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TELEPHONE HEALTH SYSTEMS: AN OVERVIEW ABOUT HELPLINES AND TELENURSING IN EUROPE

A master thesis by

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To my family

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Abstract

Global health management is being overwhelmed by both health care and economic, and quality aspects of health care. This is due to a number of factors, including the rising incidence of chronic diseases, an ageing population and austerity of public spending by some countries and states. Therefore, the use of information technologies in health is necessary to maintain the sustainability of existing health systems, while at the same time enabling governments to make financial savings. An example of this is the health telephone lines, which provide self-care and health advice to patients outside working hours, regulate patient access to health care, and reduce unnecessary demand for services. Many countries in Europe have opted for these systems, and Austria is one of them since the implementation of pilot systems for this service in several regions of the country a year ago. Thus, the aim of this paper will be to analyse not only the benefits that these systems can bring, but also the necessary conditions required for successful implementation, the disadvantages that may arise, and the dilemmas and challenges posed by the use of this type of telemedicine service. In addition, the different types of organisations involved in this service in Europe will be studied, as well as the possible restrictions and the goals obtained by each of them. Finally, the possibility of improving this type of service through the incorporation of video teleconferencing will be observed.

Zusammenfassung

Das globale Gesundheitsmanagement wird sowohl von der Gesundheitsversorgung als auch von wirtschaftlichen und qualitativen Aspekten der Gesundheitsversorgung überfordert. Dies ist auf eine Reihe von Faktoren zurückzuführen, darunter die zunehmende Zunahme chronischer Krankheiten, die Alterung der Bevölkerung und die Sparsamkeit der öffentlichen Ausgaben einiger Länder und Staaten. Daher ist der Einsatz von Informationstechnologien im Gesundheitswesen notwendig, um die Nachhaltigkeit der bestehenden Gesundheitssysteme zu erhalten und gleichzeitig den Regierungen finanzielle Einsparungen zu ermöglichen. Ein Beispiel dafür sind die Gesundheitstelefonleitungen, die den Patienten außerhalb der Arbeitszeiten Selbstversorgung und Gesundheitsberatung bieten, den Zugang der Patienten zu und den Fluss der Gesundheitsversorgung regeln und die unnötige Nachfrage nach Dienstleistungen reduzieren. Viele Länder in Europa haben sich für diese Systeme entschieden, und Österreich gehört seit der Einführung von Pilotanlagen für diesen Dienst in mehreren Regionen des Landes vor einem Jahr dazu. Ziel dieses Papiers ist es daher, nicht nur den Nutzen dieser Systeme zu analysieren, sondern auch die notwendigen Voraussetzungen für eine erfolgreiche Umsetzung, die Nachteile, die sich daraus ergeben können, sowie die Dilemmata und Herausforderungen, die mit der Nutzung dieser Art von Telemedizin verbunden sind. Darüber hinaus werden die verschiedenen Arten von Organisationen, die an diesem Dienst in Europa beteiligt sind, sowie die möglichen Einschränkungen und die von jedem von ihnen erreichten Ziele untersucht. Schließlich wird die Möglichkeit der Verbesserung dieser Art von Dienst durch die Einbeziehung von Video-Telekonferenzen beobachtet werden.

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Chapter 1

Introduction

1.1 Background

Telehealth services are a crucial aspect of modern health care, and their use has increased significantly in recent years. Telehealth, also commonly referred to as telemedicine, is a set of methods to improve health care, public health and health education, using the support of telecommunications technologies. Within the modalities of telehealth, different modalities can be found such as synchronized live video, which can be used for both consultation services and diagnosis and treatment; remote patient monitoring (RPM), to transmit personal health and medical data from an individual to a provider in a different location; and telephone health systems [Public Health Institute CCHP, 2014], where the attention of this project will be focused.

One of the most prominent health telephone systems is the health helplines. These are particularly popular because of the rapid, low-cost, and generally anonymous access to health information and counseling they provide. They also provide a means of addressing the problem of overcrowding in hospital emergency departments, a global problem that has negative consequences for quality of care, efficiency and economy [Rooney and Schilling, 2014]. In particular, it is argued that health helplines reduce the number of patients coming to emergency departments with non-emergency conditions [Jensen and Crane, 2015], eliminating pressure on the service and allowing for better management of the service.

These health helplines offer services similar to primary care consultations, such as triage, physical evaluation and treatment recommendations [Lopriore et al., 2017], but over the phone, which means that the patient and provider are not face-to-face. This implies that the triage performed by telephone must be more exhaustive.

Telephone triage is [Bunn et al., 2005] a process by which people with a health problem receive counseling or are referred to another relevant service by telephone. It is often conducted using a computer decision support system (CDSS) to assess, diagnose and classify patients [Randell et al., 2007].

Thus, as we see the changing demographic landscape in countries around the world, with the resulting increasing pressure on health care and social services, the need to develop sustainable, high-quality and affordable health care becomes crucial. Governments have therefore seen the use of telephone health systems as an opportunity to improve existing health systems, save costs and improve the quality of care [López and Blobel, 2015].

In this way, the concept of telephone nursing, described in [Kaminsky et al., 2009] as the conduct of medical assessments by telephone, is introduced with the aim of supporting, strengthening and teaching callers, while at the same time referring them to the appropriate level of care.

As long as the resources of the health centers are limited, telephone contacts with a nurse or a qualified person will make it possible to arrange an appointment that is tailored to the patient's needs. So, the available acute appointment times can be used for those in need of urgent medical care, while other patients can be advised about self-care or receive an appropriate non-acute appointment time.

According to [Greenberg, 2009], the telephone nursing process includes three phases: information gathering, to assess the caller's needs; cognitive processing, to cognitively process the information collected and determine the priority of the caller's needs; and outcomes, to meet the caller's needs, including referral or counseling for another service.

By reducing the number of unscheduled visits through this referral of patients to "the appropriate level of care", the goal of telephone nursing from an economic standpoint is

to improve planning and make more efficient use of health resources [Marklund et al., 2007], allowing savings in state health care. Telenursing can even prevent or reduce some long-term inpatient stays, and since the state subsidy can amount to at least 50% of inpatient bills, the state could save a great deal [Grandchamp and Gardiol, 2011].

As a result, these services are becoming an integral part of international health care, particularly in the United States, Canada (LINK), Australia (Health Direct), and the United Kingdom (NHS 111), although the way they are conducted and organized is different [Kumar and Snooks, 2011].

In addition, telenursing helps to promote primary care and to improve rehabilitation and health maintenance processes, which helps to complement, deepen and intensify the integration of health systems, with an emphasis on patients with chronic diseases who experience the greatest treatment difficulties [López and Blobel, 2015].

Research has shown that, as a result of the increase in the elderly population and the number of bedridden people suffering from chronic diseases, telenursing should be used in health systems as a tool to support care delivery, as it can address excessive demand and mitigate the difficulties posed by geographical distances and transport problems [Kawaguchi et al., 2004].

Not only does it help in the economic sphere, and in reducing the burden on healthcare systems, but also in the more efficient use of the physician's time, avoiding the demand for unnecessary appointments and overcrowded waiting rooms both in health centers and in emergencies.

On the other hand, these systems would also bring benefits for insurers. According to research carried out in the Swiss healthcare context [Grandchamp and Gardiol, 2011], the incorporation of compulsory access to telemedicine services into an insurance plan, so that policyholders are obliged to call a medical call center before visiting a doctor, would save costs for both the insurer and the insured, allowing monetary gain for both parts. Not only would the average health expenditure be much lower than a conventional insurance plan, but the patient would also save travel expenses, waiting time and lower levels of anxiety due to the advice given by health professionals at the telemedicine call center.

1.2 TEWEB "1450"

The possibilities that health telephone systems can bring to today's society, both in the economic field and in the efficiency and management of patients and available resources, makes it essential to use them in today's health systems as a bridge to achieve better quality health care.

Thus, the use of health helplines is increasing, and one example of this is Austria. Since 2010, the question of how to deal with the already very tense emergency revenues has been raised in Austria, and in this context, country comparisons and also the studies themselves clearly stated that there is a need for action, as well as the possibilities of telephone systems to solve such problems [Weik, 2016].

All Austrian federal states have highly developed emergency medical services and emergency call services such as rescue and emergency medical services. However, there is no first contact for health issues that do not lead to an acute health problem, causing a large part of the population to use the emergency service incorrectly. Therefore, in 2016, a health advice telephone service called TEWEB "1450" is being developed in Austria, which aims to inform patients where they can receive the best medical care for their specific problem, trying to provide them with the "best point of service".

The TEWEB service "1450" is described as the first point of contact for health issues with transfer within the health system itself or as instructions for self-treatment, while the existing emergency call system remains reserved for emergencies [Weik, 2016].

This telemedicine service was launched in the first quarter of 2017 in Vorarlberg, Vienna and Lower Austria as part of a pilot project that could provide future assessments prior to implementation at the national level.

1.3 Aim

For the above reasons, and in view of the recent implementation of this system in Austria, it is necessary to understand how these telephone services are structured in healthcare, as well as the possible challenges, vulnerabilities and disadvantages that may arise from their use, and which cannot be ignored for the proper functioning of this type of system.

This paper will first address the major problems and constraints that the implementation of these services may cause, and which could affect patient safety. It will also analyze the requirements and demands necessary for the implementation of these systems to be feasible. The characteristics of these systems in the different European countries where they are being developed will be presented below, as well as the objectives achieved in each of them since their implementation. Finally, the possibility of incorporating video systems as an improvement will be studied.

Chapter 2

Theoretical Framework

As discussed in the previous chapter, the benefits that the implementation of a health telephone service can bring are extensive for different health care providers (medical staff, insurance companies, the state, hospitals), as well as for achieving quality medical care for the patient. In addition, it has been demonstrated over the years that the use of telenursing and telephone services in the healthcare field is safe and effective [Lattimer et al., 1998] [Wheeler et al., 2015].

