# Nursing experiences before and after the use of an electronic clinical records system for the early detection of cervical cancer

# Experiencias de enfermería antes y después del uso de un sistema electrónico de registros clínicos para la detección oportuna de cáncer cervicouterino

Gutiérrez-Enríquez, Sandra Olimpia [a], Rodríguez-Solís, Cintia Nayely [b], Terán-Figueroa, Yolanda *[c] and Acuña-Aradillas, Jorge Martín [d]

[a] Autonomous University of San Luis Potosí • 0000-0003-2719-766X • 215601
[b] Autonomous University of San Luis Potosí • 0009-0002-2601-0816 • 463760
[c] Autonomous University of San Luis Potosí • 000-002-6118-6393 • 78254
[d] Autonomous University of San Luis Potosí • 0000-0002-3169-2623 • 1127068

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## Key Handbooks

The electronic system <SISCAP-DOCACU> used by the nurses is a technological development for process innovation in nursing that is original and innovative, capable of issuing and sending the results related to screening for the timely detection of cervical cancer electronically and in a reduced time directly to the health centers, to be delivered to the users of the program so that they can have a timely diagnosis. In addition, the electronic system allows easy access, data confidentiality and has a great competitive advantage with ecological benefits by migrating from manual to electronic format. Knowing the experiences of the health personnel helps to improve the acceptance of new ways of working and innovation in the processes. The application of new technologies are strategies that have been promulgated by national and international organizations as lines of action within their health policies to improve priority health programs and thus increase the quality of life of the population, so it is important to promote the continuous updating of health personnel and increase knowledge and skills with the use of technology. The electronic system is functional to perform cervical screening clinical records with legibility, accuracy and completeness. The nursing staff developed skills and competencies in making electronic health records. The nursing staff shared their experiences and expressed their acceptance of the electronic system because they verified its benefits, among which the following stand out: user-friendly system, easy access and adaptability, time optimization during the cytology collection process, reduction in the time it takes to deliver the results to the users, improved communication and interconnection with the pathology department, as well as legibility, accuracy and completeness of the data.

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* ✉ [yolandat@uaslp.mx]

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**Abstract**

**Objective**: To analyze the experiences of nurses before and after the use of an electronic system for cervical screening records of the Cervical Cancer Timely Detection program, called "SISCAP-DOCACU". **Methodology**: A Qualitative study was conducted in a public health institution in San Luis Potosí, S.L.P., Mexico. 8 nurses from three health centers participated. Data collection was carried out through a systematization of experiences. The Taguette program was used for the analysis of the information. **Results:** Before the implementation of the electronic system, limitations were identified in manual recordings. After applying it, the nursing staff was very satisfied with the training and use of it. **Conclusions**: The analysis of the nurses' experience allowed us to know the self-perception of their practice, recognize the limitations and broaden their perspective on the importance of process innovation through health technology.

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| Objetive | | Methodology | | Contribution |
| To analyze the experiences of nurses before and after the use of an electronic system for cervical screening records of the Cervical Cancer Timely Detection program, called "SISCAP-DOCACU" | | A qualitative study was conducted in a public health institution in San Luis Potosí, S.L.P., Mexico. 8 nurses from three health centers participated. Data collection was carried out through a systematization of experiences. The Taguette program was used for the analysis of the information | | The analysis of the nurses' experience allowed us to know the self-perception of their practice, recognize the limitations and broaden their perspective on the importance of process innovation through health technology. |

**Screening cervical cancer; Innovation, Nursing perception**

**Resumen**

**Objetivo:** analizar las experiencias de las enfermeras antes y después del uso de un sistema electrónico para los registros clínicos del tamizaje cervical del programa de Detección Oportuna de Cáncer Cervicouterino, llamado <SISCAP-DOCACU>. **Metodología:** estudio cualitativo realizado en una institución de salud pública de San Luis Potosí, S.L.P., México. Participaron 8 enfermeras de tres centros de salud. La recolección de datos se realizó a través de una sistematización de experiencias. Para el análisis de la información se utilizó el programa Taguette. **Resultados:** antes de la implementación del sistema electrónico se identificaron limitantes en los registros manuales. Tras aplicarlo el personal de enfermería se mostró muy satisfecho con el entrenamiento y el uso del mismo. **Conclusiones:** el análisis de la experiencia de las enfermeras permitió conocer la autopercepción de su práctica, reconocer las limitaciones y ampliar su perspectiva sobre la importancia de la innovación de los procesos mediante la tecnología en salud.

