

# Tele-Nursing: Opportunities for Nurses to Shape their Profession's Future

Hanan Mohammed Mohammed<sup>1</sup>, Abeer El-Said Hassan El-sol<sup>2</sup>

<sup>1</sup>(Professor of Medical-Surgical Nursing Department, Faculty of Nursing, Ain Shams University, Egypt)

<sup>1</sup>(Faculty of Applied Medical Sciences, Nursing Department, Al-Baha University, Saudi – Arabia)

<sup>2</sup>(Assistant Professor, Medical Surgical Department, Faculty of Nursing, Shibin Elkom, Menoufia University, Egypt)

Corresponding Author: Hanan Mohammed Mohammed

E-mail: [hanan.t2004@yahoo.com](mailto:hanan.t2004@yahoo.com)

---

**Abstract:** Nurses are instrumental in improving the quality of patient care through innovative ideas, based on observations at the bedside and knowledge of best-practices. In today's health care system, information and telecommunication technologies have been integrated into nursing practice. Increasingly, technologies are being used to provide care, conduct consultations with patients or other professionals, and provide education or transmit information over geographical distances. The tele-nursing is cost-effective and time saving innovative technology. It has expanded very fast over last few years and will continue to expand. It will be excellent carrier option for the nurses of 21<sup>st</sup> century. This field of health care is not so very well established all over the world, but is a very valuable innovative method of providing nursing care especially in home health care( The nurses need to possess adequate competencies, technology friendly attitude and ways to ensure patient safety so that its safe use can be established worldwide. Nurses always need to ensure that they should not go beyond the scope of nursing practice. Many of studies were reviewed showed that the benefits of tele-nursing to patient and nurses; additional nursing students in numerous countries. If nurses want to become tele-nurse; they must have a positive attitude, open-mindedness, knowledge and ability to navigate the technology and understand its limitation. They should be able to assess the need for hospitalization and need of change in the care plan. There are Problems related to tele-nursing as difficulty in using technology due to lack of instructions, education, lack of help and support can be a big problem both for nurses and clients.

**Keywords:** Tele-Nursing; Tele-health, Telecommunication.

---

## 1. INTRODUCTION

Technologies have evolved to offer more and broader capability for tele-health/tele-nursing practice. Limited access to health care services, difficult admissions, early discharges from hospitals and long cues of outpatient departments have increased the need of a kind of health care service which can be accessed form home or from remote areas. The word tele-nursing came from the Greek word *telos*, which implies distance. Tele-nursing is defined as the “use of telecommunication technology to deliver nursing services to client at a distance” <sup>(1)</sup>. This can be something as simple as faxing medical records to the more complex delivery of nursing care to patients' home through the use of cameras and computer technologies. It combines information technology to render nursing services to clients at geographically distant locations <sup>(2)</sup>. The American Nurses Association defined “tele-nursing as a subset of tele-health in which the focus is on the specific profession's nursing practice. In America 40% home services are tele-heath based by 21<sup>st</sup> century <sup>(3)</sup>. It is believed that in United States half of nurse's home visits are replaced by tele-nursing. In developing countries where there is shortage of nursing, this innovation can play a vital role in patient care and they will able to access nursing services sitting at their home <sup>(4)</sup>.

**Terms definition:**

**Telecommunication:** referring to the extension of communication over a distance, this term covers all forms of distance and/or conversion of the original communications, including radio, telegraphy, television, telephony, data communication and computer networking <sup>(5&6)</sup>.

**Tele-health:** the use of communications and information technology to deliver health care services and information over large and small distances <sup>(7)</sup>.

**Telemedicine:** is the delivery of health care services, where distance is a critical factor, by all health care professionals using information and communications technologies for the exchange of valid information for diagnosis, treatment and prevention of disease and injuries, research and evaluation, and for the continuing education of health care providers, all in the interests of advancing the health of individuals and their communities <sup>(8)</sup>. **The World Health Organization (WHO)** refers to telemedicine as “healing from a distance“. It is the use of telecommunications technology and information technologies to provide remote clinical services to patients. Physicians use telemedicine for the transmission of digital imaging, video consultations, and remote medical diagnosis <sup>(9)</sup>.



**Figure (1) How work Tele-health &Tele-nursing? <sup>(10)</sup>.**

**History of Telemedicine**

Contrary to popular belief, telemedicine is not a new practice. In fact, the concept of telemedicine is dated back to the 19th century! What began as a few hospitals wanting to reach patients in remote locations became an integrative system across the care continuum. The history of telemedicine will unveil how we got to where we are today <sup>(10)</sup>.

**Telemedicine in the 19th Century**

The creation of telemedicine began with the inception of the telecommunications infrastructure, which included the telegraph, telephone, and radio. Casualties and injuries were reported using the telegraph during the Civil War, in addition to the ordering of medical supplies and consultations. This is considered one of the earliest adoptions of telemedicine technology. By 1879, a Lancet report discussed how using the telephone can reduce the number of unnecessary office visits. This was only the beginning of what would be a patient care transformation <sup>(10)</sup>.

**Telemedicine in the 20th Century**

Gernsback featured the teledactyl in a science magazine in 1922, in the same time he predicted that this sensory feedback device would permit physicians to see their patients through a television screen and touch them from miles away with robot arms <sup>(11)</sup>.

The first radiologic images were sent via telephone between two medical staff at two different health centers in Pennsylvania by 1948. The health centers were 24 miles apart from one another! Then in 1959, physicians at the University of Nebraska transmitted neurological examinations across campus to medical students using two-way interactive television. Five years later, a closed-circuit television link was built that allowed physicians to provide psychiatric consultations 112 miles away at Norfolk State Hospital <sup>(12)</sup>.

**Telemedicine Today**

Today, most people have access to basic telemedicine devices like mobile phones and computers. With improved accessibility, individuals in rural areas and busy urban areas can connect with a provider with ease. Home-use medical devices make it possible for caregivers to monitor everything from vitals to glucose levels. Physicians can gather essential medical information and make a diagnosis without patients stepping foot in a doctor's office <sup>(10)</sup>.

**Telemedicine vs Telehealth**

Although the terms telemedicine and tele-health are often used interchangeably, there is a distinction between the two. The term tele-health includes a broad range of technologies and services to provide patient care and improve the healthcare delivery system as a whole. Tele-health is different from telemedicine because it refers to a broader scope of remote healthcare services than telemedicine. While telemedicine refers specifically to remote clinical services, tele-health can refer to remote non-clinical services, such as provider training, administrative meetings, and continuing medical education, in addition to clinical services. According to the World Health Organization, telehealth includes, "Surveillance, health promotion and public health functions <sup>(13)</sup>.

Telemedicine involves the use of electronic communications and software to provide clinical services to patients without an in-person visit. Telemedicine technology is frequently used for follow-up visits, management of chronic conditions, medication management, specialist consultation and a host of other clinical services that can be provided remotely via secure video and audio connections <sup>(13)</sup>.