On the one hand, they allow patients to receive care and self-care advice or remote redirection, saving them time and money. On the other hand, this facilitates not only comfort for the patient but also the possibility of reduced queues in the emergency room, unnecessary appointments for doctors, keeping patients who do not need it out of hospitals and financial savings for the state and insurance companies. Not only that, but the opportunities it provides for citizens with chronic illness, reduced mobility or need for follow-up could significantly reduce the number of hospitalizations.

It could therefore be said that this type of service is undoubtedly a step forward towards the sustainability of current health systems, both financially and in terms of care. However, it must also be borne in mind that they have limitations and drawbacks, as well as specific requirements for their implementation. Next, these aspects are analyzed and must be taken into account when establishing this type of service.

2.1 Disadvantages

Poor communication

Since the health care provider and the patient are not face-to-face during the consultation, communication between them is essential, as it is the only way for the telenurse to obtain information, carry out triage and make the most correct decision regarding the patient. Thus, mishandling the conversation between the two could have a devastating effect on patient safety.

The problems in the conversation can come from the patient (nervousness, a third person such as a family member, language difficulties, problems in explaining the symptoms, their behavior...), from the telenurse or part of the infrastructure equipment (software failures, interruption of the telephone line, interferences in the call, equipment failures...).

On the part of the call handler, long working hours, short time for in-depth discussions with patients or lack of education can lead to poor management of the practice, which in turn can lead to the possibility of malpractice. According to [Rutenberg and Greenberg, 2012], limited call time can result in stress, leading to deficiencies in telenurse productivity.

According to [Roing et al., 2013] one of the problems raised by Swedish telenurses was the demanding, angry or anxious behavior of the caller. They also defined understanding and communication with callers who had language problems as problematic. These situations could create uncertainty. In addition, they reported that some conditions were almost impossible to assess over the phone, as callers were not always able to describe their symptoms effectively. The situation may be even more difficult when someone calls on behalf of the patient, which happens quite often.

Controlling patient-related problems in the conversation is very difficult because each call is a completely different case, however, controlling the aspects that can lead to a mishandling of the conversation by the equipment or the telenurse can be avoided. Hence the importance of educating call handlers and being as strict as possible with the installation of the infrastructure.

Misunderstood advice

This problem is closely related to the previous one, as it depends to a large extent on the quality of the communication between the customer and the call handler. However, it often has to do with the patient's own interpretation. Therefore, a good understanding between both parties must be essential.

While the telenurse may be thinking he or she is giving clear advice, the patient may be interpreting it differently because of language the patient does not understand, ignorance on his or her part, or a different view of the patient. Not being able to have eye contact with the client means that the telenurse is not aware of a possible misunderstanding on the part of the patient.

Lack of information

The first phase during the telenursing process is the collection of information by the health care provider (symptoms, ailments, duration of the same...). The poor execution of this first stage can be an impediment to achieving a good result of the consultation. This may be due to the patient's lack of explanation, the call handler's failure to obtain half of the information, or a lack of understanding between the two parts.

Studies have described how uncertainty is pervasive in health care and how both nurses and physicians make decisions without all relevant information or knowledge of the positive outcome of decisions [Thompson, 2003] [Thompson and Yang, 2009].

In [Roing et al., 2013] some telenurses seemed to be aware of the risk of getting partial information from callers. Sometimes, however, instead of seeking a deeper explanation of the caller's symptoms, telenurses simply accepted the patient's situation and ideas. Another recurring problem was the tendency of telenurses to focus primarily on the "here and now" aspects, which prevented them from obtaining other information of interest such as the person's medical past and often made them gather insufficient background information.

Patient safety

According to the study [Roing et al., 2013], issues affecting patient safety may be present throughout the telenursing process: information gathering, cognitive processing and outcome.

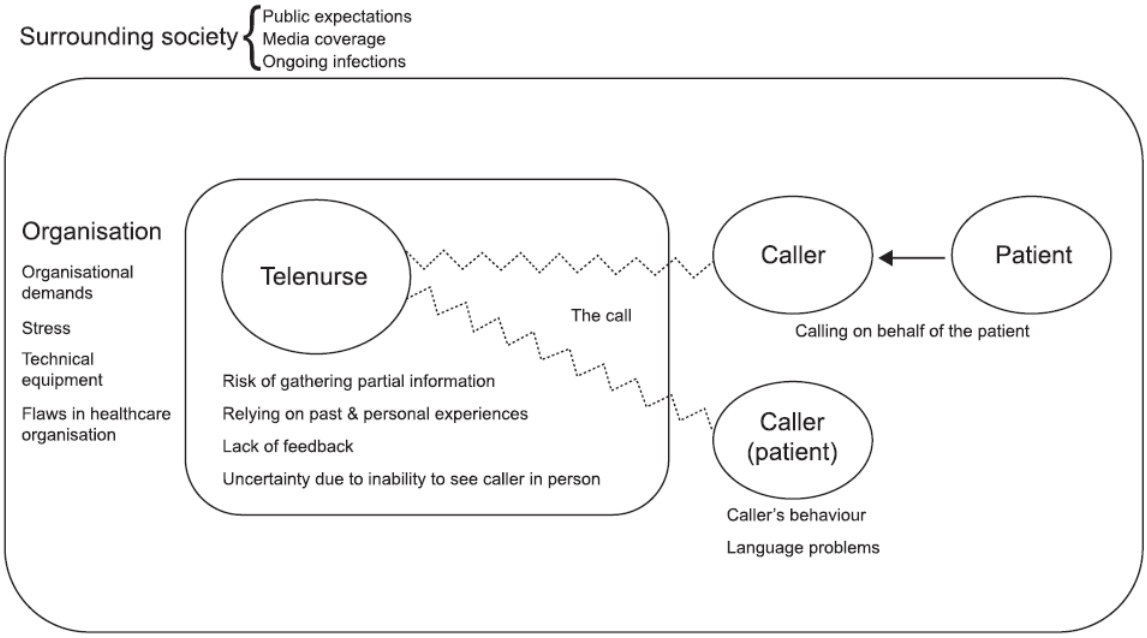

Figure 2.1: According to Roing's study, threats to patient safety can be divided into four categories: threats related to the surrounding society, organization-related, nurse-related, and caller-related (source: [Roing et al., 2013])

Education

Lack of adequate knowledge and education, as well as experience in the medical field and in the use of computers and software, can be a key drawback in the triage process. To respond to individual customer needs, call handlers need clinical knowledge, knowledge about how to maintain or manage health services, and knowledge about access to health data and information.

In situations of uncertainty, the call handler relies heavily on his or her own experience and intuitive knowledge, suggesting that the quality of decision making is consistent with the basic training and understanding of the call handler [Roing et al., 2013].

Unlike doctors and nurses, non-clinical call handlers do not have the ability and education to act in a medical emergency situation, which can pose a very real threat to patient safety. Just like a doctor, he or she has much more experience in the field of medical diagnostics and interviews than a nurse.

Some studies have suggested that current tools, training and education do not adequately prepare nurses for telenursing work [Valanis et al., 2003] [Giesen et al., 2007].

Technological challenges and need for technical assistance

Technical defects such as interruptions and sound interference, or faults in the software used by call handlers can lead to deficiencies in the communication of the query. This will cause complications and difficulties during the course of the telephone consultation. For this reason, full technical support will be required during service hours to help with any possible problems immediately.

Non face-to-face contact

One of the major impediments to telephone health services is the absence of physical and visual presence between the health care provider and the patient. This makes this type of service unsuitable for all types of clients, as there are many patients who are strictly dependent on direct and on-site assistance, allowing for physical and visual medical evaluation. Thus, the absence of face-to-face contact makes patients with cognitive disorders and/or psychosocial problems unfit for this type of care, due to their inability to maintain good communication and treatment with the call handler or healthcare provider [Niederberger Burgherr, 2007].

What may quickly be identified or diagnosed with the naked eye may be difficult for the patient to describe and therefore lead to confusion.

High cost of equipment

This type of health telephone service requires large upfront investments that can be an obstacle in terms of actual implementation [Hardin and Langford, 2001].

In addition, the costs of purchasing both technical equipment and professional staff may be higher than anticipated during service implementation due to technical problems or the need for additional staff.

Privacy and confidentiality concerns

Problems related to data security and patient privacy stem from the fact that the patient's medical record is being sent to a remote location electronically, which raises concerns related to the exchange of information using servers, the network and databases for this purpose.

In addition, the confidentiality of the patient's clinical data can be a major dilemma in the telenursing process and in health helplines because the calling customer gives a social security number and a name but the call handler has no way of knowing if it is the right person. Therefore, privacy breaches can occur.

2.2 Requirements

Implementation requirements

To facilitate the implementation of telenursing, government and administrative authorities must make management decisions, appropriate budgets, and move towards the implementation of specific policies, including the initiation of pilot programs in local municipalities and the design of grant systems [Kumar and Snooks, 2011].

The deployment and management of the programme should be a collective effort that includes the clinical and technical leadership of the telemedicine team, with the implementation of pilot programmes that can change the work-flow of existing practices. Therefore, planned and sensitive change management is critical to the successful introduction of telemedicine services. Once the programme has become "live", the telemedicine team should use the data collected and surveys to review and discuss whether the programme has met the strategic goals [Kornak, 2016].

Pilot programmes often fail to move to a higher level because of their failure. This may be due to multiple problems such as [Kornak, 2016]: reimbursement, rural environments, technical problems at remote sites, staff turnover, lack of patient interest, adoption problems, risk of neglect or security problems. For this reason, government support, including legislation and the establishment of regulations, will be required and implementation tasks will be a priority and clearly identified in the project plan. In addition, the management and supervision of services will be necessary for quality control and service continuity.

Research requirements

Not only will it be necessary to promote administrative policy decisions, but scientific data will also be required as a basis for assessing the effectiveness of telenursing, with the aim of assessing the feasibility of the service depending on the conditions. This requires practical research results from universities, research centers, and health care organizations [Kumar and Snooks, 2011].

Quality requirements

In order for the government to preserve the clinical quality of the service, it will need to establish a solid internal structure in the state's health system on telenursing policies and procedures. For this purpose, it is required to carry out a strategic plan so that the available services are used according to the needs of the patients, that is, to ensure that only patients who need to go to the ambulance or emergency care service are referred, and that when an alternative service is available, it is used.