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**Detección de cáncer de cuello uterino, Innovación, Percepción de enfermería**

## Introduction

According to the World Health Organisation (WHO), cancer is considered the second leading cause of death in the world by 2021, causing 10 million deaths each year. One in six deaths worldwide is due to cervical cancer. Oncogenic infections include human papillomavirus (HPV) infections, which cause 30% of cancer cases in low- and middle-income countries *(World Health Organization, 2021)*.

The incidence of cervical cancer has increased to 18.1 million new cases by 2020. An estimated 569,847 new cases are estimated annually in developing countries and its incidence is highest in East Africa and West Asia. In Latin America, it is the second most common neoplasm in women, with approximately 72 000 cases per year (24.3 cases per 100 000 women) *(Government of Mexico, Secretaría de Salud, Mexico, 2019)*.

In Mexico, in 2020, this disease caused 4185 deaths and the death rate was 11 per 100 000 women, with an average age of 53 years. Late treatment reduces life expectancy to five years on average in 95 % of cases; however, it is curable if detected early. This situation is contrary to what happens in the United States and Europe, where up to 75 % of the cases are diagnosed in early clinical stages, in Mexico, according to the National Institute of Cancerology, locally advanced stages are the most prevalent. Currently, global efforts to prevent cervical cancer have been based on cytological screening, quality, coverage and follow-up screening; if these aspects are properly addressed, the incidence of cervical cancer can be reduced by up to 80 % *(Government of Mexico, Ministry of Health, Mexico, 2022)*.

The World Health Organization and the Pan American Health Organization emphasise the importance of the development and availability of new technological tools as a public health strategy to promote and strengthen cervical cancer prevention and control, as well as to implement changes in programmes to achieve a positive impact for women *(Pan American Health Organization, 2021)*. Thus, one of the lines of research for continuous improvement is Health Information Systems.

The Mexican Health Services have a national database called ‘Women's Cancer Information System’, which integrates information to guide programme actions, as established by the Official Mexican Standard (NOM 014) for the prevention, diagnosis, treatment, control and epidemiological surveillance of cervical cancer *(Official Journal of the Federation, 2007)*.

This system is available to the Statistics Department, the Cytology Analysis Laboratory and the Colposcopy Department. Access to this system is not available to health personnel who take samples in clinics or screening areas and there is no interconnection with the place where the samples are analysed. This limits systematised care, with adequate organisation of the clinical data of the clients, ensuring the legibility, accuracy and completeness of the information collected, which is also related to more effective patient tracking and tracing, as well as a reduction in waiting times and delivery of results to the clients. On the other hand, the screening programme has a large number of forms for manual registration, which makes it difficult to process the information *(Vidales-Cerda M. 2017)*.

Based on the above, in 2014, the ‘Electronic system for the registration of cervical cytology and cytopathology reports (SISCAP-DOCACU)’ was created (*Gutiérrez-Enríquez SO et alt., 2022)*, which consists of a prototype of a functional operating system, this system allows migration from manual to electronic systems, promoting that all service providers involved in the sampling, registration and interpretation of cervical cytology have an accessible and useful information system for accessing information in a faster, more accurate, readable, complete and reliable way. To achieve this goal, it is necessary to know the opinions of the staff who will implement the changes, as the success of innovation projects depends to a large extent on the acceptance of health workers, as well as the training provided to them.

The aim of this study was to analyse the experiences of nurses before and after the use of an electronic clinical record system for the timely detection of cervical cancer (DOCACU).

**Methodology**

Qualitative study conducted in the period from 01 December 2022 to 22 April 2023. Eight nurses from the Women's Care Module of four health units belonging to four municipalities in the interior of the State of San Luis Potosí, Mexico, participated. The study was carried out in three stages: Phase 1 (initial), phase 2 (training) and phase 3 (final). To collect the data, the systematisation of experiences was used (*Jara O, 2012)* which aims to recover the experiences of the participating health personnel, through an exercise of analysis and reflection, based on the self-perception of their knowledge and skills in the process of recording the clinical data of the users of the Cervical Cancer Early Detection programme. A total of 14 hours were invested. First phase 2 hours, second phase 10 hours and third phase 2 hours. A total of two interviews were conducted, one in the initial phase and the other in the final phase after using the electronic system.

