant number of patients, which do not have access to modern videoconference tools, were completely isolated. As a result, the University Hospitals of Geneva decided to implement a Visio conference system inside their patient app ecosystem to allow every patient to remain connected. This article presents the iterative development of the solution in order to respond to the specific timely constraint of the situations as well as its evaluation by the patients and caregivers. Two iterations of the tool have been developed. The first relied on an existing commercial platform whereas the second is a fully integrated solution in our patient app ecosystem. The very positive evaluation at the first stage by more than 300 patients, relatives and caregivers convinced us to invest additional effort to provide a fully integrated solution. The second version, evaluated by 16 patients, confirmed that the Visio reaches its objective of reducing isolation during hospitalization. This initiative is completely in line with the objective of the hospital of providing human centered care.

Keywords. Patient empowerment, isolation, pandemic

1. Introduction

Physical access to hospitals has been dramatically limited during the COVID 19 pandemic [2]. Indeed, the strong contagiousness of the disease constrained the hospitals to limit access to authorized personnel only [11]. This restriction was particularly enforced in intensive care due to the high viral load of the patients [4]. As a result, the patients that were not familiar with existing Visio capability from modern smartphones (such as whatsapp) were totally isolated from their families. Without the initiative of caregivers using their own smartphone to contact the families, some patients could have died without being able to speak directly one last time with their families.

In the United States, the American Academy of Pediatrics and the American College of Critical Care Physicians support family and patient-centered care and recommend open visitation for both adult and pediatric patients [7,9]. These recommendations are

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based on data demonstrating both improved satisfaction and decreased stress of both patients and their family members when open visitation policies are adopted as well as data demonstrating no adverse health effects of open visitation with some suggestion of improved outcomes when open visitation is facilitated [1].

The University Hospitals of Geneva (HUG) decided that a solution had to be proposed in order to maintain the link between the patients and their family [10]. A task force was mandated to deal with this challenge in an agile and iterative way. The aim was to provide a solution rapidly but without ignoring the associated constraints such as data protection and security as well as ensuring a high level of usability for people that are not acquainted with technology.

1.1. The first version

Given the urgency to provide a solution during the first wave of the COVID-19, we decided to rely on an existing Visio system in order to offer quickly the service to the patients. A generic account has been created on the institutional Zoom™ account. A module was implemented in our in-house EHR in order to enable caregivers to create invitations that are send to the patients' family without having to login on the Zoom account. Once the invitation created an SMS is sent to the relative. When the link integrated in the SMS is open, the receiver is directly redirected to the Zoom communication channel and the call can begin.

1.2. The second version

Although the first solution did fulfill the requirements of performing Visio, it required the intervention of caregivers and therefore impeded the users' independence. Also concerns raised about the privacy of the information transiting though a platform that was not owned by the HUG. Therefore, following the feedback received from the first version we have implemented our own Visio system, based on WebRTC technology, seamlessly integrated with the patient's application ecosystem. With this system users can identify themselves using their patient ID and are authenticated through an SMS challenge. They can then choose one of their relatives informed in the information system or to choose a new contact. The patients can then send an invitation to their relatives. The relatives receive an SMS redirecting them to the Visio system and starting automatically the conversation. This new system can also be triggered by a caregiver when necessary by simply scanning the identification bracelet of the patient.
For both versions a team of 10 support staff have participated in the deployment of the solution in the different care units. These staff members had at their disposal several institutional tablets that they could propose to the patients in order to perform the Visio conference.

2. Method

Each iteration of the solution has been evaluated by the patients, family and caregivers. The first solution was evaluated through questionnaires sent to the patients and relatives. Caregivers were also invited to fill a questionnaire assessing their satisfaction after using the tool. Free text comments were explored using word cloud in order to understand the feeling of the patients toward the first solution. For the second version, an extended

survey, targeting also the impact of the solution on isolation, has been designed in order to evaluate the benefits of the solution. This survey has been distributed to the patients after using the solution at least once in a real setting.

3. Result

3.1. Evaluation of the first version

During the first evaluation period, from the 1st of April to 31 of May, 1512 Visio were performed. During this period, 17 caregivers, 268 relatives and 33 patients filled a simple questionnaire intended to capture their perception about the deployed solution. Almost 94% of patients and relatives were satisfied and intended to use the solution again but only 70% of the caregivers were satisfied.

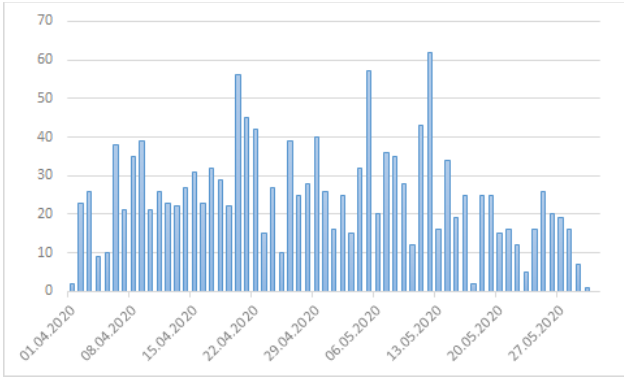

Figure 1. Number of visio performed during the first wave of the pandemic (Apri and Mai 2020).

