

## Effectiveness of an educational intervention program on the prevention of cervical cancer in adolescents

Efectividad de un programa de intervención educativa sobre la  
prevención del cáncer cervicouterino en adolescentes

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## ABSTRACT

**Background:** cervical cancer is a type of preventable and eradicable malignant neoplasm; however, it is one of the most frequent causes of death in women worldwide.

**Objective:** to determine the effectiveness of an educational intervention program on the prevention of cervical cancer in adolescent middle school students.

**Methods:** a pre-experimental intervention study was carried out at the Julio Pino Machado Basic Secondary School, which belongs to the health area of the Marta Abreu University Polyclinic, in Santa Clara, in the period October 2023-October 2024. Quantitative and qualitative methods were used, with a pretest-posttest design. Theoretical and empirical methods were used for the foundation of the research, data collection and processing.

**Results:** The implementation of the applied program raised the level of information with a predominance of the "Good" category in 73.3% of the adolescents, and zero in the "Poor" level. These changes were highly statistically significant after applying the Wilcoxon test, with values below 0.01. A total of 86.66% (26 students) achieved a maximum level of satisfaction.

**Conclusions:** the program was assessed as Adequate by the specialists. Its implementation raised the level of information on cervical cancer prevention; its effectiveness was evidenced by the satisfaction achieved in the adolescents, and by the statistically significant changes.

**MeSH:** early detection of cancer; adolescent; risk factors; health status indicators; health promotion; education, medical.

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## RESUMEN

**Fundamento:** el cáncer cervicouterino es un tipo de neoplasia maligna prevenible y erradicable; sin embargo, es una de las causas más frecuentes de muerte en las mujeres a nivel mundial.

**Objetivo:** determinar la efectividad de un programa de intervención educativa sobre la prevención del cáncer cervicouterino en estudiantes adolescentes de la enseñanza media.

**Métodos:** se realizó un estudio de intervención, preexperimental, en la secundaria básica Julio Pino Machado perteneciente al área de salud del Policlínico Universitario Marta Abreu, en Santa Clara, en el período octubre 2023-octubre 2024. Se utilizaron métodos

cuantitativos y cualitativos, diseño de pretest y postest. Se emplearon métodos teóricos y empíricos para la fundamentación de la investigación, recolección de información y su procesamiento.

**Resultados:** la implementación del programa aplicado elevó el nivel de información con predominio en la categoría Bueno en el 73,3 % de las adolescentes, y cero en el nivel Malo. Estos cambios resultaron estadísticamente muy significativos a partir de la aplicación del test de Wilcoxon, con valores inferiores a 0,01. El 86,66 % (26 estudiantes) alcanzaron un nivel máximo de satisfacción.

**Conclusiones:** el programa fue valorado por los especialistas como Adecuado. Su implementación elevó el nivel de información sobre la prevención del cáncer cervicouterino; su efectividad se evidenció en la satisfacción lograda en las adolescentes, y en los cambios estadísticamente significativos.

**DeCS:** detección precoz del cáncer; adolescentes; factores de riesgo; indicadores de salud; promoción de la salud; educación médica.

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## INTRODUCTION

Currently, cancer constitutes a serious health problem for humanity. The rates of incidence and mortality are high, as are the psychological, family, work, and economic disturbances it causes.

The fight against cancer concerns not only doctors, researchers and other health professionals, but also the rest of the population. It is reasonable to welcome any path that represents help in the fight against malignant tumors. Cancer is one of the most complicated diseases faced by medicine due to its complex, diverse, and multi-causal nature.<sup>(1)</sup>

The World Health Organization (WHO)<sup>(2)</sup> estimates that 500,000 new cases of uterine cancer are diagnosed each year and more than 550,000 women die, 80% of whom come from developing countries.