In the initial or pre-phase, interviews were conducted with a nurse manager and the operational nurses in the health units, who are responsible for taking cervical cytology smears. Six trigger questions were asked about the types of records used in their practice, the limitations they observe in terms of accuracy, readability and completeness, and their perspective on innovations to improve recording systems. These interviews were recorded and lasted 15 minutes per participant. The conversation was conducted both face-to-face and virtually. The information was collected by video-call recording with prior authorisation of the participating staff.

The training phase was carried out based on professional competencies according to the International Labour Organisation *(International Labour Organisation, 2020)*. Five basic activities were carried out: 1) awareness-raising on the use of digital systems, 2) importance of the legal framework and current regulations on Health Information Systems, 3) demonstrations on the use of the system in person and through video-tutorials, 4) practice with the system without users, and 5) final practice of the records with users. The training was carried out in a hybrid modality (face-to-face and on-line).

At the end of the training programme activities, the use of the SISCAP-DOCACU electronic system began, which was implemented for 4 months; subsequently, at the end of its use, the second interview was implemented, in which the same questions from the initial interview were answered again, but focused on the use of the SISCAP-DOCACU electronic system.

For the analysis of the information, the interviews were transcribed into text, with the support of the <Taguette> platform, and based on an analysis of the content, the information data was labelled (Table 1).

**Box 1**

**Table 1**

Categories and subcategories of analysis used for the Systematisation of Experience

| Types of registers used | Limitations for record formats | Innovation for new registration systems |
|---|---|---|
| Description of the formats. | Material resources. | Structure of the electronic format. |
| Reasons for use. | Difficulties with formats. Consequences of record-keeping limitations. | Quality of records. |
| Number of formats. | Structure of the manual format. | Satisfaction with the use of the electronic system. |

*Source: Own elaboration*

Participation was voluntary and all nurses signed a letter of informed consent. The data collected were used for research purposes only. The ethical principles of respecting autonomy and ensuring confidentiality of information were safeguarded. The project was approved by a certified and registered

Ethics Committee in the State of San Luis Potosi, Mexico, with registration number: HNM/03-2015-024. Authorisation by the institution with registration number: DG///DSR/OF 02768/2023. The electronic system has the copyright registration (INDAUTOR) with number: 03-2019-101510192400-01.

**Results**

The age range of the participants was 28 to 51 years. The seniority was from 2 months to 4 years and the experience in years taking cervical cytology smears was from 4 to 13 years considering that before working in their current workplace they already had that experience (Table 2).

**Box 2**

**Table 2**

Demographic and employment data of the nursing staff in the women's care unit.

| No. | Age in years | Post | Seniority in the health centre | Years of experience with cervical smear tests | Work Schedule |
|---|---|---|---|---|---|
| 1 | 28 | Operational Nurse | 10 months | 5 years | Evening |
| 2 | 30 | Operational Nurse | 11 months | 10 years | Morning |
| 3 | 36 | Operational Nurse | 4years | 11 years | Morning |
| 4 | 37 | Service Manager | 13 years | 13 years | Morning |
| 5 | 51 | Operational Nurse | 16 months | 11 years | Morning |
| 6 | 35 | Service manager | 4 years | 8 years | Morning |
| 7 | 33 | Operational Nurse | 2 months | 10 years | Evening |
| 8 | 37 | Operational Nurse | 9 months | 4 years | Afternoon |

*Source: Interview with nursing staff*

**Types of records conventionally used in the cervical cytology collection process**

The formats currently used within the DOCACU programme are manual formats due to institutional norms, in which the clinical records of the users who come for screening for the timely detection of cervical cancer are made.

[*The manual formats, because they are the ones we use in the unit and we do not have or know of any database that we can use, so we do it manually. The patient's data is recorded in several formats, one for HPV detection, a manual format for cervical cytology and a format for breast examination.* [...] (Nurse 1).