Thus, to ensure that patients are redirected to the correct level of health care, and thus preserve quality of service, linkages and collaboration with local health organizations, primary care, emergency departments, ambulances, community-based services, and local emergency care centers will be required. All this with the aim of promoting and maintaining an integrated, high-quality and seamless system-wide response for patients, developing a continuous understanding between the health needs of the population and health services [Integrated Urgent Care Delivery Team , 2017].

In addition, the monitoring of services will also be crucial. A series of measures will be agreed upon to monitor the quality of the system, which should be reported from time to time to keep an exhaustive control of the condition of the service.

To monitor clinical standards and measure results, quality reports should be developed that contain information related to incidents, complaints, call reviews from start to finish, surveys, percentage of ambulances used, physician participation and availability, calls offered, calls answered, percentage of calls abandoned, speed of response, clinical queues, availability and utilization of resources.

This leads to the fact that telemedicine has many participants, and each has different needs and expectations. Therefore, surveys and subsequent analysis will be an essential factor to take into account. On the one hand, patients want effective and friendly care. On the other hand, caregivers want effective consultation but are also interested in the time they spend preparing and presenting a case. Finally, managers are concerned about the length of the visit and the quality of the presentation [Kornak, 2016].

Consequently, a comprehensive assessment of telemedicine satisfaction must take into account all perspectives [Viegas and Dunn, 1998]. To ensure the quality of the programme, all participants should be surveyed and different opinions obtained on the effectiveness of the consultation.

On the other hand, the data and operating measures collected are very important for monitoring, designing the system and allowing the resilience of the service, since with all this management information collected, it will be possible to allow the system to be resilient and effective. This also includes the ability to plan for and respond to peak demand. So these changes in demand will be planned and responded to ensure that the service meets the desired performance levels [Integrated Urgent Care Delivery Team , 2017].

Education requirements

Telenursing is a new service technology and education systems should therefore be established to teach telenursing and provide the necessary academic resources, including the training of new staff in nursing informatics. This educational framework would also require political action [Kumar and Snooks, 2011]. In addition, [Forslund et al., 2004] argue that counseling, education, and feedback would give telenurses a greater sense of security and reduce stress, enhancing service quality.

Therefore, it will be essential to carry out specialized training of all staff on the software used and its operation, as well as correct telephone behavior and call handling, since even through the use of CDSS (Computerized Decision Support Systems) that help decision-making and facilitate the monitoring of standardized protocols, each patient who calls is unique and situations vary [Roing et al., 2013], so it will be necessary for staff to have an education specifically adapted for telephone consultations [Giesen et al., 2007].

Social requirements

The distrust of telenursing compared to direct nursing on site can be a problem for the development of telemedicine services. Therefore, it is considered a fundamental requirement that both health care providers and medical facilities, as well as patients, have a good view and responsiveness of the health telephone systems.

The public's understanding of telemedicine therefore becomes a priority for the implementation of the service to go ahead, as well as public recognition by society of the profession of telenursing.

On the one hand, the ministries of health will have to inform the population about the new service and its benefits. On the other hand, marketing the service through the publication of data analysis and surveys [Kornak, 2016] would help motivate others to enter the world of telemedicine, and thus eliminate possible public scepticism or mistrust.

Ethical requirements

The ethical principles applicable to traditional face-to-face encounters also apply to the evaluation and management of patient telemedicine, including non-maleficence, charity, fidelity, fairness and patient autonomy [Standford Medicine, 2016]. In general, there must be equivalence and correspondence between ethical and professional standards, either face-to-face or distance medical care [Zubrow et al., 2016].

[Malloy, 1998] discusses the ethical dilemmas within telenursing, considering confidentiality, privacy and decision making as key points.

On the one hand, information and communication involve ethical issues such as the protection of privacy and confidentiality. On the other hand, [Malloy, 1998] also points to the ethical conflict that arises for telenurses when a standardized protocol advises a course of action but their experience, knowledge and intuition tell them that something else would be more appropriate.

Therefore, the development of information technologies will be required, as well as an administrative policy, including a legal framework, in which patient privacy, information security and the legal protection of telenurses will be preserved.

Legal requirements

First, the legal admission of the business and the practice of telenursing should be authorized for the implementation of the telenursing, as well as the development of an operating guide or a standardized manual. In addition, government verification and recognition of telenursing as a cost-effective health care delivery system will also be necessary [Yun and Park, 2006].

All the requirements of the equality legislation will be essential both in relation to the universal service offered to patients and in relation to the way in which it guarantees equality within its organization and its staff [Integrated Urgent Care Delivery Team , 2017], as one of the imperatives of this type of telemedicine system is that access to health care should be equally accessible to everyone.

On the other hand, nurses are human, so there is always the possibility of error. In this situation, very detailed documentation of consultations will need to be established to help protect telephone triage nurses from legal and civil liability through [Egleston et al., 1994]: the use of protocols, call documentation, and quality assurance and audit controls. This point may be especially crucial in countries such as the United States, where health care has a joint structure between the economy and the provider-patient relationship, because the health system is not financed by taxes. In these countries, legal charges against health care providers are much more common [Zubrow et al., 2016].

Finally, in health telephone services, as with a face-to-face visit to the hospital, the provider must document the visit in the patient's medical record. Therefore, access to the patient's medical record must follow the standard privacy and confidentiality provisions and requirements described in the law [Kornak, 2016].

It should be noted that depending on the norms and policies of each city or country for the practice of telemedicine, a greater or lesser growth and impulse of these systems may be achieved, since not all countries recognize the medical act of telehealth or have stricter and more cumbersome regulations than the practice of presential medicine [Zubrow et al., 2016].

Security and Privacy Requirements

Privacy and confidentiality about the patient's health has always been a concern in health care. Since telemedicine is not static, consideration should be given to how patient information is exchanged before, during and after a telemedicine encounter. And compliance with this same regulation requires that patients be informed that their data is being sent electronically to a remote location or is being recorded via audio, i.e., informed consent [Zubrow et al., 2016].

To do this, all entities in the patient information exchange chain must address local security issues by maintaining a secure server [Zubrow et al., 2016].

With advances in technology over the years, the use of encryption software has been able to protect information from unauthorized access. In addition, most health care organizations have one or more departments that specialize in network connectivity and security [Kornak, 2016].

For this reason, these departments must be included during the development of the health telephone service so that the necessary precautions can be taken to protect all parts. On the other hand, it will also be necessary to carry out a privacy impact assessment, including the assessment and treatment of all risks provided by the service.

Recording/File Requirements

The issue of recording and archiving queries is another area of concern when it comes to telemedicine that must be addressed from the outset during the creation of a service. The recordings can be recorded for educational or legal purposes, so that if a patient returns and sues the provider for malpractice, the provider may release a recording to provide legal counsel with assistance in court proceedings. On the other hand, legal counsel and compliance departments are concerned about negligence based on a record which the patient does not know ever took place. Therefore, any clinical user participating in a recorded session should announce his or her name, position and intention as to why he or she is participating in the consultation, as well as obtaining the patient's verbal consent to approve the recording of his or her telemedicine consultation [Kornak, 2016].

Infrastructure requirements

A clinical decision support software tool will be needed, which leads through the telephone survey, assists with triage and results in a treatment recommendation. This software should include the requirements related to the protocols and standards to be followed depending on the symptoms, gender, age,... It will also require the computer facilities to host the call centers and telephone facilities, in addition to backup hardware systems.

The equipment must be connected to a fiber optic cable network and to a mobile network, as well as to the most reliable connection. The reliability of networks and connections should be maintained at the highest level, incorporating two fibre routes, the highest and most acceptable network speed, and alternative communication systems, should any fail.

Likewise, service maintenance will be very important for success and longevity, so the technology will require infrastructure support, repair service and preventive maintenance. In addition, any telemedicine programme that also requires assistance 24 hours a day, 7 days a week, should create a telephone support programme so that a dedicated technical and clinical support team can provide the necessary support in a timely manner [Kornak, 2016].

On the other hand, the success of a telemedicine programme will depend on minimizing failures, reducing difficulties in providing technical assistance and constantly testing hardware and software. Reliability and performance must be approximately 99% or more to ensure that the service is a viable process for the delivery of care. It is often difficult to regain credibility with both physicians and patients if systems or networks are unreliable [Viegas and Dunn, 1998]. Therefore, not only should a working model be developed for the provision of support, but also event drills should be conducted to test the hardware, software and reliability of the equipment itself. Repeated drills will increase the reliability and accuracy for the successful launch of the telemedicine programme [Kornak, 2016].

Financial requirements

From an economic point of view, the high cost of equipment, communication and maintenance of telemedicine systems is noteworthy. Government investment in the telephone health system is a key issue in activating telenursing in both urban and rural areas, beyond medical benefits.

In addition, in [Yun and Park, 2006], it is revealed that one of the priorities is the need to develop a profitable economic and operational business model to guarantee the ROI (Return on Investment), and thus guarantee one of the objectives of the service, as is the saving in health care by the state.

2.3 Dilemmas and challenges

Telemedicine is not intended to replace traditional medical care, but to support it. In this way, we find that health telephone lines have limitations and compromises.

First of all, one of the biggest dilemmas of telenursing is the fact that you can't face the patient face to face. This makes many critics of telemedicine concerned about health problems that should not be treated over the telephone, or that cannot be evaluated by simply reporting symptoms. This issue raises the challenge of using video in telenursing

as a management tool to enhance the quality and effectiveness of healthcare, although it would, of course, require other conditions and needs, in addition to stricter policies.

Secondly, the fact that there is so much heterogeneity between policies and regulations; health systems; and nursing functions between different countries across Europe is a challenge for telenursing. Before carrying out any form of telemedicine, it is crucial to have knowledge of and follow any current international, national, state and specialty standards of practice to establish the provider-patient relationship, the clear role of the telenurse and the basis of service. Certain countries or states require that the standards of medical practice for telemedicine be very strict, requiring that the provider-patient relationship be established through an in-person examination or visit prior to any telemedicine consultation [Zubrow et al., 2016]. This would make it too difficult to implement a system such as a health telephone line in a city, country or state.