Cervical cancer is a type of preventable and eradicable malignant neoplasm; however, it is one of the most frequent causes of death in women worldwide and in the Region of the Americas. Low-income countries have more than twice the incidence of high-income countries and a mortality rate seven times higher. According to the Pan American Health Organization (PAHO), cervical cancer is the second most frequent cancer among women in Latin America and the Caribbean; although it ranks fourth in the region of the Americas, 35,000 women die each year and an estimated 83,000 are diagnosed.<sup>(3)</sup>

In Cuba, despite the existence of an early detection program, cervical cancer persists as a health problem; this disease ranks fourth in incidence and fifth in mortality. In 1968, the first strategy for cervical cancer control was implemented through an early detection program. Although millions of women have benefited, the desired objective of reducing its incidence and mortality has not been achieved. For decades, the organic cytology test (Pap smear) has been the most widely used screening test in the world.<sup>(4)</sup>

In the Santa Clara municipality, Villa Clara in 2020, out of a total of 12,484 patients examined, 4,948 (39.6%) had abnormal cytology results. At the Marta Abreu University Polyclinic, out of a total of 3,121 patients examined, 78 (25%) had abnormal cytology, and 75.4% of the females under 25 years of age who were examined were affected and had risk factors.<sup>(5)</sup>

Cervical cancer today represents a problem with an impact on women's health in this municipality, confirmed by statistics that rise each year, and which demonstrate the increase in the appearance of this type of lesion in age groups of females that precede in age the groups established and controlled by the Early Diagnosis Program for Cervical Cancer (ages 25 to 64).

This program considers that before these ages, signs of this pathology should not appear due to the characteristics of their epithelium; however, in the aforementioned polyclinic, it is evident that a considerable number of young women come to consultation with a clinical picture typical of these lesions, from low-grade to severe lesions, meaning already sick.

Despite the implementation of the national program, there has been an increase in incidence regarding morbidity from this type of lesion in young women under 25 years of age. This indicates its early appearance with economic and psychosocial repercussions.

Knowledge about the risk factors for this disease and its consequences is important for deciding actions by members of the health team, with the aim of making an early diagnosis of this disease.<sup>(6)</sup>

With the objective of determining the effectiveness of an educational intervention program aimed at raising the level of information on cervical cancer prevention in adolescent girls in 9th grade 1 and 2, at the Julio Pino Machado Basic Secondary School, this research was carried out. The program constitutes a practical contribution of the research to the practice of the nursing profession and its novelty is related to the increase in information on the subject in adolescents.

## METHODS

A pre-experimental intervention study was carried out using quantitative and qualitative methods; in the period October 2023-October 2024 at the Julio Pino Machado Basic Secondary School in the health area of the Marta Abreu University Polyclinic, Santa Clara municipality, Villa Clara province.

From a population of 93 female adolescents, a convenience sample of 30 adolescents was selected for access to the field, coinciding with the total number of females in the 9th grade

1 and 9th grade 2 groups. The studied adolescents were between 14 and 15 years of age. The inclusion criteria were belonging to these groups and being female.

To fulfill the objective of the research, the following methods and techniques were used.

Theoretical methods:

- Analytical-synthetic: was used in the evaluation of the problematic situation and also synthesis, by relating these elements to each other and linking them with the problem as a whole. Hence its use throughout the process of reviewing and studying documents and bibliographies related to the object of study, as well as in the processing of information resulting from the research.
- Inductive-deductive: during the processing of the obtained data.
- Abstraction: throughout the entire research process.
- Historical-logical: to refer to the background of the research and in the elaboration of the theoretical framework.

Empirical methods:

- Nominal group technique: was used in the study to seek consensus on the design of the educational intervention program.
- Questionnaire for the criteria of seven specialists with teaching categories of assistant professor and full professor with more than 15 years of experience: with the aim of knowing their opinion on the designed program, before its application; they were asked for their evaluative judgment according to relevance, feasibility, quality, usefulness, and structure.
- Information questionnaire on the topic of cervical cancer: was used to explore the information that the investigated adolescents have, in the initial diagnostic stage and final evaluation, regarding the topic of cancer in the study to seek consensus on the design of the educational intervention program:

- Good: when the adolescent scores 18 points or more in the evaluated aspects.
- Fair: when the score is between 14 and 17 points.
- Poor: when scoring 13 points or less.

Satisfaction survey: to determine the individual and group satisfaction index, based on the Iadov Technique.<sup>(7)</sup> This technique constitutes an indirect method based on a survey prepared according to the requirements of the study in which it is used.