**Limitation in formats for records (readability, completeness and accuracy)**

The nurses identified some factors that limit the current recording of client data on manual forms. They commented on the criteria of readability, completeness and accuracy.

[ *Sometimes the limitation is that we do not have the forms, they are finished and we do not have them to make the detections in the women's care module. The space on the forms is very limited and the legibility of the information received with respect to the results is incomprehensible.* [...] (Nurse 1).

[...] *What happens is that in the formats perhaps we already do them in a very routine and very manual way and we say to ourselves: we already know them, we already know what's on here and we just fill them out, fill them out and fill them out, but we do have that situation, at the same time, when we review the form, I realise that maybe there is a piece of information missing, or maybe in terms of the handwriting, that maybe you have a lot of patients, so you write very quickly and you think that it was an 's' and in reality it wasn't, I mean, things like that, that you say: oh, it's a bit complicated, not all of them have very legible handwriting.* [...] (Nurse 4).

The nurses identify some errors or difficulties in daily practice in recording the cervical cytology results request and report sheet, such as the following:

[...] *I think that the time factor is a disadvantage because you have to fill out a form, sometimes as one of the colleagues mentioned, sometimes on the run, that is when we omit some data, then you have to pass it to a diary, which is also again repeating some data. The reality is that sometimes they are incomplete and sometimes we have not even put our own identity register and when they arrive at the central offices we do not know who took the cytology, because we omitted that information* [...] (Nurse at management level).

[...] *The manual format that we have is a bit incomplete, there are times when one observes other things on the cervix that are not on the sheet, so as one of the colleagues commented, it cannot be put in manually, so it is also a limitation that it does not have the characteristics to register what one sees at the time of the examination.* [...] (Nurse 6).

[...] *The academic level of the population we have also has an influence, because if a patient has a degree, she gives you all her data and mail, so it depends on the academic level of the population.* [...] (Nurse 7).

Therefore, when there are problems in the registers with the legibility, accuracy and completeness of the data of the clients, the staff reports that there are consequences that affect the patients themselves with the delivery of their results:

[...] *In our unit, it is a bit complicated to locate patients with a positive result because they go with us and we do not attend only to people in our area of responsibility, we are not taking from different areas, so we have a location that is, I don't know, almost two hours away, and there is no good reception to locate them by phone.* [...] (Nurse 4).

[...] *Besides, there are also patients who give us an address and sometimes we can't find them there, so how are we going to find them, I mean, there are patients who go and rent houses, but as they are in our area, in our area of responsibility, well, we go and look for them and no, it turns out that they don't live there because they rent, so we've already lost them* [...] (Nurse 6).

[...] *It just happened to us in December, she was a positive patient, this one and well, we went to the address and there were two identical addresses and nobody knew them and the second house was abandoned and nobody had lived there for years and well, we put out a publication and well it turned out, it was found, but the lady was from Mexico City and well she went to the unit, we offered it to her, we took it and she left the address but it was fictitious, well if it existed but she did not live there* [...] (Nurse 7).

**Innovation for new registration systems**

Currently, information and communication technologies (ICT) represent a great opportunity for the improvement of the processes that are carried out in the health sector, what we currently know as e-health.[9] In this sense, the health personnel express acceptance of the incorporation of technological tools within the health institutions as a strategy for improving the processes of the DOCACU programme.

[...] *Yes, well, definitely yes, using an electronic medium definitely optimises time, allows us to be precise in the data and does not allow us to continue and more than many platforms is what they do, they leave these locks and this, also for the result I mean, finally, the fact that the unit has the data there and that we can capture it, also helps to correct any errors, because finally it is the nurse who is doing it and can have the data at hand to record it correctly, and if there is a relationship with the pathologist, then also.* [...] (Managerial level nurse).

[...] *Yes, I consider it a good strategy, I think it could help with the timing, because previously we did have someone specifically for cytology, but there were many, but it was because of the PROSPERA programme (government programme) that they were obliged, now that it is voluntary, few people say - 'I go because I am really interested in my health' - it could be something new to attract users to have their cytology done* [...] (Nurse 7).

**Perspective of data recording with the electronic system SISCAP-DOCACU**

After using the electronic system, health personnel report satisfaction with its use and, as a result, refer to the advantages and benefits obtained with its implementation in the health facilities.

