ORIGINAL ARTICLE

Information and Communication Technologies and the teaching-learning process during the hospital visiting pass

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ABSTRACT

Introduction: the integral formation of the physician has a singular social transcendence, in which teachers are fundamental. The graduate requires a solid scientific and technical preparation. The curriculum at the Medical University includes the use of information techniques and instruction for good medical care. With these premises, the professor must include, in the students' learning, the rational and effective use of the Information and Communication Technologies in order to prepare the students integrally according to the scientific-technical development of these times.
Objective: to orient methodologically the teaching-learning of Information and Communication Technologies during the hospital visit.
Methods: qualitative research in the field of teaching-learning in relation to hospital visiting visits, with emphasis on the methodological orientation to include the use of Information and Communication Technologies during this education at work. Historical-logical, holistic-dialectical, induction-deduction, analytical-synthetic and documentary analysis methods were used.
Results: the use of Information and Communication Technologies in Medicine, its usefulness during the hospital rounds and the methodological orientations for its teaching-learning by students were founded.
Conclusions: hospital rounds as education in the work of the Medical Course cannot be developed apart from the advances, not only in scientific knowledge, but it must also imply the use of the new Information and Communication Technologies in clinical practice.
Key words: information and communication technologies; hospital visit pass

RESUMEN

Introducción: la formación integral del médico tiene una singular trascendencia social, en ella los profesores son fundamentales. El egresado requiere una sólida preparación científicotécnica. El plan de estudios en la Universidad Médica incluye el empleo de técnicas de información y la instrucción para una buena atención médica. Con estas premisas el profesor debe abarcar, en el aprendizaje de los estudiantes, el uso racional y efectivo de las Tecnologías de la Información y las Comunicaciones con

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el fin de preparar integralmente a los educandos acorde al desarrollo científico técnico en estos tiempos.
Objetivo: orientar metodológicamente la enseñanza-aprendizaje de las Tecnologías de la Información y las Comunicaciones durante el pase de visita hospitalario.
Métodos: investigación cualitativa en el campo de la enseñanza-aprendizaje en relación al pase de visita hospitalario, con énfasis en la orientación metodológica para incluir el uso de las Tecnologías de la Información y las Comunicaciones durante esta educación en el trabajo. Se emplearonlos métodos histórico-lógico, holístico-dialéctico, de inducción-deducción, analítico-sintético y análisis documental.
Resultados: se fundamentó la utilización de las Tecnologías de la Información y las Comunicaciones en Medicina, su utilidad durante el pase de visita hospitalario y las orientaciones metodológicas para su enseñanza-aprendizaje por los estudiantes.
Conclusiones: el pase de visita hospitalario como educación en el trabajo de la Carrera de Medicina no puede desarrollarse al margen de los adelantos, no solo en el conocimiento científico, sino que debe implicar el uso de las nuevas Tecnologías de la Información y las Comunicaciones en la práctica clínica.
Palabras clave: tecnologías de la Información y las comunicaciones; pase de visita hospitalario

INTRODUCTION

Advances in the Internet have radically changed communications and have become, in the world, the means of daily use for communication and information. The activities of individuals are currently under the influence of scientific and technical advances in this area.[1] The practice of maintaining permanent connectivity through mobile devices, usually cell phones or electronic tablets, to link to social networks or to search for all kinds of information has globalized and has deeply permeated education and medical practice, which has produced beneficial transformations in the Health Sciences.
The integral formation of the physician, from the undergraduate to the postgraduate level, has a singular social transcendence, in which the role of the professors is fundamental. The graduate requires a solid scientific-technical preparation and the incorporation of moral and ethical values that will identify him/her as a health professional. The educational objectives of the Medical University curriculum include the use of information techniques and the instructional objectives include providing good medical care.[2] With these premises, the professor should include in the students' learning the rational and effective use of Information and Communication Technologies (ICT) in order to prepare the students integrally and to raise their level of competence according to the scientific and technical development that has been achieved in these times. This should be the feeling of the Medical University in all its teaching organizational forms to offer methodological guidelines that favor the use of ICT in undergraduate and graduate teaching.
On-the-job education is the fundamental form of teaching organization of Higher Medical Education in university hospitals: the student, in addition to receiving teaching, participates in patient care, so he/she can acquire skills of clinical judgment and diagnostic and therapeutic procedures. The hospital visiting pass (HVP) is a peculiar type of on-the-job education that has a double character, teaching and care (both are closely related) and clear teaching and care objectives in which the achievement of the former needs the achievement of the latter. In it, information is transmitted from one participant to another,

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regardless of their hierarchy; in addition, the aim is for the student to develop intellectual skills related to the systematic application of the clinical epidemiological method and the analysis and solution of the particular health problem of each patient, so it is necessary for the teacher to use various didactic procedures in order to achieve the desired objectives in the students.[2] The PVH has a superlative complexity and importance in medical education. In this scenario ICT has a place in favor of medical care and students need to learn how to use them for the benefit of the quality of service provided to the patient.