Thirdly, there is considerable uncertainty about the real risk of liability in the field of telemedicine, as existing case law is very limited. Telemedicine is not immune from the usual responsibilities, such as the omission of the physician, inappropriate commissions or negligence of other medical or non-medical employees (IT staff or receptionists). However, the exclusive responsibilities of telemedicine services include the malfunction of hardware due to inability to provide services, software failure due to data loss, inappropriate use of protected health information by employees, or loss of patient personal and/or medical information through hackers or equipment failures [Zubrow et al., 2016]. Hence the importance in this area of maintaining maximum privacy, security, autonomy, integrity and confidentiality of the patient, as well as the prevention of malpractice and the verification of the patient's own consent.

On the other hand, health telephone lines highlight the need for more in-depth research on how to improve communication strategies and ensure a high level of safety and effectiveness in telephone triage. In order to maintain high quality triage, it is necessary to have standardized protocols for decision making by the call handler. Computerized Decision Support Systems (CDSS) are widely used in telephone triage to ensure consistent, quality and formally registered triage [Meer et al., 2012] [Holmstrom, 2007]. However, according to the study [Murdoch et al., 2015] when Swedish nurses used the CDSS for telephone triage, they were forced to reduce the patient's problem to one or more individual symptoms, creating a more restrictive environment due to the CDSS design. This creates a

potentially problematic dilemma in situations of uncertainty as to whether patients and call handlers can be considered "authors" of their own talk [Goffman, 1981]. In addition, to ensure the highest quality of telephone triage, there is a dilemma of what qualifications, experience and training are needed to ensure that call handlers, whether clinical or non-clinical, are sufficiently competent and trained for consultations.

Another of the challenges of telenursing is the issue of reimbursement, since while some health insurances cover telemedicine services, others do not [Zubrow et al., 2016]. This can be a major constraint in countries like the United States, where the health system is not funded by taxes but by insurance companies.

Finally, another of the biggest dilemmas of health telephone systems is the problems related to ethics, and in turn the legal responsibilities that this may entail for the health care provider. Ethics has always been a primary focus for medicine, understood as the manifestation of the moral patterns of society, linked to the particular characteristics of the profession. In addition, negligent liability includes omission (negligence, forgetfulness, abandonment and negligence or negligence) and harmful action (lack of skill, daring and recklessness which, when extreme, can be considered reckless). Ethical issues are found in all types of health care, and addressing them in today's fast-paced health care system is not easy, especially if care and communication are done remotely.

Almost all of the ethical dilemmas identified in telenursing can also be found in other areas of nursing, however, since in the former the encounter with the patient is by telephone, a situation particularly sensitive to ethical demands appears. The study [Holmstrom and Hoglund, 2007] shows and explains five different points where Swedish telenurses experience ethical dilemmas, and these are:

- Speaking through a third part. In this type of phone system it is not unusual that the caller is not the real patient. While the study nurses describe that they try to reach out to the patient when possible, they also clearly state that talking to a friend or relative of the patient could cause ethical dilemmas, as well as conflicts related to the patient's autonomy. An example of this is the case of a person who wants to make an appointment with a doctor for a relative without the relative's own prior knowledge.

- Discuss personal and sensitive issues over the phone. One of the study nurses stated that, in a way: "The whole telenursing service could be considered unethical." The caller gives a name and social security number, but the nurse cannot know for sure that it is the right person to talk to. Because of this, the nurse always gave little information when asked about previous calls, illnesses and sensitive information, documented in the patient's record.

- Insufficient resources and organization of health care. This topic is about instant prioritization among patients that the nurse cannot see. Some of them express ethical concerns in the study on the organization of the health system. They give the example of a caller with symptoms related to stress or depression who has to be told by the telenurse that the doctor on call only deals with acute conditions and that symptoms related to stress and exhaustion cannot be characterized as as acute. Therefore, the nurse must refer the caller to the psychiatric clinic instead, although she knows that the clinic will probably inform her to contact her primary care physician's office.

- Balancing the information needs of callers with professional responsibility. This topic attempts to balance the caller's information needs and the right to appropriate information with the risk of giving information that could overwhelm the caller, without knowing anything about the caller. If a patient asks for what she thinks is simply self-care advice, the nurse may realize that the symptoms she is experiencing are signs of a serious illness. The nurse feels she cannot confront the caller by saying, for example,'I think you have advanced cancer'; however, she has to make the caller aware of the severity and urgency of the symptoms. In these cases, a standardized procedure or checklist cannot be followed. On the one hand, the patient should not be disturbed too much, but on the other hand, the problem cannot be minimized either.

- Differences in judging the caller's credibility. Nurses differ in the way they perceive the credibility and right to care of callers. The study presents a case in which while the nurse receiving the call is shocked, other colleagues with whom she discussed appropriate action to be taken questioned the patient's history. In other words, the ethical values differed from supplier to supplier.

Chapter 3

Implementation in Europe

3.1 United Kingdom

In the UK, the first point of contact for those seeking medical care was traditionally general practitioners (GPs), however, following the introduction of nurse-led telephone advice lines, the organization of primary care has changed significantly [Elliott et al., 2015]. Among the implementation of these lines are: NHS Direct (NHSD) in England, NHS Direct Wales (NHSDW) in Wales, and NHS 24 in Scotland.

NHS Direct was launched in 1998 with the establishment of three pilot sites. It was in November 2000 that the service expanded nationwide, with a total of 22 call centers, and was the world's first national telephone clinical nursing assessment service [Sadler and Challiner, 2008]. NHSDW started operations in April 2000 in two parts of Wales and in the rest of the region in December 2000. As for NHS 24, it was implemented during 2001 in pilot areas, and officially launched in 2002 [Peconi et al., 2011], being an established part of the NHS service. All three services were created with similar objectives and organizations, including being the first point of contact for access to health care, including out-of-hours care.

Among the main reasons for the creation of these services are: lack of knowledge of the available services, confusion among users about which service to access and frustration in

access to emergency and urgent care [O'Cathain et al., 2008]. On the other hand, targets set for services by the Government Department of Public Health include [Munro et al., 2003]:

- Provide the public with a confidential, reliable, and consistent source of professional health care advice, 24 hours a day, 7 days a week, so that they can manage many of their problems from home or know where to turn for appropriate care.

- Provide easy and fast access to a full and up-to-date range of information on health and related topics.

- To help improve quality, increase cost-effectiveness and reduce unnecessary demand for other NHS services by better meeting the needs of the public.

- Enable professionals to develop their role so that patients can be partners in self-care and help them focus on those patients for whom their skills are most needed.

Although these services were referred to as a "nurse-led" service, calls were first handled by a non-clinical call handler who collected basic information. The call handler then transferred the call to the most appropriate personnel (nurse or health consultant) depending on the nature of the consultation, and could call an ambulance immediately if he or she considered the situation to be an emergency, or place the call in a queue if the situation was not urgent and the available personnel were busy with other calls [Peconi et al., 2011].

On the one hand, health information counselors provide consultation on local services, disease prevention, and requests for information on conditions, treatments, and procedures. They may or may not be medically qualified and handle approximately 13% of calls. Nurse consultants, on the other hand, do not make diagnoses, but classify patients using a clinical computerized decision support system (CCDS). The nurse guides the patient through a series of questions that result in advice about what medical care is needed, where to go for that care and when. The nurse can override the course of action recommended by the system, but must document his or her reasons for doing so [Peconi et al., 2011].

Despite the establishment of these three services, problems of access continued to persist. NHS 111 was developed to address these issues and provide a telephone service that would handle all urgent requests for assistance [Department of Health, 2008], including out-of-hours primary care requests, urgent problems that can now be addressed to 999 and self-care advice [Turner et al., 2013].

Thus, the NHS 111 National Health Service started with four pilot sites (Durham and Darlington, Nottingham, Lincolnshire and Luton) in 2010, and fully replaced NHS Direct in early 2014, being a helpline now operating in England and Scotland, as NHS 24 was also replaced by NHS 111. It is a free service available 24 hours a day, 365 days a year throughout England and Scotland. There are plans to extend NHS 111 to Wales [Pope et al., 2017].

The implementation of NHS 111 has changed the way emergency care is structured and organized in the UK dramatically. While it was traditionally the general practitioners who managed the emergency services outside of working hours, and then the nurses at NHS Direct, today the NHS 111 service is predominantly provided by non-clinical staff using decision making software and handling all calls. They use the NHS Pathways assessment system (CDSS) to assess symptoms, prioritize care needs, and direct callers to services or self-care, and are supported by nurses, paramedics, and general practitioners (often one or two clinicians are available on each shift) [Pope et al., 2017].

The NHS Pathways software was designed, developed and is owned by NHS, which is unusual as CDSS are generally developed and owned by private agencies. NHS Pathways is an algorithm built on a large library of regularly updated medical expertise [Pope et al., 2017], which integrates in real time with a Directory of Services (DoS). This directory is automatically accessed in case the patient does not require an ambulance or a doctor in the emergency and urgent services, and is responsible for providing real-time information on the personnel and services available to support the patient as close as possible to the location where they are located [NHS, 2018].

At the end of the consultation, after the call handler has made the evaluation, patients are referred to the most appropriate service available. This may include direct referral of an emergency ambulance, emergency department (ED), transfer of the call to another telephone service, referral to a walk-in clinic, referral to a minor injury unit, booking of an

appointment, referral to the general medical service out-of-hours, or referral to community services or home care during general health care hours [Turner et al., 2013].

The main differences between the NHS 111 service and NHS Direct are [Turner et al., 2013]: access via a toll-free, easy-to-remember three-digit "111" telephone number (also indirectly accessible via out-of-hours telephone support services for general practitioners); calls answered and evaluated immediately by a trained non-clinical call handler, without waiting or returning calls (only some calls are evaluated by a nurse); and direct referral to some services or making appointments with them at the time of the call.

Regarded as the "less urgent than 999" service, the expected benefits of NHS 111 were [Turner et al., 2013]: improving access to emergency care; increasing efficiency by directing people to the "right place first time"; increasing public satisfaction with emergency care and the NHS; and in the long run reducing unnecessary calls and inappropriate use of the 999 emergency ambulance service.

