

# Being in front of the patient. Nurse-patient interaction and use of technology in emergency services

Yeimy Yesenia Granados-Pemberty<sup>1</sup>  
María Mercedes Arias-Valencia<sup>2</sup>

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### Abstract

**Objective.** This study sought to describe how the use of technology intervenes in the nurse-patient relationship, from the nurse's point of view. **Methodology.** This was a qualitative research with tools from grounded theory. Twenty semi-structured interviews were conducted with nurses working in emergency services in three municipalities of Colombia. **Results.** Four categories emerged: 1) direct care, the maximum interaction or being in front of the patient; 2) fairly direct care; 3) indirect care, institutional management; and 4) minimum interaction; technology as facilitator of the interaction and awareness of the necessity for interaction. **Conclusion.** This study shows the irreplaceable nature of the nurse and the fundamental necessity of technology. The dual mediations of technology constitute a paradoxical matter that reveals the importance of placing it as a means; warning on the danger of converting it an end in and of itself.

**Key words:** emergency medical services; nurse-patient relations; biomedical technology.

## Estar al frente del paciente. Interacción enfermera-paciente y uso de la tecnología en los servicios de urgencias

### Resumen

**Objetivo.** Describir cómo interviene el uso de la tecnología en la relación enfermera-paciente, desde el punto de vista de las enfermeras. **Metodología.** Investigación cualitativa con herramientas de la teoría fundamentada. Se realizaron 20 entrevistas semiestructuradas a enfermeras que trabajaban en servicios de urgencias de tres municipios de Colombia. **Resultados.** Emergieron cuatro categorías: 1) el cuidado directo, la máxima interacción o estar al frente del paciente; 2) el cuidado medianamente directo; 3) el cuidado indirecto, la gestión institucional; y 4) la mínima interacción; la tecnología como

1 RN, Master. Universidad de Antioquia UdeA, Medellín, Colombia.  
email: yeyeea@une.net.co

2 RN, Ph.D. Professor. Universidad de Antioquia UdeA, Calle 70 No. 52-21, Medellín, Colombia.  
email: mariamav@udea.edu.co

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facilitadora de la interacción y la consciencia de la necesidad de interacción. **Conclusión.** Este estudio muestra el carácter irremplazable de la enfermera y la necesidad imprescindible de la tecnología. Las mediaciones duales de la tecnología constituyen un asunto paradójico que revela la importancia de situarla como medio; se advierte sobre el peligro de convertirla en un fin en sí misma.

**Palabras clave:** servicios médicos de urgencia; relaciones enfermero-paciente; tecnología biomédica.

## Estar à frente do paciente. Interação enfermeira-paciente e uso da tecnologia nos serviços de urgências

### Resumo

**Objetivo.** Descrever como intervém o uso da tecnologia na relação enfermeira-paciente, desde o ponto de vista das enfermeiras. **Metodologia.** Investigação qualitativa com ferramentas da teoria fundamentada. Realizaram-se 20 entrevistas semiestruturadas a enfermeiras que trabalhavam em serviços de urgências de três municípios da Colômbia. **Resultados.** Emergiram quatro categorias: 1) o cuidado direto, a máxima interação ou estar à frente do paciente; 2) o cuidado mediamente direto; 3) o cuidado indireto, a gestão institucional; e 4) a mínima interação; a tecnologia como facilitadora da interação e a consciência da necessidade de interação. **Conclusão.** Este estudo mostra o caráter insubstituível da enfermeira e a necessidade imprescindível da tecnologia. As mediações duais da tecnologia constituem um assunto paradoxo que revela a importância de situá-la como meio; adverte-se sobre o perigo de convertê-la num fim em si mesma.