Currently, one of the main challenges for professionals is to develop skills in the use of ICT because, through these tools, there is access to the network, which allows communication and information, and because they are necessary, and even indispensable, for users, particularly for university students to whom it facilitates the learning process, thus improving their educational level.[1,3] But it is not only possible to limit its use as an educational medium in the subjects of the Medical Universities, but it is also necessary to develop in the students the skills for its use in the diagnostic and therapeutic conduct of patients.

From the Pedagogical, Psychological, Philosophical, Sociological and Medical Sciences it is necessary to assume referents in the development of the HVP in order to achieve its objectives.

The objective of this work is to methodologically orient the teaching of the rational use of ICT during the HVP with undergraduate and postgraduate medical students who participate in this activity.

METHODS

A qualitative research was carried out in the field of teaching-learning in relation to the HVP, with emphasis on the methodological orientation to teachers for the inclusion of ICT management during this form of education at work. Theoretical methods such as the historical-logical method were used to determine the theoretical foundations of the use of ICT in health, the holistic-dialectical method in the evaluation of the didactic characteristics and the methodological structure for the drafting of the methodological guidelines, the analytical-synthetic method to process the theoretical information of the literature reviewed and as an empirical method the documentary analysis of Resolution 47/2022 of the Ministry of Higher Education of Cuba to identify guidelines regarding the teaching and learning of ICT. Finally, induction-deduction was used, which allowed assuming a critical position to reach conclusions based on the author's reflections and assessments. Information was searched in the databases of PubMed, MedlinePlus, Cochrane and Google Scholar.

RESULTS

I- Current application of ICT in Medicine

The neglect of a systematic control of the correct use of the clinical method as an indicator of quality, both in scientific activity and in teaching and care, has led to the assertion that there is a crisis of the clinical method in modern

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medicine. This situation is inextricably linked to the modes of action, and teachers have an elementary responsibility in this regard. Advances in ICT should complement this method by forming a dialectical unit that enriches the physician's cognitive process and the development of the entire diagnostic and prognostic process with a more objective content. They can never replace the premises of the clinical method, which include meticulous observation, interrogation and exhaustive physical examination, pillars of clinical practice that today are promoted with actions such as the Sherlock Holmes method to exalt their importance in medical diagnosis. These techniques of the clinical method can only be achieved by the physician during the direct and personal doctor-patient relationship. It is from the information obtained through the use of these techniques that ICT can be used to make precise diagnostic, prognostic and therapeutic evaluations and never in the opposite direction because it would lead, fatally, to error in Medicine (Figure 1).[4,5,6]