3.1.1 Possible restrictions

On the one hand, to mention that although one of the objectives of both the old services and the new NHS 111 is to try to provide equal and equitable care to the entire population, this is a difficult challenge to achieve, as according to [Knowles et al., 2014] and [Knowles et al., 2006] in the UK, people belonging to the poorest socio-economic groups or with communication difficulties are less likely to call and access the service.

On the other hand, NHS 111 calls and inquiries, as noted above, are mostly answered and evaluated by non-clinical staff, and although they are trained to do so, they are not medically qualified. According to [Wheeler et al., 2015] the most cost-effective professionals to perform telenursing safely are registered nurses (RNs), because they achieve appropriate referral rates above those of physicians and non-clinicians. In addition, it is claimed that non-clinical call handlers are not secure decision makers, even when they closely use expert software such as CDSS [Kaminsky et al., 2017], which could compromise and limit the success of the NHS 111 service.

Although [Lattimer et al., 1998], [Wheeler et al., 2015], and [Campbell et al., 2015] have concluded that telenursing and telephone triage systems are safe, [Campbell et al., 2015] called for an investigation of the circumstances that led to more deaths or income after triage was performed. Thus, according to [Anderson and Roland, 2015], it is disconcerting that some countries have chosen to provide telephone triage services with unqualified call handlers rather than registered nurses, as this would reduce the quality of services and increase the number of referrals to urgent and emergency services [Kaminsky et al., 2017].

This issue has been the subject of a number of claims and disputes in the United Kingdom. According to the RCN (Royal College of Nursing), the NHS 111 service and its staff could be "overwhelmed" by the shortage of nurses on the non-emergency helpline. This has also been discussed by some authors in the country, such as [Kendall-Raynor, 2016], who argue that nurses and paramedics should be the only ones to carry out the assessment work in NHS 111. In addition, the helpline has been heavily criticized for not being able to alleviate the pressures on emergency departments, as some policy experts are missing opportunities to divert large numbers of patients [Duffin, 2014].

3.1.2 Goals achieved

First, in terms of NHS 111 service performance targets and standards, in [Turner et al., 2013] it was shown that during the first year of operation all pilot sites met the national quality requirements of not exceeding 5% abandoned calls, and answering 95% of calls within 60s. In addition, 28% of calls were transferred to a nurse for clinical advice.

However, the study [Pope et al., 2017] conducted later showed that the requirements raised at the outset (patient calls should be resolved in a single contact; the number of calls abandoned should be minimized; and calls should be answered within 60 seconds) were not always met, with a decrease in the performance of all these criteria over time, although it was suggested that staff worked hard to try to meet performance targets. It was noted that the target that 95% of calls should be answered within 60 s had rarely been met, the target that only 5% of calls could be dropped was violated during the 4th quarter of 2015/16, and the service appeared to be operating under pressure from the

3rd quarter of 2015/16. At the same time, the proportion of calls transferred for clinical advice decreased over time (from 58% to 36%).

Regarding the impact of NHS 111 on other health care services, the pilot assessment [Turner et al., 2013] showed that there was no statistically significant change in emergency ambulance calls, although one of the expected benefits was reduced demand for other services. In [Pope et al., 2017], the impact on other health services was notoriously difficult to assess, although there was an average of 11.3% of calls forwarded to an emergency ambulance, and 8.1% of recommendations for attending emergencies. In addition, approximately 50% of all calls to the NHS 111 were directed to primary care where patients consult a doctor or nurse, which raises the question of whether the implementation of NHS 111 is a new success or the reinvention of "an old wheel" according to [Pope et al., 2017].

On the other hand, with regard to the cost-effectiveness of the service, the study [Pope et al., 2017] indicates that there is a significant lack of robust data on the use of resources and costing of NHS 111, both in terms of start-up and operating costs, and therefore no cost-effectiveness of the NHS 111 service could be established. The reason for the lack of data may be due to data that are not publicly available, lack of data on health outcomes, difficulties in capturing activity data, or impediments to economic costing by private sector providers. Therefore, the study states that the replacement of labor by the recruitment of 'cheaper' non-clinical staff motivated by the desire to reduce costs does not lead to a reduction in overall costs. This may be because more non-clinical staff are needed to provide the same service as the clinical staff they replace.

In terms of patient satisfaction, the evaluation of the pilot sites [Turner et al., 2013] revealed that the public was generally satisfied, with 73% of respondents reporting high satisfaction with the new NHS 111 service, so if deployment, use and patient satisfaction are markers of success, then NHS 111 can be considered highly successful. In addition, the use of the service seems to have an increasingly high demand trend, receiving more than 15 million calls in 2016 [Pope et al., 2017].

3.2 Sweden

In Sweden, a national project for the development of telenursing was launched in 1997. However, it was not until 2000-2001 that telenursing call centers emerged on a large scale [Holmstrom, 2011]. It was in 2003 that the Swedish Healthcare Direct (SHD) national telenursing helpline, inspired by the National Health Service Direct in the United Kingdom, was launched [Kaminsky et al., 2017].

SHD is part of the New Public Management (NPM) reform in Sweden, associated with efficiency, cost control and performance evaluation objectives. TN (telenursing) in Sweden is, as in many other countries, an expanding healthcare area, accessible 24 hours a day, 7 days a week, and free of charge to all callers [Kaminsky et al., 2014].

The telephone counseling system started mainly because the demand for appointments with general practitioners in health centers was much greater than the resources available. One of the reasons for this was the shortage of family doctors in health centers, which represented only about 10% of the total number of doctors in Sweden [Marklund and Bengtsson, 1989].

The telenursing organization in Sweden is very flat in structure because it has only two levels: managers and telenurses. That is, there are no receptionists or call handlers employed at SHD to respond to inquiries [Holmstrom, 2011]. Therefore, callers are connected directly to telenurses in the nearest region through the national number 1177 [Kaminsky et al., 2014], where the level of care received will be based on the individual needs of the patient, the nature and urgency of their symptoms [Martinsson and Gustafsson, 2018].

A computerized decision support tool helps the nurse make medical evaluations and provides a basis for medical decisions, regardless of the nurse's experience and skills [Kaminsky, 2013] [Martinsson and Gustafsson, 2018].

This tool, called the Computerized Decision Support System (CDSS), is part of the telephone network [Swedin, 2003]. The CDSS covers several symptoms and conditions common among children, adolescents, adults and seniors, suggesting different key questions

based on the callers' symptoms. Based on patient responses, the CDSS suggests a recommended action [Holmstrom, 2011].

Possible outcomes or referrals from a call include self-care advice, an appointment with a family doctor, a visit to the emergency department or a request for an ambulance [Marklund et al., 2007]. Specific information can also be sought from the CDSS by entering a tentative diagnosis (e.g. migraine), and facts and recommendations are made by the CDSS [Strom et al., 2006] [Holmstrom, 2011].

The use of the CDSS was optional at the beginning of the SHD, however it is now linked to patient records, becoming an implicit requirement [Roing et al., 2013], so that RNs are obliged to follow the CDSS throughout the consultation [Kaminsky et al., 2017]. Because of this, the CDSS can be experienced as a quality assurance (assessment, feeling of having a safety net to trust and consistency provider) [Roing et al., 2013] or as an inhibitor to telenurse work (by choosing a symptom in the CDSS, the software forces telenurses to follow it) [Ernesater et al., 2009].

If a telenurse wants to override the recommendations provided by the CDSS, she must write a deviation report indicating why she decided to make a different recommendation [Andersson Back, 2008].

Thus, in Sweden, registered nurses (RNs) assess, give self-care advice and refer patients to the appropriate level of care, completely independently. In addition, according to the New Public Management (NPM) basis, teleworkers must maintain internal efficiency targets to improve performance in the public sector [Diefenbach, 2009], for example by meeting a minimum of six to eight calls per hour, or by maintaining 7 to 9 minute calls [Kaminsky et al., 2014].

As for the additional educational level of Swedish telenurses, there is no specific education for them in Sweden, although there is currently debate about the need to introduce a formal university telenursing course [Holmstrom, 2011].

3.2.1 Possible restrictions

As mentioned above, the SHD base has only two levels: the managers (who are responsible for organizing and controlling that all the objectives of the service are met) and the telenurses. This means that Swedish telenurses can consult each other and have the help of the CDSS, however, they do not have any support from a doctor [Ernesater et al., 2009]. This may therefore be a possible limitation on the job security of Swedish telenurses, as according to [Greenberg, 2009], medical support is essential for a safe and quality telenursing service, and in the absence of it, telenurses would work in a vacuum in which they would not receive systematic feedback and communication, thus limiting their possibilities for professional growth [Greenberg, 2009] [Wilson and Taylor, 2011].

For the same reason, although Swedish telenurses are very independent and much more autonomous than telenurses in the UK, they also have more responsibilities, and are therefore more vulnerable. They themselves, and not the organization, take professional responsibility for their assessment and actions and may lose their nursing license in the event of a serious mistake [Valsecchi et al., 2007] [Roing et al., 2013]. This causes possible limitations and conflicts in the working environment of telenurses, due to the stress and risk they may be subjected to. In [Holmstrom and Dall'Alba, 2002], Swedish telenurses describe how almost every time they make calls they have this threat in mind.

On the other hand, telenurses must listen to and evaluate the patient's symptoms from their point of view and professional experience, while at the same time entering all the information into the CDSS and trying to follow the order imposed by the software itself. All this by trying to get the call within the required time objectives (7-9 minutes). Undoubtedly, telenurses carry out a complex multi-tasking process, which SHD managers consider a challenge [Roing and Holmstrom, 2015]. In addition, [Holmstrom, 2007] shows in his study that the CDSS is not always used by Swedish telenurses as intended and that it could affect communication with the patient. Precisely for this reason, the question is whether the CDSS should be used after the assessments as a decision support, rather than during the calls as suggested by other studies such as [Rutenberg and Greenberg, 2012] and [Murdoch et al., 2015], which support the use of the CDSS to support nurses in providing effective and safe patient care.