**Palavras chave:** serviços médicos de emergência; relações enfermeiro-paciente; tecnologia biomédica.

## Introduction

Understanding the relationship between technology and the nursing discipline is an important but difficult task, given that in terms of its use it is immersed in all the components of the practice. The interactions can be studied from the theories of human relations stemming from human sciences and from theories of nursing. Peplau,<sup>1</sup> in the theory based on interpersonal relations, emphasizes on recognition of the subject, not only in the illness, which permits greater contact of the nurse with the patient. Meleis,<sup>2</sup> refers to the work by Joyce Travelbee and the development of the person-person relationship theory and exposes the phases of this theory: of the original meeting, emerging identities, empathy, sympathy, and relationship. All the phases culminate in a relationship defined as the set of experiences, thoughts, feelings, and attitudes that both the nurse and the patient are capable of perceiving, sharing, and communicating.

As far as technology at the service of care, for authors like Barra *et al.*,<sup>3</sup> nursing is affected by technology in two aspects: first, by modifying the care provided; and second, by modifying the care received. Apart from its real significance or its application in the practice of the nursing discipline, it is important to define that the cultural construction, the scientific paradigm with which nurses have been educated and the meaning technology acquires in their daily work is what determines its use as a means or as an end, translated into caring for the person as a subject/individual with an active role or as a passive object to whom procedures are applied.<sup>4</sup> Undoubtedly, it is highly relevant to know how the use of technology intervenes in the nurse-patient relationship, from the nurse's point of view. In this respect, studies were found in services like intensive care unit (ICU), surgery, and hospitalization in which these technological

elements are required for patient care;<sup>4-7</sup> on the contrary, no articles were found with respect to emergency services.

Regarding authors who have studied technology, Allix and Irurita<sup>8</sup> indicate that nursing interactions focused on individuals are blocked in the presence of technology.

For ICU, surgery, or neonatal services, Neto<sup>9</sup> proposes that technology becomes an end in and of itself, seeking only to maximize results, as well as to occupy the center of the care provider world, displacing individuals as the center of attention. Barnard,<sup>10</sup> states that technology was the excuse for the lack of time to better care for the individual; while for McGrath<sup>5</sup> technology may interfere with decisions made by nurses during their professional practice, changing their approach and aims. For Locsin,<sup>11</sup> daily routines of nurses have been focused on machines, in such a manner that it does not permit caring for the patient. Wikström<sup>12</sup> narrows this discussion that humans and instruments are interwoven in problem solving processes. For Kiekkas *et al.*,<sup>13</sup> most nurses recognize the positive effects of equipment in clinical practice, but at the same time, using equipment can lead to greater risk due to human error, mechanical failure, increased stress, and limited autonomy. Neto *et al.*,<sup>14</sup> conclude that technology is good or bad according to how it is used.

For the effects of this study, we understand technology<sup>15</sup> as the objects, materials, artifacts, or apparatus of daily use that are integrated to thought, behavior, interrelations, connections, development, production, elaboration of processes, products, or transference of information, operated by users and integrated into their daily work, almost unconsciously and invisibly, making human beings interact with materials. Technology is part of the material world; it is described as instruments, tools, apparatus, machines, devices, materials, systems, equipment, inputs, or elements with technological characteristics and conditions that permit direct or indirect care of a patient. Meir<sup>16</sup> also considers that the concept

of technology is comprehensive and goes beyond the use of machines. The aim of this study was to describe how the use of technology intervenes in the nurse-patient relationship, from the point of view of nurses who work in emergency hospital services.

## Methodology

This was a qualitative study with tools from grounded theory in which semi-structured interviews were conducted with 20 nurses working in emergency hospital services. Collection of information took place during 2011. Data analysis was carried out manually according to procedures from grounded theory; the steps applied were those Strauss and Corbin<sup>17</sup> typify as open, axial, and selective coding. This work emphasized upon the first two; through axial coding data were grouped into categories and subcategories emerged during open coding, which were linked regarding their properties and dimensions. The theoretical saturation was an objective sought from the beginning, with its procedures of gathering data until saturating the categories and establishing the relationships. For said purpose, the necessary amount of participants was considered until filling the categories and accounting for the variations.