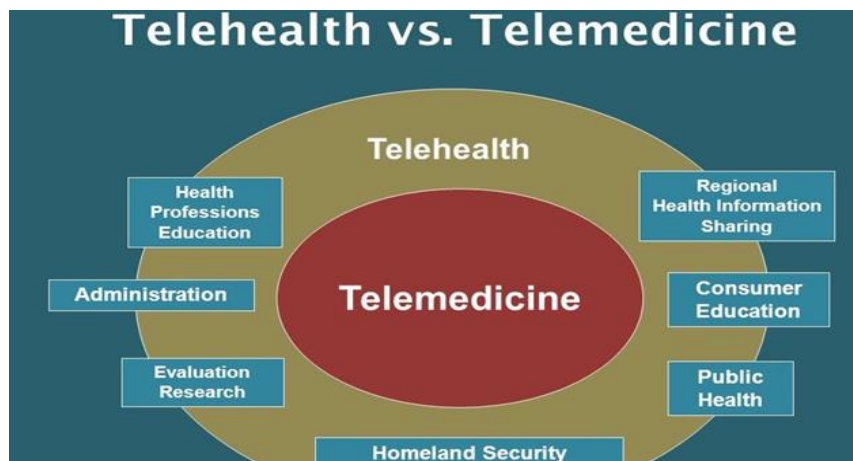


Figure (2) Telemedicine vs Telehealth <sup>(14)</sup>.

**PURPOSE OF TELEMEDICINE**



Figure (3) Purpose of telemedicine <sup>(10)</sup>.

**Benefits of Telemedicine:**

Using telemedicine as an alternative to in-person visits has a host of benefits for patients and healthcare providers alike.

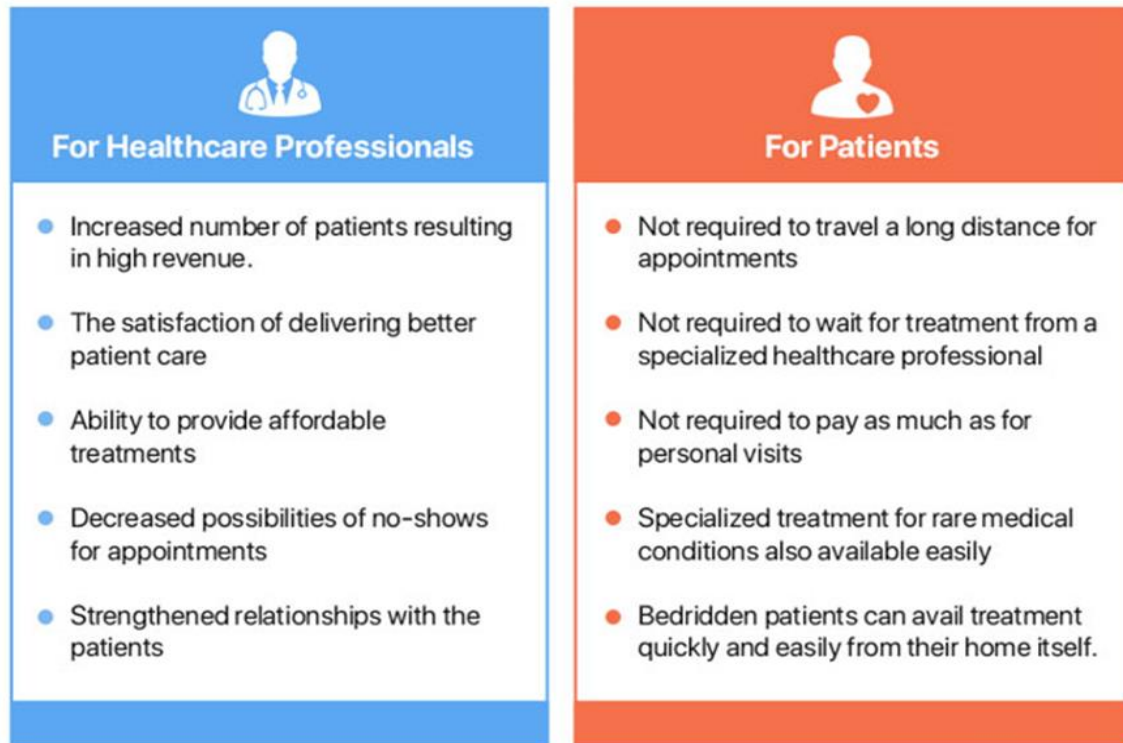


Figure (4) Benefits of Telemedicine<sup>(14)</sup>.

**Pros and Cons of Telemedicine (Advantages and disadvantages)**

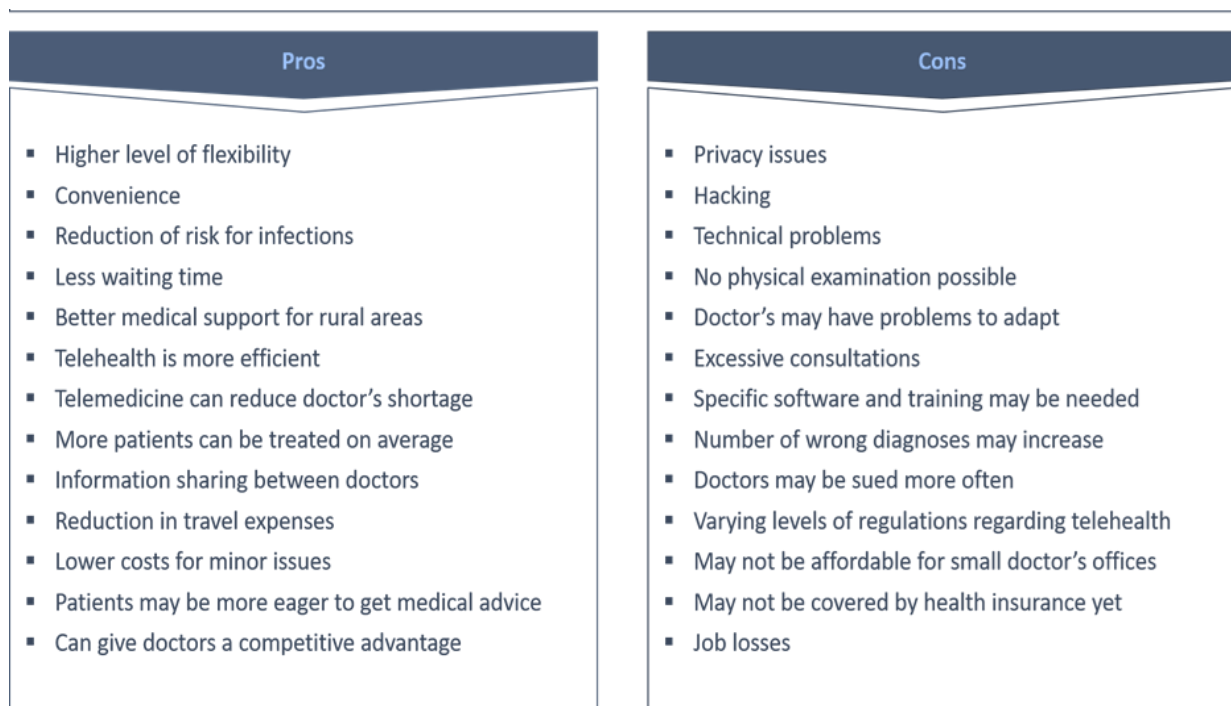


Figure (5) Pros and Cons of Telemedicine<sup>(15)</sup>.