*I found it very easy to record data electronically and I found the electronic format to be very complete, since it is possible to make observations regarding the patient's gynaecological-obstetric history and the examination during the cytology examination.* [...] (Nurse 2).

[...] *Well, I found the system to be very efficient, more than anything else to save time in the results, because, of course, it asked for the same data, the same as the physical format*. [...] (Nurse 7).

**Structure of the format and quality of the records with the electronic system**

Based on their experience, the structure of the electronic format for the registration of patient data, the nursing staff reported that it is adequate, a logical and organised structure, with sections that allow for the entry of observations.

[...] *Yes, I think the structure is clear and simple, I had no problem in recording the data.* [...] (Nurse 1).

[*... The sheet as such in the system appears well because if it comes what we commonly handle, there is only one result, and then it says that it was reviewed by the pathologist and gives us the result, but as I said we do not know the date on which it was carried out by one of them, with this system we don't, we have the two diagnoses, it even allows us to see what one said and what the other said (cytotechnologist and pathologist), in the times when it is being reviewed and everything, so yes, it is complete, no data is missing*. [...] (Nurse 4).

[...] *In fact, the physical format does not have a record of the history or the use of hormones or so on the electronic one it does specify, it does tell you what specifically is being used, and on the other one there is only the use of hormones with a yes or no answer option. So yes, if it is more complete*. [...] (Nurse 3)

[...] *Yes, because we had the space to put some observation about why one is asking for it in an urgent or normal way. In addition, in the physical format there is no section to put an observation of what is observed during the examination and in the electronic format there is, there we would write something that we looked at when we took the sample and we would put it and justify it with the urgent taking of the sample in that section, because we looked at something important for the patient.* [...] (Nurse 7).

Another element of great relevance is that the nursing staff considers that the completeness, legibility and accuracy of the records are more adequate with the electronic system, as opposed to the manual format where there are greater limitations during the process of taking the cervical cytology.

[...] *Well, in this case all the basic data that they ask us for is included, there is a little bit of a difference in terms of the format that we have in physical format because of the gestures that this electronic format asks for it and the other one does not, that is what we did not have the same, but at the end of the day I think it is fine.* [...] (Nurse 4).

[...] *There, it would just be like a mistake on our part, if we were to enter something wrong, it would obviously be reflected there, but in terms of legibility, yes, because it's not the same when we do it by hand, we all write differently or some of us write differently because of haste or something, but it is clear*. [...] (Nurse 6).

**Interconnection with the pathology department and delivery of results**

The experience of the nursing staff in having an interconnection with the Pathology Department for the reception of the patients' results was satisfactory, and one of the most relevant factors was the timeliness in the delivery of results, which favoured a quicker intervention in the case of patients with positive results.

[ *Of course, of course yes, because it took too long for the lab results to arrive in the jurisdiction, then from the jurisdiction here to be sent to us here, so now, the moment I tell the patient to come for her results after a month or less, that's very effective for the patient*, isn't it? [...] (Nurse 6).

[...] *And the fact that you are checking the system and you see that you already have the result there, it is very fast, so it is very good. Previously, it took two months or more to get the results to the patients*. [...] (Nurse 5).

[...] *As we've been advancing and doing and doing, now we've kind of shortened the times a little more, but now if you tell me that a patient is coming for cytology, then I go directly to the platform, open it and start to enter the data, but now the times have shortened a little more*. [...] (Nurse 3).

[...] *Yes, in the conventional way the delivery of results took up to three months, but no matter how quickly they arrived, they took at least two months, and with the electronic system it was less than a month, and the patients themselves even told us, when we called them, they said, 'is it because something came out wrong or why are you talking to me so soon', and then when they arrived we explained to them, so, I tell you, it no longer went through the jurisdiction, it arrived directly at the health centre in the system, and it was faster*. [...] (Nurse 7).

**Satisfaction with the electronic system**

The perspective of the health personnel with the electronic system format was gratifying and with favourable results.

[...] *I think it is a good strategy to implement, because it saves us time with not only first time patients, but also patients who come to the health centre subsequently. In addition to the interconnection with the pathology department to get the results faster. I found it satisfactory, and with the previous training I found it very easy to use.* [...] (Nurse 2).