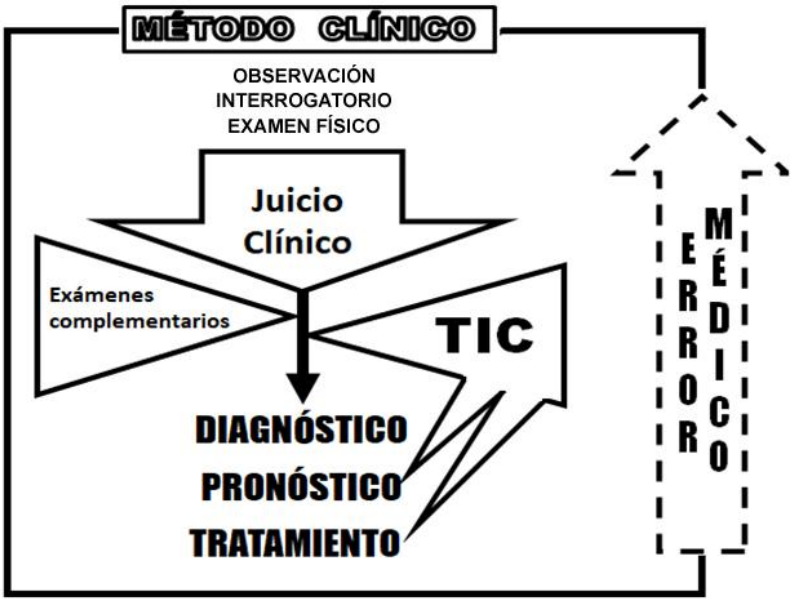

Figure 1. ICT and clinical approach

The diagnosis is the center of a patient's care, and for its accuracy the effort is focused on achieving support with a "gold standard" that allows testing the presumptive hypothesis, i.e., the evidence that confirms it; However, there are innumerable diseases that require a set of diagnostic criteria, which further complicates medical performance which, as time goes by, is subject to constant reassessment by the different medical associations that define new guidelines and criteria that change very rapidly according to new advances in scientific and technical knowledge (e.g., the diagnostic criteria for lupus, the diagnosis criteria for lupus, the diagnosis of lupus, the diagnosis of lupus, the diagnosis of lupus, etc.): diagnostic criteria for systemic lupus erythematosus and rheumatic fever, among others).[7] ICT is considered a quick reference tool for updated diagnostic criteria; it is known beforehand that these criteria cannot be a dogma and that their use must be based on the good clinical judgment of the physician.

Evidence-based medicine (EBM) aims to ensure that the decisions of health professionals are based on proven scientific evidence and not on empirical

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practices, although this evidence should be applied in combination with the best clinical experience, the values and experiences of patients and with costs. The inclusion of EBM in the training of undergraduate and graduate students will contribute to improve teaching and promote critical thinking in professional practice. ICTs allow access sites to this information and favor its use by practitioners.[8]

The concept of health risk implies the probability of suffering a disease in a given period of time. Many applications exist to calculate the risk of different diseases based on scientifically proven scores: the cardiovascular risk calculator of the Pan American Health Organization (PAHO), also designed for mobile devices, helps to estimate the risk of developing relevant cardiovascular diseases such as acute myocardial infarction and cerebrovascular disease, among others, within 10 years, and also offers other aids such as the calculation of body mass index (BMI) and glomerular filtration rate (GFR).[9] All this estimation can be carried out quickly in patient care, allowing more precise therapeutic decisions and the development of preventive medicine, which upholds the well-known proverb "prevention is better than cure".

Forecasting is inherent to contemporary science and its certainty has an essential function for the patient and his family. The identification of factors capable of influencing the prognosis of a disease facilitates decision-making in terms of diagnostic actions or treatments; knowing the possible evolution will inform the patient about the clinical course of his disease. Currently, the integrated study of predictors of mortality has generated prognostic scales to predict a poor outcome. The rational, intelligent and weighted use of technology complements this process and provides greater accuracy through various mobile applications created for these purposes. Not estimating the prognosis is to work with uncertainty and exacerbates the worries and suffering of the patient and family.[10]

II- Rationale for teaching ICTs during HVP

The HVP is a particular form of on-the-job education and is, at the same time, the most integrative and used organizational form of teaching in the teaching-learning process of the medical career. In university hospitals, it is part of the regulations to be complied with and, due to its double teaching and assistance character, it is within the requirements of the Ministry of Public Health and is given great interest and attention.[11] It has relevant importance in the professional training of physicians; the professor has the responsibility of directing it, for which he needs to increase his scientific-pedagogical preparation in order to fulfill the duality of objectives that the execution of this activity implies (teaching and assistance objectives).

The general teaching objectives of the HVP framed in the system of didactic principles of Higher Education include fostering clinical judgment or diagnostic and therapeutic reasoning in students by acquiring practical experience applying knowledge on health promotion, prevention, diagnosis, treatment and rehabilitation of the most frequent conditions and stimulating the autonomy of thought to favor the scientific development of the student and his future creative thinking according to the scientific and technical advances of the times he lives in.

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In recent years there has been an increase in the use of cell phones by health professionals and medical students;[12] technological advances have led to their use in medical assistance, at the patient's bedside. These devices allow access to various applications that facilitate early determination of risk categories, prognosis, calculation of body mass index, glomerular filtration rate and therapeutic doses with greater accuracy, among other benefits.

There is a continuous emphasis on the impact of the pedagogical preparation of Medical Education teachers to transmit the teaching to their students. This particular form of on-the-job education is not exempt from this need. Linking it to the teaching of the use of ICT is necessary in these times considering that they are part of modern medical practice and that their use is becoming more and more essential during the HCP in patient care. It is an opportune space for the learner to incorporate its benefits in favor of diagnostic and therapeutic decisions that have an impact on the patient's health.