## International Journal of Novel Research in Healthcare and Nursing

Vol. 7, Issue 3, pp: (660-676), Month: September - December 2020, Available at: [www.noveltyjournals.com](http://www.noveltyjournals.com)

### Common types of telemedicine:

- **Interactive Medicine** – which allows patients and physicians to communicate in real-time while maintaining HIPAA compliance
- **Store and Forward** – which permits providers to share patient information with a practitioner in another location.
- **Remote Patient Monitoring** – which allows remote caregivers to monitor patients that reside at home by using mobile medical devices to collect data (e.g. blood sugar or blood pressure) <sup>(16)</sup>.

### Opportunities of telemedicine:

a- **Cost Reduction** – One of the main objectives of digital technology integration is to provide better services at lower cost. In case of telemedicine, several operation costs such as traveling can be reduced as the patients are able to get medical services online. Several results indicate cost effectiveness of telemedicine compared to other methods. Telemedicine can thus be considered as an alternative diagnosis and treatment methods in several cases <sup>(16)</sup>.

b- **Preventive Medicine Promotion** – People sometimes have symptoms which can be prevented. One of the key benefits of practicing preventive medicine is to decrease feasible illnesses. It can be conducted by several levels ranging from the governmental agencies to individuals <sup>(17)</sup>.

c- **Health monitoring concept together with telemedicine** is the main driver of applying preventive medicine. In order to obtain the real-time vital sign readings, wearable devices available in the market can be used to sense and transmit the readings to the medical staff. Preliminary diagnosis and following procedures are performed by using telemedicine. Possible illnesses can thus be prevented or found at an early stage <sup>(17)</sup>.

d- **Medical Education** – Most countries are still experiencing the lack of medical staff and specialists. Remote areas do not have professionals to provide specific medical cares or treatments. Such problems are worsened in case of emergency. Apart from being a medical treatment platform, telemedicine can be used as a continuing medical education where medical staff and professionals meet, learn and exchange their knowledge and experiences. Successful cases of telemedicine as an education platform are reported. Sessions can be conducted at any convenient sites where attendees gather and participate an assigned workshop <sup>(18)</sup>.

e- **Healthcare Equality** – Limitations of distance and time are tackled by the information and communication technologies. Telemedicine is built on top of such technologies in order to provide medical services. People around the world can therefore access the services as soon as they are connected to the Internet. Medical services are not only delivered by local physicians <sup>(19)</sup>.

Professionals residing at other areas can provide diagnoses and treatments. Local or novice physicians are capable of learning from medical specialists. In order to achieve healthcare equality, collaboration, regulation and standardization are required. Governmental agencies and private institutes have to cooperate and agree upon a set of requirements. Regarding the digital technologies related issues, several predefined standards such as communication protocols can be adopted <sup>(19)</sup>.

f- **Service Diversity** – With an advancement of recent digital technology, data delivery and processing are considerably improved. Instead of basic data type, multimedia streaming over the Internet is now more efficient. Processing power is also remarkably increased while the hardware price is continually decreased. Such improvements support a variety of medical services and enable real-time applications. A variety of telemedicine services such as tele-pathology, tele-dermatology, tele-nursing and tele-surgery and their performance acceptance are addressed. The key consideration on offering new service is to select a set of suitable tools and technologies <sup>(20)</sup>.

### Steps guide before starting telemedicine:

**Step one:-Understand the Basics;** before setting up a telemedicine practice, an organizations administration and providers should know how laws differ when using telemedicine solutions. They should also consult with an expert to determine what equipment they need, and have a basic understanding of why they want to offer this in the first place. In addition, if it's an existing practice, they should get buy-in as some physicians are not ready to make the transition <sup>(18&19)</sup>.

**Step two: Deciding On Telemedicine Solutions;** after laying out the basics, an organization should decide what type of telemedicine solutions to offer. A telemedicine expert like VSee offers a text and video collaboration app, a Virtual waiting room, and more. The organization should be responding to their current pain points, such as overcrowded waiting rooms or difficulty reaching patients in rural areas <sup>(18&19)</sup>.

**Step three: The Equipment;** as compatible microphones; webcams, speakers; Internet connection and computer capabilities <sup>(18&19)</sup>.

**Step four: Understand Regulations and Reimbursements; policies** and regulations in the telemedicine arena can be confusing for providers, vendors, and payers. Organizations interested in implementing telemedicine should be familiar with the laws in their state. For example, some states require informed consent from patients, while others do not. Some payers may not pay the same rate for telemedicine services as they do for in-person services. Practices should identify how providers will be paid, as some organizations seek grant funding <sup>(18&19)</sup>.

**Applications of tele-medicine:**

There are few limitations to how telemedicine can be applied. Here are a few examples of how it is being used today.

**(1) Follow-up visits;** using health software for routine follow-up visits is not only more efficient for providers and patients, but it also increases the likelihood of follow-up, reducing missed appointments and improving patient outcomes <sup>(22)</sup>.

**(2) Remote chronic disease management;** the increasing rate of chronic disease is a major challenge for our health system. It is a prime candidate for the use of telemedicine software because it makes it easier and less expensive for patients to maintain control over their health <sup>(22)</sup>.

**(3) Remote post-hospitalization care;** one telehealth program for patients with congestive heart failure reduced 30-day hospital readmissions by 73 percent and six-month readmissions by 50 percent <sup>(22)</sup>.

**(4) Preventative care support;** weight loss and smoking cessation are the keys to reducing heart disease and a host of other conditions. Telemedicine can be a valuable tool in connecting providers with patients to make sure they get the support they need to be successful <sup>(22)</sup>.

**(5) School based telehealth;** when children become ill at school, they might visit a school nurse or be picked up by their parents and taken to an urgent care center. Some innovative districts have teamed up with doctors to conduct remote visits from the school. The provider can assess the urgency of the case and provide instructions or reassurance to parents <sup>(22)</sup>.

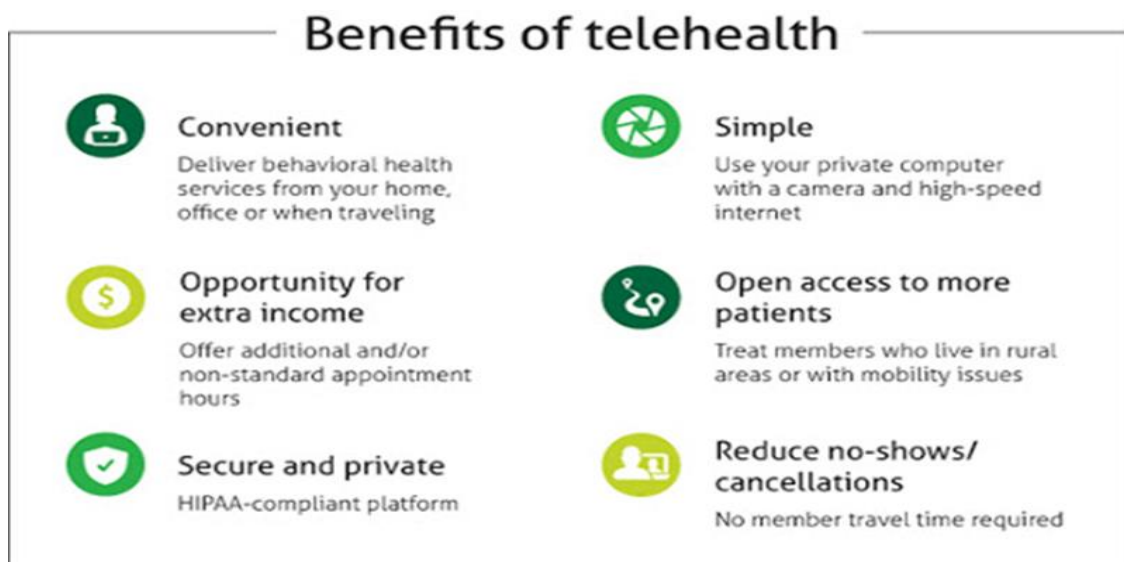


Figure (6) Benefits of telehealth <sup>(21)</sup>.