As criteria of rigor, the study kept in mind plausibility, based on the rigorous exam of the sense of the testimonies; audit ability and confirm ability with evaluations of the results and from the final report, as well as the participation of professors responsible for guiding the work; transferability and applicability, given that data were referred by nurses working in emergency services in hospitals of urban centers; however, people from other services like surgery, delivery ward, and ICU can see their experiences reflected in the present results. The main ethical matters considered in this research were: in the first place, acceptance to participate through an informed consent; in the second place, confidentiality in which every participant used a pseudonym, besides, they were guaranteed that

their real names would not be revealed and that data obtained would be safeguarded; and, third, divulging the data to account for the results to participants and institutions.

## Results

This study had the participation of 20 nurses who work in emergency hospital services from three Colombian cities (nine in Medellín, eight in Popayán, and three in Envigado), in triage areas or emergency classification, adult observation, pediatric observation, transition or hallways, reanimation or emergency ward and procedures. Fifteen nurses had been working in these types of services between one and five years; three between six and 10 years; and two between 11 and 15 years.

### Interaction, care, and mediations

Care, specific function of nursing professionals, assumes interaction as implicit. This work studied the relationship between interaction and care with technology mediation. In this respect, three dimensions of interaction were found: maximum, medium, and minimum, represented in direct care, fairly direct, and indirect, respectively.

Direct care: being in front of the patient, the maximum interaction. Activities that cannot be delegated facilitate nurse direct interaction with the patient, which represents the maximum interaction. This reciprocity involves the nurse's responsibility and the patient's trust in professional care. Being in front does not only mean physical presence, it also means patients feel accompanied during their process and secure of the course of the illness/recovery. The following testimonies confirm it: *...care of the human being as that individual in front* (Adri: E5P2PAR33-36) and *having the patient in front* (E.Prado: E6P1PAR14-19), denote the maximum interaction and mean that the professional is there (E.Prado: E6P1PAR14-19). This has to do with the care provider, not delegated in terms of the participants.

Care provided by the nurse during an emergency, for the participants is... *direct care, the care provider part...* (El chino: E15P2PAR15) or *more technical care, more specialized care... just the same, we are prepared for what other cannot do* (El chino: E15P1PAR31P2PAR1-2).

Direct care is proportional to how critical the patient is: the more critical require more presence from the nurse. An example of maximum interaction is a patient being attended in emergency, who is in triage one (struggling between life and death, a vital emergency) who will be cared for directly and with priority by the nurse in emergency: *...during emergencies or with critical cases we have to provide direct care* (El Chino: E15P1PAR7-8). There is more interaction with patients who *... arrive at the service in serious state* (E.prado: E6P1PAR14-19); *that special patient with lots of care... the patient in critical state* (Laura: E9P2PAR27-32), *a patient in delicate state* (Laura: E9P5PAR32-33), *that is, a complex patient* (E.Prado: E6P2PAR21-23).

If the nurse considers that the patient is serious, *the nurse dedicates more time to this patient* (Liliana: E8P5PAR5-7) and *...for these types of patients one provides more direct care* (Gordis: E18P4PAR8-14). Nurses take the initiative of being in front of the patient in the beginning of the emergency situation to characterize and categorize the care in terms of the emergency level, to *try to accommodate and monitor the patient and start emergency care* (E.Prado: E6P1PAR14-19). As exposed, these activities cannot be delegated, given their training and the responsibility with specific procedures that enable interaction: *...the hospital has certain procedures that are exclusive for the chief: taking blood cultures, arterial gas samples, passage of urinary catheters... basically, those are the procedures we have to do* (Minerva: E10P1PAR27-30)... *we have procedures, for example, taking arterial gas samples, taking blood samples, complex cures... according to the patient's status, passage of nasogastric catheters, passage of urinary catheters, requesting nutrition, and having availability in pump service, only special care*

*is involved... (Lola: E11P4PAR5-10,12)...care provider: changes of position, administer special medications... drop dosage, care of patients admitted as triage one and who should undergo all types of procedures (vein channeling, monitor, passage of fluids, tests like electrocardiogram and blood sugar, among others) (A Henao: E4P1PAR11-15).*

Interaction with emergency patients also occurs because of the need to understand what is happening to them, hence, nursing professionals must *explain to this patient in detail what will be done, given that many patients do not know what the equipment is, they do not know how to identify the noises (beeps) it makes, the warning alarms... sometimes they are so nervous that anxiety influences on the patient's psychological part* (Caliche: E7P3PAR19-21).