[...] *Yes, I think it is very useful both for us as operational nurses and for the patients to receive their results, it would only be necessary to make some improvements in the platform to make it a little more agile, but in general I think it helps us a lot*. [...] (Nurse 6).

[...] *Yes, it was very useful, we were uploading all the patient's data into the system, but to say, all those who are already registered, we only searched for them through their population registry (CURP), which is in the case of those who were inadequate for some reason, we only registered data from the patient's interview section, we no longer had to fill in all the data again, so that was an advantage*. [...] (Nurse 7).

[...] *In terms of the use of the system, I think it was easy, the time for the process of taking the cytology with the patient was 20 minutes, for example, if a patient came in a year's time and we continued with the same system, well, obviously we optimised a lot of time, the patient's entire record is already discharged with her CURP*. [...] (Nurse 8).

Finally, the training of the nursing staff prior to the use of SISCAP-DOCACU had an impact on the satisfaction and performance of the nurses in achieving the objectives set with the incorporation of the technology in the DOCACU programme.

[...] *Yes, it is very practical because it also prevents us from making more mistakes, if in practice situations may appear that perhaps did not appear in the training and then different situations appear and mistakes are made, but the training was very good*. [...] (Nurse 5).

[...] *Yes, the system was available all the time, one could see if the patient's result was there or consult the patient's identification data at any time and to print out the delivery reports. In addition, we trained our colleagues with the system ourselves, it was easy, they didn't struggle.* [...] (Nurse 8).

[...] In *addition, we trained our colleagues with the system ourselves, it was easy, they did not struggle, with two patients that we started to enter and by the next one they did it independently, well in my case, I would arrive here and I would say - 'hey I am going to enter this patient' - and they would tell me - 'explain to me' - and we did it with two patients and the next ones they entered, so they had no difficulties either* [...] (Nurse 7).

**Discussion**

The organisation of the cervical cancer screening programme is of great relevance to the incidence and mortality rates of cervical cancer in each country. Cervical cytology or Pap smear and the test for HPV infection are the most important tests for the early detection of cervical cancer, which is why both the quality of the specimen collection and the records kept during this procedure are of great importance for detection and timely treatment.

Health information systems enable innovations and process improvement, patient tracking, faster collection and delivery of results by facilitating communication between different departments within an organisation. Currently, electronic health records can generate quality information and facilitate the exchange of data to contribute to the efficiency of health systems, **(***Kruse CS, et alt., 2018)*, such is the case of the DOCACU programme, which as a priority requires trained staff and tools with the potential to improve the quality of care (*Cifuentes et alt., 2015)*.

Among the countries that consider informatics and the use of technological tools as an essential competence for nursing professionals, the following stand out: United States, Canada, New Zealand, England, Finland, Australia and recently Peru; *(World Health Organization, 2021)*, so it is important to promote and train the development of digital and informatics skills necessary for professional performance, according to the recommendations of international bodies, because service providers must be at the forefront in the process of transformation of health care, especially of the most vulnerable population. (*Capellari Fabrizzio G, et alt., 2021)*.

According to the authors Echeverry et al., implementing a systematisation of experiences implies an intentionality of transformation and as a product, research questions can be raised to guide specialists in the production of new knowledge at the service of practice and the interests of social transformation; it also promotes positive changes in attitudes, practices and relationships based on experiences that have a significant impact on people's lives (*Echeverry Velásquez ML, 2021)*.

As a result of the analysis and reflection carried out with the support of the participants in this study, during the interviews and before implementing the electronic system, it was found that there are difficulties with the quality of the records they make, since they indicate that they use a wide variety of formats for recording the clinical data of the users of the cervical screening module, and they also indicate that the identification data of the users are repeated in several formats, thus generating difficulty in locating the users.

The application form does not have adequate space to make observations about the visualisations of the cervix, the form does not have the options of ordinary or urgent delivery, there is an excess of information and limitations in the distribution of data, which can lead to confusion.