Transforming Access to health care

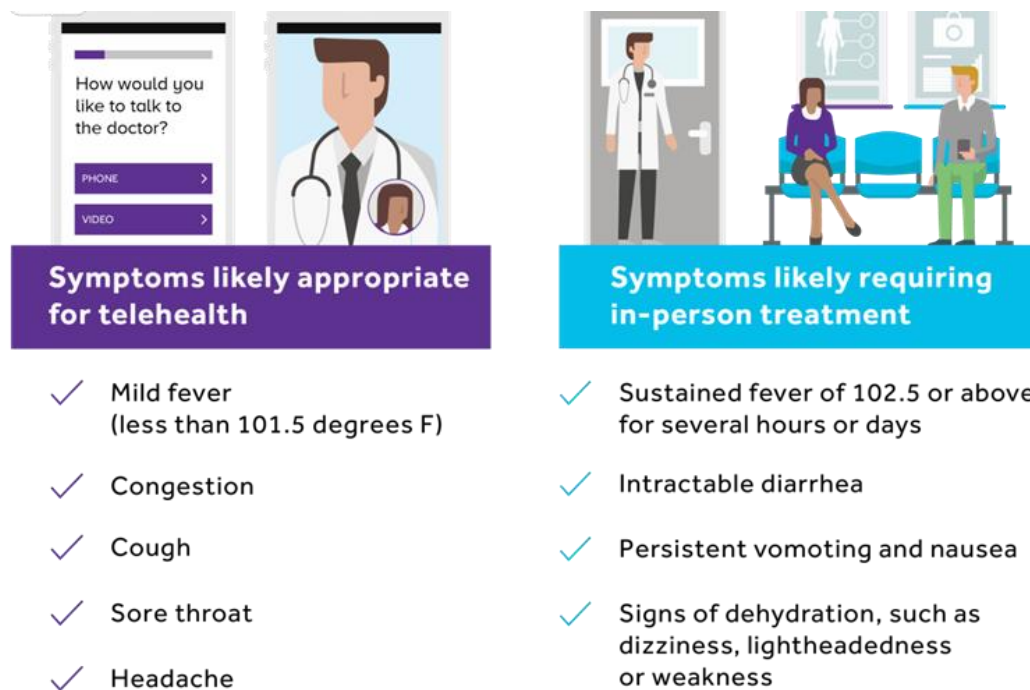


Figure (7) Example of clinical telehealth application <sup>(21)</sup>.

**(6) Assisted living center support;** telemedicine software has already proven to be useful in keeping residence of assisted living facilities out of the hospital. Problems often occur at night or on weekends, making hospitalization the only option even for less urgent problems. With telemedicine, on-call doctors can conduct a remote visit to determine if hospitalization is necessary <sup>(22)</sup>.

**Telemedicine software solutions:**

- **Video call;** video calls are used for in-home care, ambulatory care, and acute care. Not only does it allow for providers to reach patients in rural populations, but it also makes providing care more efficient. Practices that choose to use video calls can do so for urgent care, primary care, or follow-up consultations.
- Physicians and patients can communicate by using Health Information Portability and Accountability Act (HIPAA)-compliant software. In addition, providers can use Pan-Tilt-Zoom to view close-ups of their patients on remote exams. They can also share and mark-up documents, CT Scans, and lab results <sup>(20&22)</sup>.
- **Note:** Health Information Portability and Accountability Act. It is mostly known for providing standards and requirements regarding how confidential patient information is protected and handled <sup>(20&22)</sup>.

**(b) Waiting Room (triage)**

- Emergency room and urgent care environments are known for long wait times, overcrowding and even staffing shortages. This leads to additional stress being added to not only the patient, but the staff too. With tele-triage, patients can arrive to an emergency department and be seen by an off-site physician using video conferencing software. The off-site physician can order tests or determine a treatment plan, which moves patients through the system faster. Cases that are more severe can be moved to the next level of patient care and others can be discharged <sup>(20&22)</sup>.

**(c) Virtual Clinic**

- Clinics that want to improve their workflow experience and backend experience, should consider using a Virtual Clinic <sup>(20&22)</sup>.

**(d) With EMR**

- Because of telemedicine, physicians can access patient medical records without being onsite. Some telemedicine providers offer the ability to do data entry using a point-and-click method or video/handwriting recognition. This can cut down on the amount of time that physicians dedicate to administrative tasks. As a result, physicians can see more patients or spend more time with those cases that are more complex <sup>(20&22)</sup>.

**(e) With Billing Solution**

- Like an onsite clinic, patients can check-in for walk-in or scheduled visits, complete an intake form, and make payment online <sup>(20&22)</sup>.

**Telemedicine Software: Features and Capabilities**

Figure (8) Features and Capabilities of telemedicine software <sup>(10)</sup>.

**Barriers of Telemedicine:****(I) Provider Reimbursement**

- If private payers, Medicaid, and Medicare choose not to reimburse organizations for telemedicine, then the fee falls on the hospitals. Some hospitals are able to receive grants, but there are only so many that can go around. In addition, some states do not have parity laws. That means physicians may not receive the same reimbursement that they would for onsite services. This issue alone makes implementing telemedicine unattractive for providers and they, in turn, forego it <sup>(2)</sup>.

**(II) Physician Licensing**

- Although telemedicine itself permits physicians to treat patients nationwide, there are restrictions on who can provide services across state lines. States with large rural areas with limited access to care could greatly benefit from this, but varying state regulations make the process challenging. Physicians who do want to practice medicine across states may have to obtain a full medical license in all states. Not only is the process time consuming, but it is also expensive for physicians to do. This process alone makes what would be a convenient option, a very inconvenient one <sup>(2&3)</sup>.

**(III) Security Concerns**

- Providers and patients alike have concerns with telemedicine due to the mass amount of sensitive information in the healthcare world. Because of telemedicine, physicians are able to communicate with their patients via video chat, text message, and phone call, but not all communication mediums are safe <sup>(2&3)</sup>.
- Once these barriers are removed, we can anticipate greater access to care and improved patient outcomes <sup>(2&3)</sup>.



Applications of Telemedicine Software in Today’s Scenario



Figure (9) Telemedicine Software Application <sup>(23)</sup>.

Developments of telenursing:



Figure (10) Development of telenursing <sup>(10)</sup>.

(1) Tele-nursing kits

Tele-nursing kits bring healthcare services into the comfort of the patient's home. It targets the chronically ill under-served residents and elderly patients by supplying them with devices that can collect data, interpret results and monitor patients to ensure compliance to discharge instructions. These kits allow nursing care to perform from the comfort of a patient's own home. This increases patients' compliance to their healthcare regimen which, can lead to reduced number of hospital stays <sup>(24)</sup>.