In turn, technological devices can be mediators in the nurse-patient interaction. For example, their use constitutes an opportunity to practice the so-called *formalisms* like greetings, introduction, cordial dialogue, and explanation of the procedure to patients and their families: *First, the greeting: good morning, the introduction: what is your name?, confirm my name, I am going to administer this medication, it is good for...; that type of attention and contact with the patient is quite important, because even if it takes one hour to be cared for* (Caliche: E7P10PAR30-34); *...getting introduced from the beginning is very important, the first contact with the patient is what counts, offering the patient warmth* (A Henao: E4P4PAR24-25), *... even if it is a monitor, with that the patient is being offered contact; while placing the oximeter or tensometer, one can talk to the patient, you can explain the procedure and give instructions about their pathology; if the patient has high blood pressure you can talk to him, or if he or she is taking medications or if he or she has never had high blood pressure; well, you start to interact with them...* (Lis: E3P2PAR12-17). In summary, emergency services permit interaction in front of the patient, which constitutes the maximum professional interaction. In this type of

interaction, technology can be joined to the direct care provider.

Fairly direct care: medium interaction. Direct care carried out through another constitutes a medium degree of interaction, which lies between being in front of the patient and the indirect care typical of management; this type of care includes the preparation, training, evaluation, and accompaniment of processes performed by another. Thus, a fundamental task of nursing that is incorporated as obligation becomes visible; it is carried out with the patient and aide personnel, serves for efficient functioning of the service or ward, the institution and for patient care. An example is the end-of-shift and start-of-shift procedure: *...first you start the shift; then, during the start of the shift you review everything about the patients you are receiving, locating those with more urgent needs, which have procedures pending for classification... you set priorities for what needs to be done first... (Minerva: E10P1PAR3-9). ...Receiving a shift consists of... identifying the patients and their illnesses, identify how you are receiving the shift... and any novelties* (Lola: E11P1PAR5-7). *...Assigning daily shifts, shift schedules for nursing aides* (A Henao: E4P1PAR8-11).

Also part of the fairly direct care is the tasks of distributing the nursing personnel and the service organization. Assignments are made according to priorities of patients and the unit, and to the quality of the personnel under supervision – those with higher training, receive assignments with greater complexity; thus, functions are delegated and responsibility is conserved: *... shift changes, sick leaves, organizing nurse shifts, that service gets covered, at least with the adequate personnel... confirm and look for an aide to cover shifts due to sick leaves and calamity leaves* (Caliche: E7P4PAR24-29).

Regarding supervisory and audit tasks: *My functions... receive the shift; verify patient status like skin, rails in position... (Luna: E13P1PAR3-6). Start recognizing the patients, identifying at once what ails them... checking on*

*the plan with each patient for the rest of the shift* (Lola: E11P1PAR8-10).

Through systems to organize compliance of orders delegated by physicians, along with treatment and care plans... *like checking the clinical chart, filling out support orders for special laboratory exams... checking all the clinical histories, assigning shifts, and solving problems arising on the spot...* (Talu: E16P1PAR9-17). ... *verification of rights, request schedules to carry out diagnostic aids, claims, patient's complaints* (A Henao: E4P1PAR8-11).

In synthesis, fairly direct care includes organizing personnel and their distribution, which combines skills and functions to benefit the patient and the quality of care. In this type of care, the computer is the technological element of greatest use.

**Indirect care: institutional management for patient care.** Institutional management is conducted through the application of administration and management theories and has support technology. Those surveyed classified in the category of indirect care everything referring to administrative tasks, which constitute indirect care, management of processes, solution of problems, and care support. ...*you have to be there... to expedite exams, diagnostic aids and remissions, organize remissions and counter-remissions* (E. Prado: E6P13PAR29-31). ...*report adverse events, be aware of any novelty during service: if suddenly oxygen runs out [,] request it immediately, order laboratory exams and patients' studies, for example [:] ultrasound, CT, being aware of... an infinity of activities* (Caliche: E7P3PAR24-29). ... *the paperwork is filled out in letterhead, monthly requests... those are administrative functions* (Talu: E16P1PAR9-17).