This potential conflict between the use of the CDSS as an aid to decision-making after the telenurse's own evaluation or as a strict guide to follow during the call could limit different aspects of telenursing in Sweden related to safety, telenursing autonomy and quality of service, as well as issues related to consultation time. According to [Kaminsky et al., 2014] callers may end up seeking treatment elsewhere, because telenurses may not have enough time to practice health promotion during consultations, which is one of the primary goals of the service and its absence could be counterproductive to SHD's efficiency.

3.2.2 Goals achieved

The study [Marklund et al., 2007] assessed the telephone triage of one of the TN-centers in Sweden with the aim of assessing the appropriateness of referrals to the appropriate level of care in an area of quality and cost, as well as patient compliance with the advice given by the telenurse. According to the cost analysis, all cases with self-care recommendations resulted in 56.1% fewer visits to primary health care and 8.6% fewer visits to A&E (Accident and Emergency department), which saved an amount of 70.3 €per visit or call. Taking into account these results with the population of the study area and the recorded proportions of calls, the magnitude of savings could amount to 1 million euros.

Although the study was conducted at a single TN-center in Sweden, given its normal staffing and operational levels, the cost reduction from a national perspective could amount to billions. It was therefore confirmed that the advice given could result in considerable financial savings and an effective way of managing limited health care resources, indicating advantages both from an individual patient and community perspective for the Swedish health system.

On the other hand, the Swedish telenursing service has proven to be safe, with only 33 malpractice calls claimed between 2003 and 2010 [Ernesater et al., 2012] [Ernesater et al., 2014].

Thus, we could say that telephone counseling nursing in Sweden is cost-effective, safe, saves time, and increases the patient's self-care capacity. This is why it is growing rapidly and becoming a very popular service in the country, receiving 5.5 million calls per year

and leading TN compared to other Scandinavian countries where this type of service has recently started or is under development [Kaminsky et al., 2017].

3.3 The Netherlands

In the Netherlands, until the 1960s, out-of-hours medical care was provided by family doctors or primary care doctors through telephone or home consultations. As a result, the doctors suffered a heavy workload because they were on call most of the time. As a result, GPs began to form small call rotations, usually involving between five and ten doctors, and providing out-of-hours care to each other's patients. At first, this was only done on weekends, but later, it was also done in the afternoons and evenings on weekdays [van Uden et al., 2006].

In 1990, when almost all general practitioners were on rotation shifts, another reform was announced. Primary care outside working hours was reorganized on a larger scale, from small call rotations to large cooperatives of 40 to 120 family doctors in regions ranging from 50.000 to 500.000 inhabitants. The reason for the reform and reorganization of existing services was due to increased dissatisfaction among GPs with the former emergency departments and out-of-hours care; decreased personal commitment of GPs to out-of-hours care; lack of separation between the work and personal life of GPs; and an imminent shortage of GPs for the future [Leibowitz et al., 2003] [Hallam, 1994]. In addition, factors related to the workload of physicians (19 hours per week on call, plus 50 hours per week of regular work) and the increased demand for out-of-hours care by patients were also involved [van Uden et al., 2006]. Thus, out-of-hours health care in the Netherlands (5 p.m. to 8 a.m. on weekdays and all weekends) is currently provided by general practitioners' cooperatives (GPCs), emergency departments (EDs) and ambulance services. On the other hand, in emergency situations, patients can call the national emergency number [van Ierland et al., 2011].

In 2007, about 95% of the 16 million inhabitants of the Netherlands had access to one of the 105 GP cooperatives or out-of-hours centers (OOHs) [Derkx, 2008]. Although there are small organizational differences between these cooperatives, such as differences in location (located next to a hospital emergency department or in a separate and distant

building in a city center or rural area) or differences in accessibility (free access compared to appointment only) [van Uden et al., 2003], they basically work in the same way.

However, despite the creation and development of GP cooperatives (GPCs), the assertiveness of patients in referring to the ED and the lengthening of ED admission times, have led to overcrowding of emergency departments in the Netherlands [Olshaker and Rathlev, 2006] [van Charante et al., 2008], a problem that is also common in many other countries. For this reason, and to prevent this type of situation, primary and emergency care outside of working hours in the Netherlands is organized with telephone triage to manage patient flows, prioritize treatment and make a decision on the appropriate action to take [Huibers et al., 2014].

All GPC calls in the Netherlands are initially handled by trained nurses (80% general practice nurses and 20% hospital nurses [van Uden et al., 2006]). After telephone triage in the cooperatives, the triage nurse may decide on different outcomes depending on the degree of urgency: send an ambulance immediately (immediate and urgent care); refer the patient to a family doctor at the cooperative (either by advising the patient to visit the GPC or by calling the doctor himself); arranging a home visit by the family doctor (chauffeur-driven vehicles are available for doctors who make home visits with communication equipment, oxygen, infusion drops and automatic defibrillators [Grol et al., 2006] [Radboudumc, 2018]); advising the patient on care by a general practitioner the next day; or self-care counseling [van Ierland et al., 2011] [Derkx, 2008].

In this context, one of the doctors on call at the OOH center or the cooperative is responsible for all decisions made by the triage nurses. In cases where the triage nurse has decided to give self-care advice, the responsible GP must approve the nurse's decision based primarily on the nurse's report, although the doctor may also request additional information from the triage nurse [Derkx et al., 2010]. In this way, the nurses are supervised at all times by general practitioners, who are consulted in case of doubt and who verify and authorize all calls handled by the triage nurses [Grol et al., 2006]. In all primary care cooperatives in the Netherlands there are national (evidence-based) triage protocols and guidelines that nurses can use during consultations [van Uden et al., 2006]. In addition, some cooperatives have begun to use computer-based decision support systems [General practitioners cooperatives in The Netherlands, 2004].

After a phone call at an OOH center, the triage nurse should write a medical report to record what has been discussed with the patient, as the report is the only documented source of information. Since it is important to ensure continuity of care, in the event that the patient calls back, the report quickly informs the triagist about the last telephone consultation. Although calls may be recorded, the report provides nurses with a quick way to place themselves in the patient's healthcare context [Derkx et al., 2010].

Therefore, in the Dutch health system, the family doctor acts as the guardian of most other primary care professionals (physiotherapists, speech therapists, etc.) and secondary care [Kulu-Glasgow et al., 1998]. As a general rule, patients need a referral from their physician to use any type of hospital service, and even to attend an A&E department a referral is recommended, although not strictly necessary [Kulu-Glasgow et al., 1998]. Therefore, although many patients come to the emergency department without a referral, patients seeking help outside of office hours are encouraged to call the cooperative (the only regional phone number). They can also visit the local hospital emergency department or call the national emergency number [Grol et al., 2006].

3.3.1 Possible restrictions

The organization and structure of out-of-hours primary care (OOH) in the Dutch region is quite similar to that of Denmark, with similar health organizations and telephone triage. In the study carried out by [Huibers et al., 2014], it was found that despite this similarity, the frequency of contact with OOH cooperatives in Denmark was higher than in the Netherlands. According to the study this could be because the fee-for-service system in Denmark potentially influences the registration and behavior of general practitioners [Van Weel et al., 2012] [Pedersen et al., 2012]. While Danish family doctors receive a higher rate if they use telephone consultations instead of face-to-face consultations, in the Netherlands there are no financial incentives for any particular behavior [van Uden et al., 2006]. Thus, according to [Huibers et al., 2014], it could be argued that Dutch GPs would accept a lower call threshold, based on the assumption that telephone consultations are generally slower [Olesen and Jolleys, 1994], and there is no economic difference for them.

On the other hand, although the majority of general practitioner cooperatives in the Netherlands require patients to contact the cooperative by telephone before attending (approximately 95% of all cooperatives), some cooperatives allow patients to attend the facility without prior contact [van Uden et al., 2006]. Both situations could be limiting the growth of the service and could be contributing to the fact that overcrowding in health services is not reduced so considerably.

Another limitation may be that most general practitioner cooperatives in the country are located near or within a hospital, however the flow of patients from the service together with the hospital or its emergency department has not been formally regulated [van Uden et al., 2006].

As for the consultation reports, as mentioned above, in the Netherlands, it is the triagist who is responsible for drafting them, and they will then need the approval of the general practitioner responsible. [Derkx, 2008] found that only one OOH center had made a report for every 21 calls and that another OOH center had only written a report for 23% of all calls. The reason why some triagists did not document all telephone consultations is unknown, but what is clear is that this omission could limit service, lead to clinical repercussions for the patient, and legal consequences for the organization and the triagist. In addition, the study also found that the number of questions asked during the consultation compared to the agreed standard was very low in all OOH centers, indicating that there was little documented information on the patient's clinical status. This could endanger the patient's health, as it could mislead the primary care physician who evaluates the quality of care provided over the telephone, and could also have serious legal consequences. In short, according to the study, the reporting of telephone calls is far from optimal and needs to be improved. The use of a computerized decision support system during telephone triage (as is the case in Sweden and the United Kingdom) could be an alternative to this problem [Derkx et al., 2010].

Finally, with regard to telephone triage, it is not yet clear whether it is also safe [van Uden et al., 2006]. In particular, because triage nurses can see the records that general practitioners write about the patient, they may not be able to properly identify complex, rare or urgent cases. As a result, more and more cooperatives of general practitioners have set up a supervising telephone doctor [Busser and Giesen, 2002], who are more closely involved in the telephone triage process.

3.3.2 Goals achieved

In 2006, the Dutch Health Inspectorate concluded that the organization of services outside working hours had improved considerably since its inception, although it questioned the safety of telephone selection as discussed above under possible constraints [Derkx, 2008]. It was shown that as a result of the new organization, general practitioners had experienced a considerable reduction in workload [Giesen et al., 2000].

In terms of patient satisfaction, it appears to be good and they are satisfied with the new system and the care provided by family doctors, although patients who only received telephone counseling reported less satisfaction than those who attended the medical co-operative or received a home visit [Van Uden et al., 2005] [van Uden et al., 2006]. In addition, at least 85% of patients use the cooperative's regional telephone number to access primary and emergency care outside of working hours [Grol et al., 2006].