III-Methodological guidelines for teaching and learning ICT use in the HVP

The Ministry of Higher Education of Cuba, in Resolution 47/2022, establishes the organizational regulations of the teaching process and the direction of the teaching and methodological work for university careers. It states that the content of the methodological work has to contribute to the preparation of teachers to fulfill the objectives of the study plans with the required quality and meet the specific needs registered at each organizational level. It is oriented towards the construction of the didactics of the profession and is supported by the experiences accumulated as a result of the systematic methodological work developed in the career and the achievements reached in the pedagogical research carried out for this purpose. Chapter X "Of the

Table 1. Methodology for the teaching-learning of ICT skills

Premises	
• Continuous and updated preparation of the teacher in the correct use of ICT in Medicine. • Orienting students to scientifically proven sources of mobile medical applications	
ICT-supported skills	**Teaching actions**
Diagnostic	-Use apps* as a complement to the clinical method and not as a substitute for it -Use apps that include diagnostic criteria, examples: DSM-5 diagnostic criteria, SPIRO -Specify the value of BMI, GFR and other medical diagnostic estimates that require calculations with the use of app designed for this purpose, examples: GFR and BMI calculators.
Dispense	-Estimate prognosis using app based on prognostic variables, example: Medscape -Identify risk groups using app, example: PAHO/WHO cardiovascular risk calculator.
Apply therapeutics	-Calculate exact doses with the use of apps, example: PEPID, SAEDYN hospital insulin dose calculator -Perform conversion of different units of presentation of drugs or their pharmacological equivalents with app support, e.g.: Corticosteroid conversion.

*app- mobile applications

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curricula", Article 247.3, includes, among the curricular strategies common to universities, the generalized use of Information and Communication Technologies.[13] Under this directive, a didactic for teaching and learning of undergraduate and graduate students of the Medical Career with the objective of knowing how to use ICT during the PVH is proposed in this work.
Among the skills that are proposed to be developed in students during the PVH are diagnosing, dispensing and applying therapeutics. ICT are used in these medical actions and contribute to their better precision, which turns their correct use into one more skill to be included in the educational teaching process in the work in Medicine. With this purpose, methodological guidelines are proposed for the development of skills for the use of ICT by undergraduate and postgraduate students during the HVP (Table 1).

DISCUSSION

At present, one of the most recurrent activities for mankind is the use of ICTs because their purposes are multiple and include devices that can be used in practically all activities of society;[1] they have also become auxiliary tools for medical practice and have improved the quality of this service. Their correct use has made it possible to enhance the work capacity of the health professional and alternative ways of thinking that have improved the quality and precision of medical decisions in diagnostic, prognostic and therapeutic conducts. Portable communication devices have become an instant means of medical work that facilitates access to multiple applications designed on the basis of studies with proven scientific quality.
The student's training cannot pass on the margin of these advances because they contribute to raise the quality of health services and the results of this attention to the population.
A particular complexity is conferred to the HVP by complying with patient care and with the teaching of students who shape their professional identity by acquiring the pertinent modes of action for it.[12] It reveals a bidirectional interaction of several components with different objectives in which the student can be permeated with knowledge and scientific-technical skills; to achieve this the teacher must be prepared.
Technological advances have helped to increase the quality of medical diagnosis, but their excessive use has led to a crisis in the clinical method. This universal phenomenon has been influenced by the dedication of more time by many health professionals to their care responsibilities to the detriment of their role as clinical teachers. The ability to observe, to listen and to reason about symptoms and signs must be complemented by rational diagnostic means. ICTs in the service of health also contribute to improving diagnostic quality, but they should never replace clinical judgment or violate the clinical method. On this premise, students should be taught the application of any technology developed for diagnostic purposes.
Dispensing in medicine makes it possible to classify patients according to their diseases and risk factors in order to provide them with systematized health care. In the care of hospitalized patients, identifying risk factors allows their classification for the correct choice of therapeutic measures and other considerations about prognosis and relevant studies to be carried out. This

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action is facilitated through various mobile health applications (app). During the HVP the opportunity is provided for students to assimilate their use for this purpose.

Applying a treatment is not defined just by knowing the diagnosis of the disease because it could do more harm than good. It implies a methodology that must consider the possible adverse reactions according to the patient to be treated and his or her comorbidities. Doses cannot be dictated ambiguously, but must be adjusted according to weight and age and, taking into account pharmacokinetics, renal and hepatic function, among other variables, must be specified. In favor of these precise determinations and calculations, the teacher should teach the students in the HVP so that they understand how the ICT contribute to the precision of therapeutic indications.

In view of the above, it is interesting to propose the inclusion in the Informatics curriculum strategy of the preparation of medical students for the development of mobile applications that, based on the results of scientific studies, allow the use of this knowledge in medical practice.

CONCLUSIONS

The HVP as education in the work of the Medical Career cannot be developed on the margin of advances not only in scientific knowledge, but should also involve the use of new ICT in clinical practice. It is a necessity for students to incorporate this skill in their modes of action as part of their professional training; teachers are responsible for doing so under ethical, scientific and pedagogical principles.

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CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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