The results show the link between management and technology. The technological equipment identified as aids in nursing management were: fax, telephone, electronic clinical history, computer, and telecommunications; without these, there is a perception of chaos: ...*with the system, yes, sometimes, this week, for example,*

*we had a total tragedy: the system was down, we could not get results from the lab because their system was also down; therefore, they could not send us results for us to view on screen, so they were faxing these* (Liliana: E8P3PAR10-14). ...*the cellular phone is also an important aid for telecommunications, we can contact the specialist* (Lis: E3P3PAR24-25P3PAR1).

The electronic or manual clinical history constitutes an aid: *for us the system can help manage the clinical chart, the system can be databases of patients, of things we can retake to improve quality of care* (El chino: E15P2PAR31-34).

In synthesis, as the interaction diminishes, use of technology increases because nursing management is no longer conceived without using such.

### **Difficulties in the interaction: patient and nurse conditions: minimum interaction**

The conditions of patients, nurses, and hospital emergency services do not always allow for feedback and for interaction to take place under difficult situations. The professional's attitude intervenes in the patient's attitude in a two-way interaction, which facilitates or hinders it; however, the ethical and moral duty is care without regard to sex, age, race, class, or social conditions. These findings were found in reality and are part of the condition of human beings; it would be worth inquiring about the differences among minimum interaction, no interaction, inadequate interaction, inopportune interaction, and other difficulties.

The disjunction between professional skill and interaction is illustrated by the following: some 50% lies on the quality and skill, as well as on human talent, that is, *like one's readiness and the attitude... Because you can have very good technology, but if you don't want to do things, if it doesn't grow in you to do things, if you are not on top of the patient's needs, you can have the best technology and it won't do you any good* (Liliana: E8P7PAR20-25). Also, there was

awareness of the need for interaction, expressed in terms of culpability and discomfort of nursing professionals, given that they try to serve all the patients, attend to administrative tasks, and care for inventories. They explain that when dedicating more time to administrative tasks and not complying in the same adequate proportion for direct care, other nursing functions could be neglected (care provider, social, and research). *As it occurs in the industrial, business, and service world, administrators saw in technology the opportunity to dispense with workers, it is the case of some hospitals that, with the arrival of the electronic clinical history, who laid off the secretaries who collaborated with us, due to that, chiefs have to be on top of everything: stretchers, exams, phones, inter-consultations, schedules (16OCN3).*

In synthesis, technology is one of the reasons to approach the patient who requires maximum interaction, and to the extent that the interaction diminishes its need is more evident, which is the case of management. It must be highlighted that in the difficulties expressed, the use of technology does not influence, but the characteristics of the human beings subject of interaction. The following better illustrates the role of technology as a means of help.

## Dual mediations

The following results allude to the dual mediations between technology and the nurse-patient interaction, describing the main mediations and dualities, the irreplaceable nature of the professional caregiver, the indispensable nature of technology, and the emerging typology of antagonistic mentalities.

Dualities and mediations of technology. Dualities against technology stem from dichotomies like: it is good or bad; brings us closer or distances us; favors or hinders, facilitates or obstructs the. According to the participants, technology facilitates interaction, but one nurse provided the key by stating that it is good or bad depending on who uses it and for what purpose: *...it depends on who*

*uses it, it is like the internet which by itself is not bad, but it depends on who uses it; some may use for good purposes and others may use it with bad intentions (La monita: E14aP6PAR34P7PAR1-2). And she adds: I think it is good and it is bad. It depends on who is using it because if I have a monitor, I'm monitoring a patient, I base myself on what is trace don the monitor and I don't analyze the patient then I am not working well (La monita6: E14aP6PAR23-27).*