Table 1. Satisfaction of the different

Population	Number	High satisfaction	Intention to use again
Patients	33	31 (93.9%)	30 (90.9%)
Relatives	268	250 (93.3%)	240 (89.6%)
Caregivers	17	12 (70.6%)	11 (64.7%)

Analysis of the relative free text comments using a words cloud revealed globally a high satisfaction. Indeed, words such as “thanks”, “pleasure” and “contact” appeared with a high frequency. Interestingly the word “mum” appears also with a high frequency.

Figure 2. Words cloud of the relatives’ comments about the system.

3.2. Evaluation of the second version

The second evaluation period started the first of December 2020 until 15 January 2021. During this period more than 1000 Visio have been performed with the system. More than two third of them (710) have been triggered by the caregivers, the rest being triggered by the patients themselves. During this period, the personnel proposing tablets to the patients to perform the Visio have distributed the questionnaire to assess the perception of the solution by the patients.

Table 2. Evaluation of the Visio system by the patients (N=16)

Item	n	%
Sex		
Male	5	31.2%
Age		
Under 70	1	6.2%
70-80	9	56.3%
Over 80	6	37.5%
Hospitalization duration		
5-10 day	8	50%
More than 10 days	8	
Feeling of loneliness		
Low	3	18.5%
Normal	8	50%
High	5	31.5%
Reduction of loneliness		
Not agree	1	6.3%
No opinion	1	6.3%
Agree	14	87.5%

16 patients received the questionnaire. The majority were female over 70 and did not possess a smartphone. Half were hospitalized more than 5 days and half more than 10 days. If only 31.5% of the patients felt isolated, 87.5% of them did strongly agree that the Visio helped them to fight isolation. All of them found the system very useful, satisfying and were willing to use it again.

4. Discussion

The urgency of the COVID-19 situation has required us to provide a solution in a very limited time and made us initially rely on an off the shelf product. If using an external product allowed us to provide the service for the patients in a quick way, its poor integration limited its scalability. Indeed, setting up a Visio was not straightforward for the caregivers and required a specific training. Also, using a commercial tool made users wonder about the privacy issues [5]. Our integrated solution developed in a second phase took longer to be effective but offered a much simpler experience for the patients and their families and ensured a secured way to communicate.

The satisfaction of the patient and their family is very high, this reflects the importance of keeping a connection with the family during hospitalization as recommended by several patient centric initiatives. Also, the answers from the patients clearly show that performing Visio mitigate loneliness. This importance has been already highlighted in previous research [6]. It is also important to notice the central role played by caregivers in the process and the importance of providing interventions that do not

increase their workload. Indeed, perceived ease of use is one of the main dimensions of the technology acceptance model [8] .

5. Conclusion

The COVID-19 pandemic has requested healthcare institutions to rapidly adapt to the situation. The combination of an agile information system, a shared coherent strategic vision and an engaged healthcare personnel enabled the quick deployment of a Visio system to maintain the relationship between the patient and their families despite the hospital access restrictions. Our solution allows for better family coping which follows the Institute of Medicine's recommendations of a patient-centered model of care in which the "health care delivery systems provide for the physical comfort and emotional support of patients and family members [3,12].

References

[1] Bellou P, Georgianni KG, The contribution of family in the care of patient in the hospital, Heal. Sci. J.2014;1**:**1–6.
[2] Blumenthal D, Fowler EJ, Abrams M, Collins SR. Covid-19 - Implications for the Health Care System. N Engl J Med. 2020 Oct 8;383(15):1483-1488.
[3] Coulter A, Richards T. Care during covid-19 must be humane and person centred. BMJ. 2020 Sep 8;370:m3483.
[4] Díaz-Guio DA, Díaz-Guio Y, Pinzón-Rodas V, Díaz-Gomez AS, Guarín-Medina JA, Chaparro-Zúñiga Y, Ricardo-Zapata A, Rodriguez-Morales AJ. COVID-19: Biosafety in the Intensive Care Unit. Curr Trop Med Rep. 2020 Aug 27:1-8.
[5] Esmaeilzadeh P. The Effects of Public Concern for Information Privacy on the Adoption of Health Information Exchanges (HIEs) by Healthcare Entities. Health Commun. 2019 Sep;34(10):1202-1211.
[6] Fan PEM, Aloweni F, Lim SH, Ang SY, Perera K, Quek AH, Quek HKS, Ayre TC. Needs and concerns of patients in isolation care units - learnings from COVID-19: A reflection. World J Clin Cases. 2020 May 26;8(10):1763-1766.
[7] Preserving Family Presence During a Pandemic. Geriatr Nurs. 2020 July-August;41(4):508.
[8] De Leeuw JA, Woltjer H, Kool RB. Identification of Factors Influencing the Adoption of Health Information Technology by Nurses Who Are Digitally Lagging: In-Depth Interview Study. J Med Internet Res. 2020 Aug 14;22(8):e15630.
[9] Meert KL, Clark J, Eggly S. Family-centered care in the pediatric intensive care unit. Pediatr Clin North Am. 2013 Jun;60(3):761-72
[10] Parsapour K, Kon AA, Dharmar M, McCarthy AK, Yang HH, Smith AC, Carpenter J, Sadorra CK, Farbstein AD, Hojman NM, Wold GL, Marcin JP. Connecting hospitalized patients with their families: Case series and commentary, Int. J. Telemed. Appl. 2011.
[11] Virani AK, Puls HT, Mitsos R, Longstaff H, Goldman RD, Lantos JD, Benefits and risks of visitor restrictions for hospitalized children during the COVID pandemic. Pediatrics. 2020;146.
[12] Crossing the Quality Chasm: A New Health System for the 21st Century. 2001.