Previously, home visits consisted of approximately 16% of all contacts with patients, and 48% were visits to the GP's office [van Uden et al., 2002]. Currently, only 10% of all contacts are home visits, and 36% are face-to-face consultations at the GP cooperative [van Uden et al., 2006].

In relation to telephone consultations, they previously represented only 36% [van Uden et al., 2006]. In contrast, the proportion of telephone counseling and self-care has now increased significantly from 36% to 52% in most cooperatives [van Uden et al., 2005]. In addition, about 6% of patients are referred to a hospital [Grol et al., 2006].

With regard to the effect of out-of-hours services on other services, according to studies of general practice in the Netherlands (Van Uden), there was a 25% increase in contacts with primary care, a 53% reduction in contacts with emergency care, 89% fewer self-referrals to ED, 12% fewer calls to ambulances and 34% fewer hospital admissions [van Uden et al., 2003] [Grol et al., 2006].

Call Rotations	*GP Cooperatives*
5 to 10 GPs	40 to 120 GPs
Small-scale handling of 10,000 to 20,000 patients within distances up to 5 km.	Large-scale handling of 50,000 to 500,000 patients within distances up to 20–30 km.
Service delivered from small private practices throughout the city or region.	Mostly situated near or within a hospital.
Access daily from 5 pm to 8 am. On the weekend from 5 pm on Friday to 8 am on Monday.	Access daily from 5 pm to 8 am. On the weekend from 5 pm on Friday to 8 am on Monday.
Access via the patients' own GP's telephone number.	Access via a single regional telephone number.
GP uses own car with standard equipment.	Chauffeurs in recognizable GP cars, which are fully equipped (eg, oxygen, infusion drip, automatic defibrillation).
Use of written patient records for communication between GPs.	ICT support, including electronic patient files, electronic feedback to GPs, and online connection to the GP car.
GP or his/her spouse answering the telephone.	Triage nurses on the telephone (ie, GP nurses or hospital nurses).
A mean of 19 hours on call per week.	A mean of 4 hours on call per week.

GP—general practitioner
ICT—information and communication technology

Figure 3.1: Characteristics of the old system of out-of-hours care compared to the new system of cooperatives in the Netherlands (source: ([van Uden et al., 2006])

3.4 Denmark

In Denmark, in the 1980s, due to increased public demand for services and growing dissatisfaction among rural doctors with their heavy workload, the provision of medical care outside working hours by general practitioners (GPs) came under increasing pressure [Olesen and Jolleys, 1994]. Doctors were increasingly dissatisfied with their workload outside working hours, and a reform to change the system was carried out in Denmark in 1992 [Christensen and Olesen, 1998].

Prior to 1992, primary care outside working hours was mostly provided by the general practitioners themselves. Later, it became common for local GP groups in one area to join a rotation system to lead the service, creating substitution groups, with one non-medical person answering the phone and almost all patients receiving home visits [Christensen and Olesen, 1998]. Since the reform, primary care outside working hours has been provided by large GP organizations covering an entire region (Denmark has five regions with 0.8-1.25 million inhabitants each) [Radboudumc, 2018].

One of the main results of the reform is that all patients have direct and free access to a fully trained and licensed general practitioner during the non-working period [Christensen and Olesen, 1998] [Grol et al., 2006]. In addition, the changes were expected to facilitate easy access to emergency care and direct patients to the most appropriate level of care [Graversen, 2015].

Thus, four of the five Danish regions have an organization run and organized by a council of general practitioners representing all general practitioners in the region. These physicians respond to all calls from citizens, perform the triage function and conclude approximately 58% of telephone calls, providing telephone advice, prescribing medication or admitting patients directly to the hospital (5%) [Radboudumc, 2018]. Only fully licensed general practitioners are authorized to perform the triage function in four of the five regions in Denmark [Christensen and Olesen, 1998].

As for the patient management system, it is fully computerized with electronic contact via the Internet between all doctors on call, who have access to a database containing all prescriptions for medication to patients, but not to the patient records of day doctors [Radboudumc, 2018]. In addition, in Denmark, different fees are paid depending on the type of care used by the doctor in the out-of-hours primary care (OOH-PC) service, so that the triage doctor is encouraged to use telephone counseling and self-care advice instead of offering patients a home visit or referring them to the consultation room [Christensen and Olesen, 1998].

Since 2014, one of the regions (Capital Region) has made progress in the way its service was organized. In this region, most calls are answered by specially trained triage nurses, who have the ability to sort the call by themselves or transfer the calls to a doctor, and use the help of a decision support tool to help them ask the right questions and make the right decision about the type of care they need. Nurses may choose to provide telephone counseling, refer patients to an acute care hospital clinic or plan home visits [Radboudumc, 2018]. During home visits in Denmark, doctors keep in touch with the triage center through computers and telephones, and can obtain information about previous consultations with the patient, ordered tests and the best prescription medication [Grol et al., 2006].

So, if a Danish citizen needs intensive care outside working hours, if he is in the Capital Region, he can call the 1813 Helpline, which has different health professionals answering the phone. If you are in any of the other four regions, you will be able to access services from the out-of-hours primary care (OOH-PC) contact telephone number, where a primary care physician will answer the phone [Graversen, 2015].

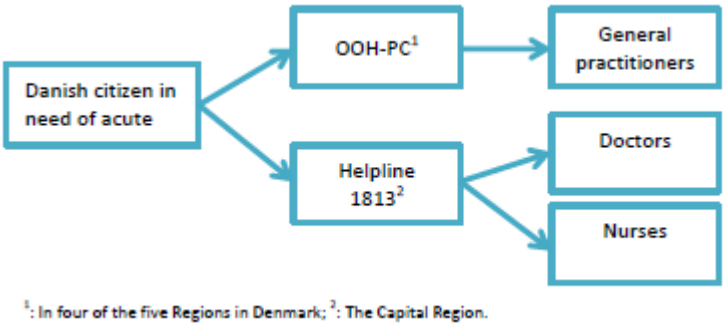

Figure 3.2: In Denmark there are different options for out-of-hours care, depending on which region you are calling from. (source: [Graversen, 2015])

In summary, out-of-hours and emergency services in Denmark are accessible via two telephone numbers [Hansen and Munck, 1998]: 112 for emergency calls and a different telephone number per region for less urgent calls, available from 16:00 to 8:00 on weekdays, and 24 hours a day on weekends and holidays [Gamst-Jensen et al., 2018].

3.4.1 Possible restrictions

In the Capital Region, where calls to the Helpline are often handled by nurses using the CDSS to support decision-making, it is known that another part of the calls are handled directly by doctors due to difficulties in Denmark in recruiting enough nurses to this service [Graversen, 2015]. In this way, the shortage of registered nurses could be a limitation in making the most of the service.

On the other hand, Denmark is currently in a unique situation because it has two different models of telephone triage for out-of-hours assistance, each with the use of different professionals although the basis and objectives of the services are similar. So far, studies on the quality of triage in Denmark are scarce, especially if one considers the quality of

triage performed by physicians, as most studies focus on triage performed by nurses or non-clinical staff [Graversen, 2015]. It would therefore be important to conduct future studies to assess the effectiveness, cost-effectiveness and shortcomings of both types of services.

In addition, patient records at both OOH-PC and the 1813 Helpline are written by triage professionals, however, these records do not include diagnostic and RFE (reason for encounter) [Graversen, 2015] codes, which could delay the search for patient information due to a subsequent call, causing the triage professional to take longer to get into context during the consultation.

3.4.2 Goals achieved

Regarding the distribution of services following the introduction of the new model, [Hansen and Munck, 1998] observed a growth of 22% in 1991 to 54% in 1995 in telephone consultations due to an increase in demand for out-of-hours services, as well as a decrease in home calls from 57% to 19% caused by a large shift from that part of home visits to a telephone or consultation arrangement.

In relation to the workload of general practitioners, [Christensen and Olesen, 1998] they indicate that it has decreased considerably. The proportion of doctors working more than 10 hours per week after working hours decreased from 50% in 1990 to 10% in 1993. In addition, the finding that about one third of all general practitioners do not work outside working hours is likely to remain constant.

On the other hand, the proportion of patients dissatisfied with the service increased in the first five years from 13% in 1991 to 19% in 1995, although satisfaction began to increase again. Part of the explanation according to Christensen and Olesen is that people may have received very little information about the reform, and also that politicians did not inform the public about the intentions of the new service. As one might expect, most dissatisfied patients did not meet their expectations. Over time, when people have expectations that are more realistic, overall satisfaction is likely to be even greater [Christensen and Olesen, 1998].

Chapter 4

Possible Development Steps

The use of telephone services to advise callers on the appropriate point of care to which they should be referred or self-care advice is a telemedicine tool, which, like any other telehealth service, can limit the way in which the healthcare provider evaluates the patient.

The fact that one of the major limitations and disadvantages of health helplines and telenursing is non face-to-face contact raises the question of whether it would be cost-effective to introduce teleconferencing and video systems into these services, to increase the quality and safety of telephone triage, facilitate access and evaluation of patients who may have communication problems, and enable an increase in the number of calls that are solved by consultation alone, thereby reducing the burden on other medical services.

As mentioned above, there are many occasions when not seeing the person makes it difficult to assess a problem that would be easy to identify or assess through visualization. A very clear example of this is cases of skin problems, where a visual examination of the skin would be far more effective than explaining the symptoms or discomfort. [Warshaw et al., 2009] suggests that teledermatology could be a valuable tool in the management of skin diseases for patients living in rural areas or who do not have easy access to a dermatologist, to limit unnecessary referrals to dermatology clinics, and to follow up after a face-to-face dermatology visit. In addition, the accuracy of teledermatology treatments was found to be equivalent to the use of usual care by around 10%, demonstrating the effectiveness of teleconsultation in this field.