Technology can be taken as an end in itself or as a means: *use of technological elements and their purpose depends ultimately on those using them: some will see it as a means to get close to the patient, generate trust, and establish care needs; while others will see it as a means that expedites their work letting them finish their tasks or daily activities faster (La Monita: E14aP6PAR23-27).*

Technology also emerged as a complement, aid and tool, (...) *it depends on who is using it, but in my case I believe it helps me to get closer to patients and their families (A Henao: E4P3PAR4-6). ...it does help us a whole lot, we must be mindful, speak to patients, have physical contact with the patient, almost like directing an orchestra, you have to be hands-on with the very patient (Caliche: E7P10PAR21-25). And if we add that we can have better management of information, better management of data... we could have a bit more time to provide that direct care that could not be offered, then there it is giving us a hand (El Chino: E15P3PAR16-20).*

The "it depends on" refers to an individual or thinking head – the nursing professional – and when and if the patient does not disappear as the subject of care: *...seeing it as a benefit, it is a valuable tool, when and if we do not lose love for the patient and put aside care, in other words that tool should be used well and we should not lose contact with the patient (El chino: E15P6PAR4-7). Mediations re-enhance the idea of technology as a tool or means to care and as a connection: A means of approach... when people control or take vital signs, it is a form getting close, at least of going to see the patients (Gerardo Bedoya: E2P4PAR8-10).*

The meaning of connecting was found, that is, being connected to technology and being tied to the institution and in turn being cared for; the metaphor of connecting applies to technology and goes beyond, when translating the connection to the patient and with the institution through technological elements. For the nursing professional, the patient's perception of technology also permits interaction, *i.e.*, *the mere fact that you connect something to the patient, that patient feels he/she is being cared for (...) when and if you interpret for that patient the result of the output* (Yadasco: E1P1PAR4-5).

**The irreplaceable nature of the professional caregiver.** Care provided by nursing professionals cannot be replaced by a technological element, inasmuch as the machine does not have the power to care for the patient, only of helping; the nursing professional is who cares, interprets, analyzes, and decides what to do with the information: *I think equipment do not become a way of acting, but a way of interpreting* (Yadasco: E1P1PAR10-11); the affirmation holds that technology is a means to an end. The interpretation of the parameters, constitutes a means to provide attention; nursing care cannot be replaced by a technological element even if it permits increasing exactness, effectiveness, efficiency, as well as gain time and even approach the patient; even so, *nursing care do not stop being nursing care... nursing care is and will continue being irreplaceable by technology* (E. Prado: E6P5PAR12-14); *equipment help us... they should not displace our concept, our project as nurses or as professionals* (Yadasco: E1P1PAR11-13); *... technology should not influence much with the contact one has with the patient, unless technology itself is made for a machine to copy the vision of a patient* (E. Prado: E6P4PAR3-6).

The quality of the interaction can also be expressed in ways of communication, a talk, an explanation, establish a conversation, cause laughter, build trust, pay attention, have empathy, do not depend on technology; rather, on the nurses' attributes and on their relationship with others. The fact that technology helps and expedites processes does not imply the disappearance of human beings who

care and receive care: *A talk with the patient, they like that a lot, does not depend on something technological. Something you say to the patient, in any case, that makes them laugh, that is what they highlight most on the part of nursing: that human part...* (Laura: E9P10PAR33-36).

### **The indispensable nature of technology**

For many nurses it is indispensable, necessary, and obligatory to use technology, which in many occasions creates dependence to a point that it is impossible to provide the service without it: *... lack of technology is inconceivable in patient care today; that is, it is preponderant and in emergency it is even more so, because if you get a patient with cardiac arrest, in shock, dynamically unstable, the first thing you have to do is hook the patient up to a monitor to make decisions based on that* (Minerva: E10P3PAR29-34); *...I think that in the world and current society it has almost become implicit in everything you do; one cannot conceive carrying out an activity, many of the activities without those technological resources* (Adri: E5P5PAR13-15) *...and sometimes we get used to using all these complements that you get to the point that if they are not available, then you don't know what to do because they are not available – knowing that things can be done without using those things* (Laura: E9P9PAR37-40).