Another problem with the manual forms in this study is that they are visually very saturated with information, and they also report that the forms have become wet, stained or lost, which makes it difficult to identify the patient. On the other hand, there are limitations in the agility and speed of the care processes, as well as prolonged times in the delivery of results, and the use of an excess of manual formats does not favour environmental sustainability, as well as the use of material and economic resources of the health institutions. The training was a central axis in the implementation of the electronic system, as it implies the sensitisation of the participants to the importance of innovation as a strategy to improve the quality of care for users by favouring the capacities and skills of the nurses through the application of a programme with a structured methodology to facilitate the teaching-learning process.

According to Torres-Flórez, the training of human resources is a human management practice that must be carried out in an orderly and structured manner in order to obtain the impact of the desired results, previously considering an analysis of various factors such as training needs, an implementation plan, as well as carrying out the evaluation and measurement of the impact (*Torres Flórez, D., 2019)*.

During the implementation of the electronic system, the participants showed difficulty in the transition from paper to digital recording, however, in a short time and with the training provided, it was possible to adopt the system on a daily basis in their work area.

On the other hand, other limitations identified were the following: lack of computer equipment in some areas, stability in the Internet, errors in some fields, some limitations in the skills they had to perform the procedure of taking cervical cytology smears and their records, and fear of the use of technology, which coincides with what Basaéz et al, This coincides with what*Basaéz et* al. points out, since it refers that the irruption of technology in society begins with a feeling of scepticism, doubt, fashion, contingency, opportunism, favourable and unfavourable, and when it passes through social, collective and cultural filters, the adoption of the new technology can be successful, becoming fluid and natural during its daily use (*Basáez E, M. J., 2022*).

At the end of the training and the application of the electronic system, the nursing staff were very satisfied with the content of the training programme and the innovation of the process implemented. They indicated that SISCAP-DOCACU could be a good strategy for optimising time and providing timely diagnosis and treatment to patients, as well as being a first step towards advancing and improving processes within the DOCACU programme with the use of technology and thus moving from manual to electronic formats, They observed benefits such as improved inter-institutional communication, a reduction in the time taken to register and send requests, as well as the ecological benefit of saving paper, due to the organised structure of the electronic system compared to the official format.

Learning about the experiences of the nurses made it possible to identify areas of opportunity to improve and increase the effectiveness of their work, as Villa-Holguín refers, where she points out that the experiences acquired in daily practices become collective spaces for feedback, scenarios that facilitate the autonomous decision-making of the subjects in the search for transformation in the personal and collective sphere *(Villa Holguín, 2019)*.

Because human error can be common in all processes, it is necessary for institutions to link appropriate training to incorporate technology, with periodic, systematic and quality training, allowing the growth of workers, both in their personal and professional development (*Arias Galvis, D., 2015*).

## Conclusions

The nursing staff developed skills and competencies in the implementation of electronic health records.

They expressed acceptance of the electronic system due to the visualisation of the benefits acquired, among which the following stand out: user-friendly system, easy access and adaptability, optimisation of time during the process of taking cytology, reduction in time in the delivery of results to users, improved communication and interconnection with the pathology department, as well as the readability, accuracy and completeness of the data.

Training is the backbone for the successful implementation of technological innovation projects in health services, so it is necessary to strengthen training strategies for operational staff in the use of the systems and in the performance of cervical cytology screening.

The main limitations of the study were the limited time for training and the limited culture of evaluation and change of working methods, especially in the departments with which the system requires interconnection. For future studies, it is suggested to have a fully face-to-face training programme, to increase the awareness of health personnel about the importance of the inclusion of technologies as working tools and to have more time available to practice with the new technologies.

## Declarations

### Conflict of interest

The authors declare that there were no conflicts of interest in the execution of this work.

### Authors' contributions

*Gutiérrez-Enríquez, Sandra* O: original project idea, design of the electronic system, project management, supervision of methods and techniques, and correction of the manuscript.

*Rodríguez-Solís, Cintia N:* drafting of the manuscript, execution of the project, corrections to the manuscript.

*Terán-Figueroa, Yolanda*: correction of the manuscript and supervision of style:

*Acuña-Aradillas, Jorge Martín*: collaboration in the design of the electronic system, implementation and control of the system and evaluation of results.

**Availability of data and materials**

All data and bases are available.

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**Abbreviations**

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|---|---|
| SISCAP-DOCACU | Capture system for the timely detection of cervical cancer |
| TIC | Information and Communication Technologies |

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**Discussions**

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