Figure (11) Home Care Kit <sup>(10)</sup>.

**(2) Drone emergency responses**

During emergency situations, nurses are critically needed, however they cannot always attend to the specific location due to the geographic location, danger etc. With use of a drone, nurses can provide care. Drones travel further distances and can reach locations that emergency medical personnel often cannot access. Additionally, drones are equipped with medical supplies that can be utilized safely by any adult. High-tech camera glasses can be found in the kit to enable the victims to communicate with emergency care nurses, who can evaluate the medical emergency through the specialized lenses and provide appropriate directions for care <sup>(25)</sup>.

During emergency situations, needed to critically nurse however they cannot always attend to the specific location due to the geographic location, danger etc. With use of a drone nurses can provide care; drones travel distances faster and reach more safely locations that emergency medical personnel often cannot access. Additionally drones are equipped with medical supplies that can be utilized safely by any adult. High-tech camera glasses can be found in the kit to enable the victims to communicate with emergency care nurses, who can evaluate the medical emergency through the specialized lenses and provide appropriate directions for care <sup>(26&27)</sup>.

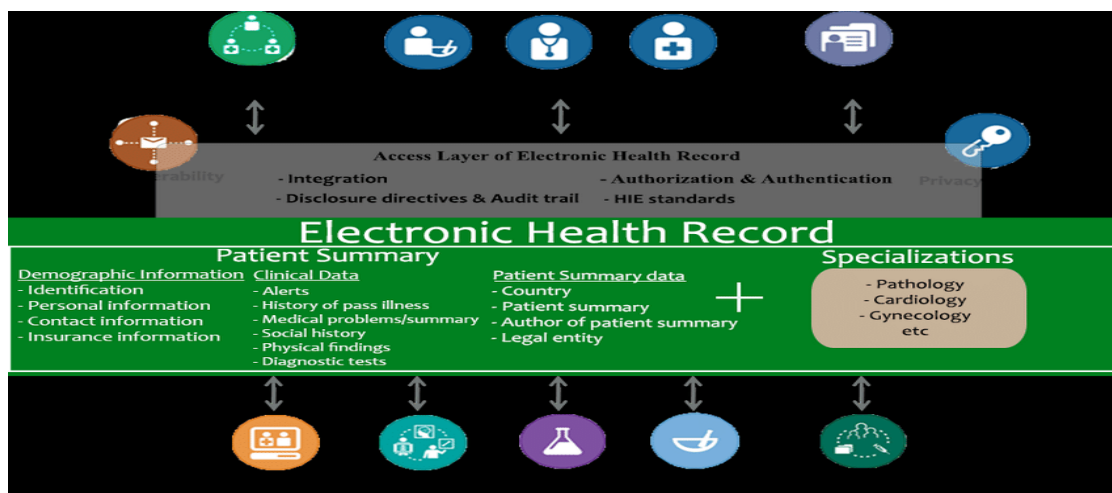


**Figure (12) Eyes on glasses let nurses see patients' veins through their skin <sup>(21)</sup>.**

**Distant Site;** Distant site is the place that the physician is located at the time of which the service is provided. This term is often used when discussing reimbursement, as certain locations are not covered <sup>(28)</sup>.

**Electronic Medical Record (EMR);** EMR's allow healthcare organizations to store, retrieve, and modify patient records <sup>(28)</sup>.

**Electronic Health Record (EHR);** Often confused with an EMR, electronic health records are a collection of patient information that can be shared across healthcare settings. EHRs commonly contain billing information, vital signs, medical history, and more <sup>(29)</sup>.



**Figure (13) Structure and functionality of the Electronic Health Record <sup>(30)</sup>.**

## International Journal of Novel Research in Healthcare and Nursing

Vol. 7, Issue 3, pp: (660-676), Month: September - December 2020, Available at: [www.noveltyjournals.com](http://www.noveltyjournals.com)

### Scope on tele-nursing

Decreasing time and distance, these advances increase access to health and healthcare, especially to underserved populations and those living in rural and remote areas.

They help to manage the demand for services, ensure more effective use of human and health resources and facilitate education and research activities <sup>(31)</sup>.

### Factors responsible for growth of Tele-nursing growth in many countries:

Due to several the preoccupations are driving down the costs of health care as

An increase in the number of:

- aging
- chronically ill population
- And the increase in coverage of health care to distant, rural, small or sparsely populated regions <sup>(32)</sup>.

### Technologies needed for delivering nursing service by tele-nursing:

Nurses' use technologies such as the Internet, computers, telephones, digital assessment tools, and tele-monitoring equipment in their practice to assess, plan, intervene, and evaluate the outcomes of nursing care <sup>(33)</sup>.

### Competency, Qualifications and Skills required:

To be a tele-nurse the nurse must have a positive attitude, open-mindedness, knowledge and ability to navigate the technology and understand its limitation. The nurse should be able to assess the need for hospitalization and need of change in the care plan. No service can be delivered effectively without a competent communication skill because it a must to assess and triage the client. The telecommunication requires a frequent use of technology. The nurses must be technology friendly and must have an appropriate video/telephone behavior. The consumers of services can be saved only with evidence based information and care, so the nurses must have continuous update. They must possess a skill to deliver competent nursing services through the technology. The Interstate Licensure is must because the services can't be restricted to one state only <sup>(33)</sup>.

### Opportunities aroused in the nursing and health care system to emerge tele-nursing:

- ☞ Tele-health, which offers the opportunities for greater access to health care through the use of technology.
- ☞ Extends access to nursing services.
- ☞ Increased networking, with sharing of ideas and information among health professionals and organizations.
- ☞ New education methodologies such as improved distance learning opportunities and greater use of the internet for education, research and communication <sup>(10)</sup>.
- ☞ New job opportunities including both the creation of new and different jobs and roles and increased opportunities to work and learn in other countries and regions and;
- ☞ New technologies which are bringing improvements in health care and the quality of life for many, but are not equitably accessible to a large proportion of the world's populations <sup>(34)</sup>.

### Tele-nursing applications:

**(1) Providing community services and home care;** one of the most distinctive tele-nursing applications is home care. For example, patients who are immobilized, or live in remote or difficult to reach places, citizens who have chronic ailments, such as chronic obstructive pulmonary disease, diabetes, congestive heart disease, or debilitating diseases, such as neural degenerative diseases (Parkinson's disease, Alzheimer's disease or ALS), may stay at home and be "visited" and assisted regularly by a nurse via videoconferencing, internet or videophone <sup>(35)</sup>. Other applications of home care are the care of patients in immediate post-surgical situations, the care of wounds, ostomies or disabled individuals. In normal home health care, one nurse is able to visit up to 5-7 patients per day. Using tele-nursing, one nurse can "visit" 12-16 patients in the same amount of time <sup>(35)</sup>.

In home based care/ outreach services; the nurses are provided with adequate education for their role, full technological facilities, decision support software, ready access to supervision and continuing education they can deliver services safely. The Child and Adolescent Psychological Telemedicine Outreach Service (CAPTOS), geriatric outreach services, rural clinics, care of patients having chronic illness at their home are some of the examples <sup>(36)</sup>. Cable television-based interactive video system, repeated telephone calls for education and follow up, electronic transmission of patient's record, and interactive websites are used to deliver services at home. Nurses' advices are based on the nursing tele-assessment, diagnosis and management protocols <sup>(37)</sup>.