For others it is clear that if these are not available, action still must be taken: *...you adapt to what you have and if not till you have... ...it helps a lot, but not having it complete does not limit the work because any way that is why you have the human resource* (Gordis: E18P7PAR29-32P8PAR1-2); *...because you sometimes do not have the material, the necessary input to carry out any procedure, for example: thoracentesis, a lumbar puncture, an aspirate... sometimes you have to do whatever it takes to find any other material that can help you solve that problem* (Caliche: E7P1PAR13-16). Regarding the role of technology, the opposite view also exists, according to which electronic apparatus cannot



be replaced by a person: *...for example... a ventilator is not replaced by the hands* (Car: E17P6PAR9-12), *...the ventilator is a very good technology that is necessary in every emergency service... in a patient with respiratory arrest it is difficult to permanently provide ambulatory treatment...* (E. Prado: E6P6PAR12-15).

The previous example can be extrapolated to other emergency situations like: constant monitoring of vital signs and the infusion pumps, among others. Without technology, some cases could not be detected and classified as urgent: *... yes, sure, very important, because if you do not have monitors, if you do not have instruments to measure many vital parameters in the patient you could not do it in emergency* (Talu: E16P7PAR14-17). Likewise, the lack of technology can delay processes, given that it facilitates decision making and expedites processes. Currently, technological equipment is part of the daily work in nursing, its use is seen as a matter of custom and it is estimated that many tasks cannot be undertaken without technology: *with the vital sign monitor the problem is that you get used... that is the biggest problem, you get used to it as chief, so, what can I do if don't have it?* (Laura: E9P4PAR32-34). The problem arises when custom limits action and resources are not sought, the situation is complicated and service becomes chaos. Also, and although nurses are accustomed to technology, some resist change, every change generates an impact (13OCN1), every change has an adaptation period (13OCN1); examples of the difficulties in the adaptation process are expressions in terms that before there were objections to its use, now because of custom professionals conceive it as necessary in their work, *...when technology really fails, and above all if you are accustomed to that technology, sometimes your life does turn to chaos* (Liliana: E8P3PAR19-21); *...everything new generates resistance, but today we have the advantages of that and there they were taken advantage, which is important, it is very cumbersome to go back and adapt to manual work* (Talu: E16P4PAR1-3,5).

The technological and clinical mentalities. Trust in technology is related to the professional's

mentality, which is classified for clinical or technological results, *...some people are very clinical and others are very technological... if the ultramodern monitor is not available they cannot act* (Talu: E16P11PAR20-22); professionals with clinical mentality rely on the practical and educational skills acquired, they are specific on the use of technology because they trust more their own criterion; those with technological mentality trust more in the equipment and turn its use into a matter of custom, to dangerous extremes. An extreme view consists in considering that indirect care can be conducted through surveillance cameras that help to exert control of situations of patients and families: *Perhaps an individualized camera per patient, in each cubicle to watch what the patient is doing, how the patient is because sometimes you could be busy at the nurse's station, making the nursing report, preparing a medication or you can be observing what the patient is doing at that very moment; if suddenly the fluids need to be changed, that the condition worsened, that there is respiratory difficulty, that the monitor was providing information that I must be agile; it could be of help, but this does not mean that we have to stay away from the patient: ...we have the camera and the camera can see it all! So, from another point of view, we cannot have physical contact with the patient, but remotely* (Caliche: E7P11PAR3-14).

Said participant seems to think that interaction takes place with patients and family members at the same time that technological equipment is used, taking technology as a means to an end, that of approaching and generating interaction. The participants relate the technological mentality to the urban and private characteristics, which according to testimonies ensures quality care; on the contrary, the clinical mentality is associated to the rural and is attributed with characteristics of being combatant, warring, public, and empirical.

## Discussion

According to studies, the optimist-pessimist debate on the use of technology in nursing is far

from solved,<sup>5</sup> given the different perceptions of the advantages and disadvantages of its correct use in processes. Regarding the perceptions, discrepancy is noted between the administrative perspective and that of nursing: administrators express that, contrary to what was believed, nurses now have more time because the kardex is electronic; rather, those surveyed, one way or another, expressed that contact or interaction with patients had diminished, because of the time spent on using the clinical history (by constantly expecting records), the significant number of patients, or the multiple functions performed. The fact that the nurse-patient interaction can be affected makes it necessary to establish a strategy that permits the use of technology to not compromise care and to disseminate ways to improve the interaction.