One of the purposes of the telephone helplines is that everyone should be able to quickly and easily access health information and medical advice. However, this type of service still fails to meet the need of certain isolated or mobility impaired patients to go to a consultation or specialist. It is also true that telephone lines with medical staff could be more useful in such cases than those with only non-clinical and nursing staff. Thus, the use of teleconsultation could be a key instrument to improve access to primary care and specialized health services for isolated patients. This is the case of people who live in rural areas and far from the nearest hospital, elderly patients who are in geriatric hospitals and whose mobility to visit a specialist can be cumbersome and complicated for the patient, or people who cannot be transferred, as in the case of patients in a prison or a psychiatric hospital. A video service in these cases would facilitate patients' access to healthcare.

The study [Esterle and Mathieu-Fritz, 2013] analyzed the impact of introducing a teleconsultation service between a geriatric hospital and a tertiary hospital, where two-thirds of patients had severe cognitive impairment or dementia, and where there were significant limitations in transporting elderly and frail patients. After the study, the doctors agreed that the patients were satisfied with the service and that it relieved them of a difficult transfer to the hospital for specialist consultations. Teleconsultations were carried out in different specialties and branches, but orthopedics and dermatology constituted the majority of them. In the opinion of physicians, some specialties are not suitable for teleconsultation services, particularly those requiring direct clinical examination of the patient by the specialist [Lehoux et al., 2002]. In addition, teleconsultations in psychiatry were abandoned in the study, as they required in-depth evaluations with older patients with complex problems.

This shows that despite the great advantages that the use of a teleconsultation service can bring to facilitate the access of certain types of patients to a specialist, it also has its limitations and a framework of conditions in which it is suitable to use these systems. In the study [Esterle and Mathieu-Fritz, 2013], health professionals agreed that teleconsultations should only be performed for follow-up of a patient they already knew or for preliminary examinations, even if the clinical specialty was suitable for teleconsultation practice.

On the other hand, the use of teleconsultation in rural areas, according to [Zanaboni et al., 2009], can help general practitioners in the management and administration of their

patients, as well as provide them with high quality primary care with the aim of solving geographical barriers. In the above-mentioned study, the use of teleconsultation improved access to quality health care for 812 patients living in 30 small rural communities, resulted in resource savings in 86% of cases, and quality was considered positive by 95% of general practitioners. The use of videoconferencing in hospitals and rural centers would also be useful in other areas, not only in primary care. In [Ricci et al., 2003] a teleconferencing service implemented in the area of trauma provided rural surgeons with the opportunity to improve clinical care and management of patients with major trauma; [Marcin et al., 2004] improved care and quality of clinical care for pediatric patients through live interactive consultations with a rural ICU; and [Ray et al., 2014] provided education and professional support to rural health care providers on palliative care issues through the use of video conferencing.

As can be seen, numerous studies and projects have been carried out demonstrating the advantages and possibilities that a video teleconferencing service could have in health care, in many cases claiming the need for structural changes in health through the help of telemedicine. These changes are really essential in specific hospital areas or in the management of certain diseases that overburden the economy of health systems worldwide and also require a large number of health resources, support and surveillance. This is the case of chronic diseases, such as Obstructive Pulmonary Disease (OPD), diabetes, hypertension and heart failure, or intensive care units (ICUs), which are areas with a high number of distractions, alarms and interruptions that require immediate attention from doctors and nurses.

In addition, the drastic increase in the aging population and the demand for health services, coupled with the lack of human resources in hospitals and possible economic constraints, have highlighted the need to use and implement video teleconferencing systems in areas such as the ICU, in order not to reduce the quality of health care and to achieve greater safety in these units by using these types of services as a "second pair of eyes" [Goran, 2010].

These systems, like many health helplines, can operate 7 days a week, 24 hours a day, assessing patient status using cameras, microphones, alert systems and vital signs monitoring [Goran, 2010]. The [Grundy et al., 1982] project conducted over 35 years ago to improve the delivery of health care services in an intensive care unit demonstrated that

television consultation had a "greater clinical and educational impact" than telephone consultation. Subsequently, other studies on teleconsultation in the ICU have shown benefits for health care provision, such as [Rendina, 1998], where the length of stay of very low birthweight (VLBW) newborn infants in intensive care was reduced by more than 17%; [Gray et al., 2000], where a teleconferencing and video programme was conducted to provide better medical, informational and emotional support to families whose babies were in the neonatal intensive care unit (NICU) due to low birth weight. The program was conducted during and after the babies' stay in the NICU, and resulted in reduced costs related to hospital-to-hospital transfers, as well as significantly improved family satisfaction with the hospital care received.

At the same time, according to experts [Tovar, 2017], the world's population is expected to grow by an estimated 1 billion people in the next 15 years, with the over-60 age group increasing by 500 million. As a consequence, "chronic pathologies will increase to account for 70% of global health activity", generating an overload not only in terms of healthcare activity but also in terms of economic activity in both developed and emerging countries. This will also make it necessary to strengthen video teleconferencing units in order to reorganize the complexity of chronicity care and to contain the health costs they generate.

One of the most prevalent chronic diseases is diabetes mellitus, which not only places a financial burden on health care, but also on patients and their families. The paper [Bertuzzi et al., 2018] sought to test the effectiveness and feasibility of a teleconsultation programme to control blood glucose levels in patients with type 1 diabetes mellitus. During the study, 74 patients were followed for one year, affirming after the process a high degree of satisfaction due to improved self-management of the disease, time savings and reduced costs for the patient. Although it was not possible to demonstrate whether video teleconsultations could be proposed as a real alternative to standard outpatient visits, they certainly offered a potential solution with greater possibilities than telenursing.

Thus, the use of video in chronic diseases can not only be an advantage and a comfort for the patient, but could also be very relevant in the field of health systems and the high expenditure on this type of disease, which could be the key to managing the sustainability of health systems.

However, an important step in verifying the real benefits of incorporating video into health helplines would be to further study video triage. In [Cady and Finkelstein, 2013] the workflow of triage nurses before and after teleconsultation implementation was investigated. The results showed that triage time via video teleconsultation was significantly longer than telephone triage, i.e., the efficiency of telenurses was reduced. However, all of them stated that despite spending more time on each consultation, it proved to be useful in obtaining "greater depth, breadth and quality of data" for patient assessment, and increasing confidence in the quality of communication.

On the other hand, the use of a teleconsultation service would allow a visual link that the telephone systems could not provide, making the nursing work and the presence of telenurses improve. In the study [Barrett, 2016] exploring the use of teleconsultation in nursing, two types of teleconsultation categories were identified: on the one hand, nurse-patient (N-P) teleconsultations, in which the telenurse and the patient interacted remotely via video, and on the other hand, nurse/patient-practitioner (NP-Pr) teleconsultations, in which the nurse and the patient were physically together, while another health care provider (usually a doctor) was on the other side of the video link. In the latter case, the use of a "third person" (usually a nurse or an assistant) physically close to the patient was the instrument that compensated for the fact that both "extremes" of the interaction could not have any contact with each other, i.e. the barriers and limitations of physical contact that teleconsultation entails would be compensated by a "third person" close to the patient who could act as "a pair of hands of the doctor", providing additional patient information and offering technical support when necessary.

In conclusion, we could say that video teleconsultation has been shown in studies and research to provide organizational benefits, improve patient satisfaction, reduce the economic burden on health systems, and be feasible and useful for the provision of medical care by doctors and nurses. Although in many cases their use is essential for the future sustainability of health systems, and their implementation would provide solutions to problems that telephone services have, these services also have their own limitations, and implementing them would require the reorganization of current healthcare and hospitals, as well as not as easy access as a telephone call, since it would require the patient to use some type of software to establish the call through video or that the patient be in a video conference room of a hospital. In this regard, studies have been conducted on the use of Skype as a clinical tool because it is a free, easy-to-use application that can be installed

on multiple devices, which would facilitate its use as a means of triage and as a way to improve existing health telephone lines, however, the clinical and economic benefits are not entirely clear [Armfield et al., 2015], which highlights the need to continue to improve, research and develop new forms and ideas of telemedicine.

Chapter 5

Discussion

The global overpopulation picture, the imminent long-term growth of disease and the aging of the population make the use of information technology in health imperative. The management of health systems and hospitals is being overwhelmed in multiple aspects of financial, efficiency, care and quality of care, which mark the complex challenges facing health organizations, states and governments today to try to solve these problems in the most appropriate way. The solution to deal with all these pressures on global health lies in the innovation of existing health services, as well as the creation of new services with the help of technology, to prevent health systems from becoming obsolete and to ensure high quality health care.

Thus, new telemedicine systems are born, such as telephone helplines and health counseling, which aim to provide economic benefits, improve patient safety and quality of care, create more efficient use of available resources, regulate patient access to and flow of health care, and reduce unnecessary demand for services. One of the most common practices in this type of service is telenursing, a term intimately linked to these systems because most of the personnel in charge of providing care over the telephone in this type of service are specially qualified nurses, although there is a diversity of personnel in charge of doing these tasks depending on the organization of the service and the country.

In other words, these systems are growing at an increasingly rapid rate in many countries due to concerns about sustainability and health care costs, an example of which is Austria, with its recent implementation of TEWEB "1450".

This project has sought to analyze the barriers and drawbacks of these telemedicine systems and the different types of telemedicine organizations currently operating in Europe, in order to gain an overview not only of the possibilities they offer, but also of the challenges they may entail. The implementation of a health hotline is not a simple process, as it requires many specific requirements, however, due to the benefits they have demonstrated, the walls and limitations they possess are gradually being removed by regulatory agencies, thanks to a high commitment from countries to achieve increasingly effective and pioneering health care.

Therefore, after the analysis of the objectives achieved in some of the countries with health telephone lines, we can say that these countries have improved their health management, although they have also encountered difficulties along the way and need to continue working on an increasingly better and more improved version of the service. We must learn from the errors and possible restrictions that these systems have generated throughout their incorporation in the different countries, to achieve the highest possible performance and try to obtain the best practice of these systems in a future implementation.

Consequently, although the incorporation of these telephone services is complex and generally expensive, the imperative must be created in society and in the state of the countries to continue to move forward in the development of these services, since the benefits and final profitability are assured, and the current global conditions require it. This is why it is urgent to highlight not only the implementation of telephone services that help healthcare, but also the need to continuously improve them and to seek solutions to their limitations in telemedicine itself.

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