**(2) Telephone triage (Assessment of conditions and triage):** Telephone triage refers to symptom or clinically-based calls. Clinicians perform symptom assessment by asking relevant open ended questions about the patient's illness or injury; or by using of interactive videos and entering appropriate data into the software are helpful. The clinician's task is to estimate and/or rule out urgent symptoms. They may use pattern recognition and other problem-solving process as well <sup>(38)</sup>. Clinicians may utilize guidelines, in paper or electronic format, to determine how urgent the symptoms are. Telephone triage requires clinicians to determine if the symptoms are life-threatening, emergency, urgent, acute or non-acute. It may involve educating and advising clients, and making safe, effective, and appropriate dispositions—all by telephone. Telephone triage takes place in settings as diverse as emergency rooms, ambulance services, large call centers, physician offices, clinics, student health centers and hospices <sup>(39)</sup>.

#### Countries using telephone triage

An international tele-nursing survey was completed in 2005, reporting that the 719 responding full-time and part-time registered nurses and advanced practice nurses worked as a tele-nurse in 36 countries around the world. 68% were reported to be working in the United States, compared to only 0.6% in Finland. Some of these 36 countries include Australia, Canada, Norway, United Kingdom, New Zealand, Iran, Sweden, and the Netherlands <sup>(35)</sup>.

**(3) Mental Health:** Tele-nursing has also been utilized in mental health applications. Tele-psychiatry is useful in many environments with limited access to care, including rural areas, emergency rooms, natural disasters and crisis zones, and warfronts. This technology delivers mental health care in areas that would otherwise not have any mental health care resources <sup>(40)</sup>. Much of the time, this use involves live interfacing between patient and care giver, whether in video conference or over text thread. In addition, use of asynchronous tele-psychiatry, in which a detailed interview with the patient is videotaped and reviewed by a provider afterwards, has also proven an effective use of tele-psychiatry <sup>(17)</sup>. Tele-psychiatry improves integrated and patient-centered care, allowing for the incorporation of mental health resources into the overall treatment of the patient <sup>(41)</sup>.

**(4) Coronavirus pandemic:** Since the rise of the coronavirus pandemic in the United States, telemedicine has risen exponentially, with estimates that telemedicine market size will be around \$175 billion up from \$45 billion in 2019 <sup>(41)</sup>. Reasons for the increase in telemedicine are numerous; however, reasons include reducing the exposure of staff to ill individuals and reducing overcrowding the healthcare facilities. Thus, tele-health has significantly grown during the pandemic as it increases social distancing by reducing the need for patient travel and going to crowded places <sup>(42)</sup>. Another benefit of tele-health is it reduces the amount of PPE that is needed for healthcare professionals that are already in limited supply. Ultimately, tele-health has many benefits beyond the pandemic, such as increasing the number of people who seek preventative care since they can do so from home <sup>(43)</sup>.

**(5) Care of school children:** Self-care abilities among school children can be increased with this intelligent technology. Many children can be educated at same time <sup>(44&45)</sup>.

**(6) Palliative care:** Nurse Line with the expertise of specialized community-based palliative care services, with a commercially available video-phone connected with the client's home telephone line. A hands-free speaker-phone and a miniature video-camera (for close-up views) can be connected to the video-phone which can be used to provide emotional and informational support <sup>(46&47)</sup>.

**(7) Tele-nursing in ICU:** The nurses working in ICU can get instruction for the care of patient through interactive videoconferencing and manipulating sensors. The nurse can also get nursing care protocols which are evidenced based from the nurses working at level I hospitals <sup>(48)</sup>.

**(8) Management of patients:** It is done by relaying their vital information (vital signs, ECG report) to the tele-nursing center. Patients having heart failure and related problems/pulmonary diseases, depression, chronic conditions like diabetes, stroke, chronic obstructive pulmonary disease have been successfully managed by tele-nursing. Pain and fluid management can also be done and the good example of this is care of pediatric client after tonsillectomy. Nurses have also addressed the problems of menopausal women, patients having ostomy and wounds through tele-nursing <sup>(49&50)</sup>.

## APPLICATION OF TELE NURSING

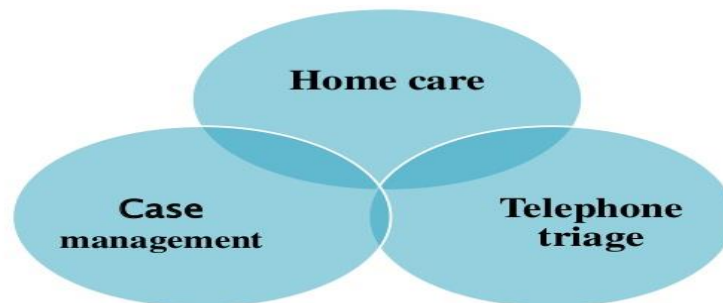


Figure (14) Examples for telenursing application <sup>(51)</sup>.

### Benefits of tele-nursing using:

#### (I) Benefits to nurses:

**New carrier option:** The growing population has overloaded the hospitals, so the need for home based care has increased. The nurses are also willing to opt for a job where they can earn more and have more satisfaction <sup>(52)</sup>.

**Data sharing:** Through use of internet and web based interface now it is easy for nurses to share data/get guidelines from different settings <sup>(53)</sup>.

**Rapid response time:** Nurses can respond within a minute if technology is in a well working condition. This is helpful for the patients having suicide tendencies. These patients can seek rapid help from suicide help lines <sup>(52)</sup>.

**Improved salary and flexible working hours:** Nurses if work from home they will feel at ease to work flexibly. They can earn more by working for more hours and providing services to many patients at a same time with in short period of time <sup>(52)</sup>.

**Less travel and Cost-effective for nurses:** The travel expense of nurses has been curtailed to zero as they provide services from their home and they are able save money <sup>(53)</sup>.

**Easy to provide remote services:** This innovative technique has made it is easy to provide services to people living at far flung areas <sup>(33)</sup>.

**Improved job satisfaction and opportunities for skill development:** Nurses working from home feel that they are more productive, have to take fewer sick leaves and their employer also reported that there is lower attrition rate. This is how this new innovative technology has increased the satisfaction among nurses with their new roles. The nurses also feel satisfied with the specific knowledge and skills used by them to deliver tele-nursing services and the settings in which they learn such skills, and competencies <sup>(35)</sup>.

**(II) Benefits to patients;** the population living in remote areas can obtain health care at their destinations if they have internet facilities on their phones/computers similarly the travellers can also get services at their home. Easy access to high quality care at minimized cost is available to patients as they are not supposed to travel to distant location nor are supposed to stand in long cues to get the services. This is how the prompt care makes the clients more satisfied <sup>(33&52)</sup>.

#### Legal, ethical and regulatory issues related to tele-nursing.

Tele-nursing is fraught with legal, ethical and regulatory issues, as it happens with tele-health as a whole. In many countries, interstate and intercountry practice of tele-nursing is forbidden (the attending nurse must have a license both in

**International Journal of Novel Research in Healthcare and Nursing**

Vol. 7, Issue 3, pp: (660-676), Month: September - December 2020, Available at: [www.noveltyjournals.com](http://www.noveltyjournals.com)

their state/country of residence and in the state/country where the patient receiving telecare is located). The Nurse Licensure Compact helps resolve some of these jurisdiction issues. Legal issues such as accountability and malpractice, etc. are also still largely unsolved and difficult to address. Ethical issues include maintaining autonomy, maintaining a patient's integrity as well as preventing harm to a patient <sup>(53)</sup>.