From the general findings and the conclusive aspects, it may be highlighted that the fact of taking the technological elements as a means to an end or as an end in itself depends on the approach of their use. Mediations, as argued by Maerk and Cabrolí,<sup>18</sup> are determinant of the explanations of the causal relations between the phenomenon and its explanation;<sup>19</sup> this is how technology can be a facilitator or an obstacle of communication between the nurse and the patient, and it depends on the validation the subject – in this case the nurse – assigns to its use. This duality of technology is referred to by Cooper<sup>6</sup> in two senses: on one side, it can bring patients closer to nurses because it improves the knowledge of the person cared for and, on the other, it can also increase the gap between the nurse and the patient, caused by the unconscious disrepute of the patient as a person.

As mentioned by Wikström,<sup>12</sup> humans and instruments interweave in the problem solving process; it is people who act upon a given situation who decide what to do in a given circumstance; then, there will be those who accept technology as a means of approach or, on the contrary, as a means to stay away from the patient. Nurses' perception of patients creates a difference in the interaction exerted by them toward the individuals cared for.<sup>20</sup> The cultural construction, the scientific

paradigm with which the nurse has been educated and the significance technology acquires in their daily work is what determines the use of technology as means or as an end, translating into caring for the person as a subject/individual with an active role or as a passive object to whom procedures are applied.<sup>4</sup>

Regarding its application, many authors assume technology as a neutral element,<sup>21-23</sup> which will provide care in positive or negative manner according to the significance attributed and its use. In this study, technology can mediate and has the characteristic of being more dual than neutral; neutrality constitutes a stereotype, insofar technology does not have the attribute of being good or bad in dichotomous manner; in this case, displacement of neutrality was observed, given that it depends on if the professional takes it as a means to an end or as an end in itself, given that dual mediations exist in patients, nurses, and the environment.

Regarding dichotomous mentalities, technology can give visibility to the expertise of professionals with clinical mentality, which correspond according to Benner *et al.*,<sup>24</sup> to the category of the expert practice, which the authors attribute to professionals who can dispense with normative systems and resources, comply with their work suitably and adapting the resources available, that is, they work with what they have in creative manner. Each extreme of the typology of the mentalities reflects the emergent characteristics of the irreplaceable professional and of the indispensable technology. As suggested by some authors<sup>6,21,25</sup> use of technology is a comprehensive part of care. In this study technological skill is a desired attribute, but not a substitute for care.<sup>11</sup> In that sense, we recommend diminishing extreme positions, that is, add humanization to the technological mentality and increase technological support to people with primarily clinical mentality.

The purpose is to seek in professionals a balance that permits the clinical approach and the technological support for the patient's benefit. The balance proposed lies between the nursing

work mediated by technology and care with the patient as a human being and not merely as an object of technological applications. When nurses are capable of relating their technological skills to nursing care, the transformation accomplished can be good,<sup>26</sup> thereby, reaching what Wikström<sup>12</sup> proposes: that human beings and instruments interweave in the process of effectively and adequately solving problems.

Barnard and Sandelowski<sup>2</sup> conclude that what determines experiences like dehumanization is not technology *per se*, but the meanings attributed to it, that is, the way individuals understand what is human and what is technological.

In synthesis, the results are related to three big spheres, subject, nurse, and care. The first is the subject that constitutes the end and the center of care, mediated by material world that represents technology; in the second, we find nurses in their irreplaceable nature, the material world as indispensable and other mediations; the third sphere is occupied by care with its direct, fairly direct, and indirect dimensions and it is aimed at the center of care which is the subject. This study reflects upon the interaction, its dimensions, and the mediation of technology and it is expected that it contribute for said interaction to be conceived as an aid in nursing work for the benefit of the patient and the profession.

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