Tele-nursing professionals use an electronic medical record (EMR) when storing and charting patient data. Digital clinical data transmission increases the risk that outside sources may intercept and exploit sensitive patient information. As a result, tele-health nurses should audit their current security measures and assess how their patient privacy and protection policies protect their patients <sup>(33&35)</sup>. Most tele-health nurses work for a hospital or organization that provides them with a laptop and a very high level of security and encryption so that hackers and outside sources may not intercept patients' sensitive and personal information. Tele-health nursing aims to improve access to care, but practitioners and patients alike have concerns about security breaches, according to a report published by the National Center for Biotechnology (NCBI) stating that security is critical for long-term telemedicine success <sup>(53)</sup>.

**Legal, Regulatory, and Ethical Issues in Tele-health Technology"**

Currently, the Health Insurance Portability and Accounting Act (HIPAA) outlines rules and regulations on how healthcare providers store and share patients' personal data. HIPAA requires that patient's identifiable information be encrypted so that only the healthcare professionals involved in their care can access it. However, HIPAA only applies to certain "entities" that included healthcare providers and insurers but not the patients. In addition, there are many considerations related to the patient confidentiality and the safety of clinical data <sup>(54)</sup>.

**Problems / Issues related to tele-nursing**

Difficulty in using technology due to lack of instructions, education, lack of help and support can be a big problem both for nurses and clients. We can face failure of technology, threat to safety of patient, and malpractice. To ensure client's conversation to a registered nurse is big ethical issue <sup>(55)</sup>. Disrespect in dialogue with female nurses and difficulties faced while talking to male clients is another challenge. Ensuring confidentiality and informed consent is also problematic in tele-nursing. The invasion of privacy can also be a problem due fitting of cameras at home. We can't ensure that these services can be accessed by disadvantaged groups <sup>(56&57)</sup>.

**Opportunities for Nurses to Shape their Profession's Future:**

Nurses are the only qualified health care professionals in their communities and that to keep pace with the rising global demand, an additional 9 million nurses would be needed by 2030.

Nursing now has set the following goals to be achieved in the future:

1. Greater investment in improving education, professional development, standards, regulation and employment conditions for nurses.
2. Increased and improved dissemination of effective and innovative practice in nursing as using tele-nursing and other technology <sup>(2)</sup>.
3. Greater influences for nurses and midwives on global and national health policy, as part of broader efforts to ensure health workforces are more involved in decision-making.
4. More nurses in leadership positions and more opportunities for development at all levels.
5. More evidence for policy and decision makers about: where nursing can have the greatest impact, what is stopping nurses from reaching their full potential and how to address these obstacles <sup>(2)</sup>.

**2. CONCLUSION**

An innovative idea may serve to help one patient overcome a disturbing symptom, while innovation applied in clinical practice could lead to quality improvement initiatives that end up benefiting many patients. The tele-nursing is cost-effective and time saving innovative technology. Using of tele-nursing had many benefits for nurses and patients. Providing community services and home care; Telephone triage (Assessment of conditions and triage); Mental Health are examples for Tele-nursing application

### REFERENCES

- [1] Edmunds, Marilyn W. (5 April 2010). "Telehealth, Telenursing, and Advanced Practice Nurses". MedScape. Archived from the original on 8 December 2010. Retrieved 23 June 2017.
- [2] Fathi, J.T., Modin, H.E., Scott, J.D., (May 31, 2017) "Nurses Advancing Telehealth Services in the Era of Healthcare Reform" OJIN: The Online Journal of Issues in Nursing Vol. 22, No. 2, Manuscript 2.
- [3] American Nurses Association. Developing telehealth protocols: a blueprint for success. Washington, DC: American Nurses Association; 2001.
- [4] Nurses Happier Using Telecare, Says International Survey Archived 18 June 2006 at the Wayback Machine, eHealth Insider website, 15 June 2005, retrieved 4 April 2009.
- [5] Loretta Schlachta-Fairchild; Victoria Elfrink and Andrea Deickman. Chapter 48 Patient Safety, Telenursing, and Telehealth. Retrieved at 2020/8/25 15:13:33. Available at: <https://www.ncbi.nlm.nih.gov/books/NBK2667/>
- [6] Wikipedia article on telecommunications retrieved April 29, 2005, from <http://www.en.wikipedia.org/wiki/Telecommunications>.
- [7] HimSS Analytics. (2016). Telemedicine adoption continues growth in 2016 and beyond. Retrieved from <http://www.himssanalytics.org/news/telemedicine-adoption-growing-35-annually-2014>.
- [8] Ittipong Khemapech, Watsawee Sansrimahachai, Manachai Toahchoodee, Telemedicine – Meaning, Challenges and Opportunities. Siriraj Medical Journal • May 2019.
- [9] WHO. A health telematics policy in support of WHO's Health-For-All strategy for global health development: report of the WHO group consultation on health telematics, 11–16 December, Geneva, 1997. Geneva, World Health Organization, 1998.
- [10] <https://vsee.com/what-is-telemedicine>.
- [11] Allen A. In the Beginning (Part II): Telemedicine and Teleradiology. Telemedicine Today. 1994;2(3):6–7.
- [12] Benschoter RA, Eaton MT, Smith P. Use of videotape to provide individual instruction in techniques of psychotherapy. Academic Medicine, 1965, 40(12):1159–1161.
- [13] Randriambelonoro M, Bagayoko CO, Geissbuhler A. Telemedicine as a tool for medical education: a 15-year journey inside the RAFT network. Ann N Y Acad Sci. 2018.
- [14] <https://environmental-conscience.com/telemedicine>.
- [15] <https://www.cms.gov/newsroom/fact-sheets/medicare-telemedicine-health-care-provider-fact-sheet>.
- [16] Connect withcare.org [Internet]. Assessment of the feasibility and cost of replacing in-person care with acute care telehealth services [updated 2014; cited 2019 Apr 13]. Available from <http://www.connectwithcare.org/>
- [17] Leelaloetphanit W, Leelaloetphanit W, Srikhuanjai K, Chomanan P, Khemapech I. UbiNurSS on Mobile: a ubiquitous nursing support system on mobile devices, Proceedings of the 5th IIAI International Congress on Advanced Applied Informatics. 2016.p.71-76.
- [18] Michael AER, Michael PC, Peter WC, Mary G. The use of telemedicine for delivering continuing medical education in rural communities. Telemedicine and e-Health. 2005; 11:124-9.
- [19] Ittipong Khemapech, Watsawee Sansrimahachai, Manachai Toahchoodee, Telemedicine – Meaning, Challenges and Opportunities. Siriraj Medical Journal • May 2019.
- [20] Hassibian MR, Hassibian S. Telemedicine Acceptance and Implementation in Developing Countries: Benefits, Categories, and Barriers. Razavi International Journal of Medicine [Internet]. Kowsar Medical Institute; 2016 Aug 21 [cited 2019 Apr 13]; 4(3). Available from: <http://dx.doi.org/10.17795/rijm38332>.
- [21] <https://www.google.com.eg/search>.

**International Journal of Novel Research in Healthcare and Nursing**

 Vol. 7, Issue 3, pp: (660-676), Month: September - December 2020, Available at: [www.noveltyjournals.com](http://www.noveltyjournals.com)

- [22] Douglas Perednia. Telemedicine Technology and Clinical Applications JAMA The Journal of the American Medical Association 1995. 273(6):483.
- [23] <https://searchhealthit.techtarget.com/definition/telemedicine>
- [24] Balenton, N., & Chiappelli, F. (2017). Telenursing: Bioinformation Cornerstone in Healthcare for the 21st Century. *Bioinformation*, 13(12), 412-414.
- [25] Centers for Medicare & Medicaid Services. (2016). List of telehealth services. Retrieved from <https://www.cms.gov/Medicare/Medicare-General-Information/Telehealth/Telehealth-Codes.html>. Google Scholar.
- [26] College of Registered Nurses of Nova Scotia. (2014). Practice guidelines telenursing. Retrieved from <http://crnns.ca/wp-content/uploads/2015/02/Telenursing2014.pdf> Google Scholar
- [27] Kabir, J. (2014). Telehealth is the future. *Advance Healthcare Network for Nurses*. Retrieved from <http://nursing.advanceweb.com/Continuing-Education/CE-Articles/Telehealth-Is-the-Future.aspx> Google Scholar.
- [28] Gleason K, O'Neill EB, Goldschmitt J, Horigan J, Moriarty L. Ambulatory Oncology Nurses Making the Right Call: Assessment and Education in Telephone Triage Practices. *Clinical Journal of Oncology Nursing*. 2013;17 (3):335-6.
- [29] Foat PS. Setting up a direct line referral system: eye triage by telephone. *Ophthalmic Nursing: International Journal of Ophthalmic Nursing*. 1999;3(3):8-12.
- [30] <https://www.google.com/eg/search>
- [31] Snooks H et al. The development of telenursing, *Journal of Advanced Nursing* 2008,61:631-640.
- [32] Sally Shaw .Globalisation and Health System Reforms, Implication and strategies for Nursing ICN Publication. 2009 5-13.
- [33] Scotia CoRNNoN. TELENURSING PRACTICE GUIDELINES2008: Available from: <http://www.crnns.ca/documents/TelenursingPractice2008.pdf>.
- [34] Kalplan B et al. *Cambridge Quarterly of health Care Ethics* 2008, 17:401-416.
- [35] Grady JL, Schlachta-Fairchild L. Report of the 2004-2005 International Telenursing Survey. *Comput Inform Nurs*. 2007 Sep-Oct;25(5):266-72.
- [36] St George I, Baker J, Karabatsos G, Brimble R, Wilson A, Cullen M. How safe is telenursing from home? *Collegian*. 2009;16(3):119-23.
- [37] Jonsson AM, Willman A. Implementation of telenursing within home healthcare. *Telemed J E Health*. 2008 Dec;14(10):1057-62.
- [38] Gleason K, O'Neill EB, Goldschmitt J, Horigan J, Moriarty L. Ambulatory Oncology Nurses Making the Right Call: Assessment and Education in Telephone Triage Practices. *Clinical Journal of Oncology Nursing*. 2013;17 (3):335-6.
- [39] Foat PS. Setting up a direct line referral system: eye triage by telephone. *Ophthalmic Nursing: International Journal of Ophthalmic Nursing*. 1999;3(3):8-12.
- [40] O'Keefe, M., White, K., & Jennings, J. C. (2019). Asynchronous telepsychiatry: A systematic review. *Journal of Telemedicine and Telecare*. <https://doi.org/10.1177/1357633X19867189>
- [41] Hilty, D., Sunderji, N., Suo, S., Chan, S., McCarron, R. (2018). Telepsychiatry and other technologies for integrated care: evidence base, best practice models and competencies. *International Review of Psychiatry*, 30:6, 292-309, DOI: 10.1080/09540261.2019.1571483.
- [42] Zhang, Natalie (18 May 2020). "How coronavirus accelerated the rise of telemedicine". CNBC. Retrieved 14 July 2020.
- [43] CDC (11 February 2020). "Coronavirus Disease 2019 (COVID-19)". Centers for Disease Control and Prevention. Retrieved 14 July 2020.



**International Journal of Novel Research in Healthcare and Nursing**

Vol. 7, Issue 3, pp: (660-676), Month: September - December 2020, Available at: [www.noveltyjournals.com](http://www.noveltyjournals.com)

- [44] "Telehealth's Role in Reducing PPE Usage". RelyMD. 13 April 2020. Retrieved 14 July 2020.
- [45] Kelo M, Martikainen M, Eriksson E. Self-care of school-age children with diabetes: an integrative review. *Journal of Advanced Nursing*. 2011;67(10):2096-108 .
- [46] Damgaard G, Young L. Virtual Nursing Care for School Children with Diabetes. *Journal of Nursing Regulation*. 2014;4(4):15-24.
- [47] Roberts D, Tayler C, MacCormack D, Barwich D. Telenursing in hospice palliative care. *Can Nurse*. 2007 May;103(5):24-7.
- [48] Madden JR, Hendricks-Ferguson VL, Foreman NK. Neurologic Symptoms in Pediatric Brain Tumor Patients on Hospice. *Journal of Hospice & Palliative Nursing*. 2013;15(8):435-45.
- [49] Williams L-M, Hubbard KE, Daye O, Barden C. Tele-ICU Enhancements. Telenursing in the Intensive Care Unit: Transforming Nursing Practice. *Critical Care Nurse*. 2012;32(6):62-9.
- [50] Santos C, Moreira BS, Alves L, Mussi F, Souza-Machado C. Effectiveness of telenursing on lung function in patients with heart failure in a developing country: a protocol for randomized clinical trial. *Chest*. 2014 Mar 1;145(3 Suppl):201A.
- [51] <https://www.google.com/eg/search?q=Tele-nursing+applications> Kamei T, Yamamoto Y, Kajii F, Nakayama Y, Kawakami C. Systematic review and meta-analysis of studies involving telehome monitoring-based telenursing for patients with chronic obstructive pulmonary disease. *Jpn J Nurs Sci*. 2013 Dec;10(2):180-92.
- [52] Lorentz MM. Telenursing and home healthcare. The many facets of technology. *Home Healthc Nurse*. 2008 Apr;26(4):237-43.
- [53] Yun EK, Park HA. Factors affecting the implementation of telenursing in Korea. *Stud Health Technol Inform*. 2006; 122:657-9
- [54] Hoglund, A; Holstrom, I. "Ethical Issues In Telenursing". *International Hospital*. Archived from the original on 4 June 2016. Retrieved 12 May 2016.
- [55] "Application of Ethics for Providing Telemedicine Services and Information Technology".
- [56] Kurki M, Hätönen H, Koivunen M, Anttila M, Välimäki M. Integration of computer and Internet-based programmes into psychiatric out-patient care of adolescents with depression. *Informatics for Health & Social Care*. 2013;38(2):93-103.
- [57] Röing M, Rosenqvist U, K. Holmström I. Threats to patient safety in telenursing as revealed in Swedish telenurses' reflections on their dialogues. *Scandinavian Journal of Caring Sciences*. 2013;27(4):969-76.