A questionnaire was applied before the intervention, to ascertain and determine the level of information about cervical cancer prevention in the adolescents in the study sample. It was completed in an individual session in a classroom at the school. It was graded according to a key and the information was processed and analyzed; then the comparison of the result before and after the applied program was made.

In the same session, the satisfaction survey was applied. Its analysis proceeded using the Iadov Technique and the use of the "logical table" from which the satisfaction index was determined:

Satisfaction with the intervention: qualitative nominal. It was operationalized according to the levels of satisfaction covered by this technique:

For the individual satisfaction index:

- Clear satisfaction
- More satisfied than unsatisfied
- Undefined
- More unsatisfied than satisfied
- Clear dissatisfaction
- Contradictory

For the group satisfaction index:

- Satisfaction
- Contradiction
- Dissatisfaction

Effectiveness of the intervention: qualitative nominal. Indicators to measure the effectiveness of the educational intervention program:

It is considered effective if:

- 50% or more of the sample achieves a good level of information.
- Statistically significant changes are obtained with values below 0.05, based on the application of the Wilcoxon signed-rank test.

The adolescents show satisfaction with the implementation of the program based on the analysis of their information, using the Iadov Technique, and express favorable and interesting opinions about its application.

The principles of ethics in scientific research were fulfilled:

Principle of respect/autonomy: informed assent was requested from the adolescents in the study sample and informed consent from their parents; anonymity and confidentiality of their data were guaranteed.

Principle of beneficence/non-maleficence: the benefit was obtaining scientific knowledge about cancer prevention to prevent this disease and reduce its incidence.

The study considered the aspects to be taken into account for ethical research: value, scientific validity, equitable subject selection, favorable risk-benefit ratio, independent review, informed consent, and respect for the subjects studied.<sup>(8)</sup>

It is based on the relationships established between three questions with closed answers that are interspersed among the questions of the satisfaction survey, a relationship unknown to the surveyed subject. These three questions are related through what is called Iadov's "logical table". The satisfaction index is obtained by establishing the link between the answers to these questions through that table. The applied survey consists of 10 questions and three interspersed questions: numbers four, six, and eight.

Methodological triangulation. Qualitative technique:

It constitutes a fundamental methodological analysis tool; its purpose is to contrast and establish cross-control of the data, both in the collection and processing of information and in the development of solution proposals.

It contributes to increasing the objectivity of the analysis of the data to be obtained and processed, related to the variables under study.

Includes triangulation of sources or collection of information from different origins, triangulation of evaluators, and methodological triangulation (of different methods and techniques and diverse methodological strategies - quantitative/qualitative -). In the study, it was used at all stages of the research process.

Ethical considerations: informed assent was requested from the adolescents in the study sample and informed consent from their parents; anonymity and confidentiality of their data were guaranteed.

Statistical methods

For statistical processing, a database was created in Excel and an SPSS version 11.0 file for Windows. Processing was carried out with this statistical package and the results were transferred to tables and figures. Mathematical percentages, contingency tables of absolute

and relative frequencies, and proportions for qualitative variables were used. The Wilcoxon signed-rank test was applied. The maximum significance value considered was 0.05. As a result of this test, the value of its statistic and the associated significance are shown.

According to the p-value, the association or relationship was classified as:

- Highly significant: when the p-value is less than 0.01
- Significant: If p is greater than or equal to 0.01 and less than 0.05

## RESULTS AND DISCUSSION

In the initial stage, the poor level of information predominated in 76.6% of the adolescent students studied. This was followed by the fair level in 16.67%, and only 6.67% had a good level of information before the implementation of the program.

The nominal group considered by consensus that prevention actions and early diagnosis are the ways to respond to the health problem represented by cervical cancer. Adolescents must be provided with the necessary tools to become health promoters, and the design of an educational program aimed at adolescents should consider group dynamics as an important means of transmitting information. The unity of the cognitive and affective aspects, the active role of the subject, and their active interrelation must be considered. Furthermore, the structure of the educational program should include the specification of organizational aspects, objectives, knowledge system or topics, work sessions, and forms of evaluation. The knowledge system or topics should support the objectives and sessions, which must have a planned organization as a process. The evaluation of the program should be systematic and dynamic through its own participants.

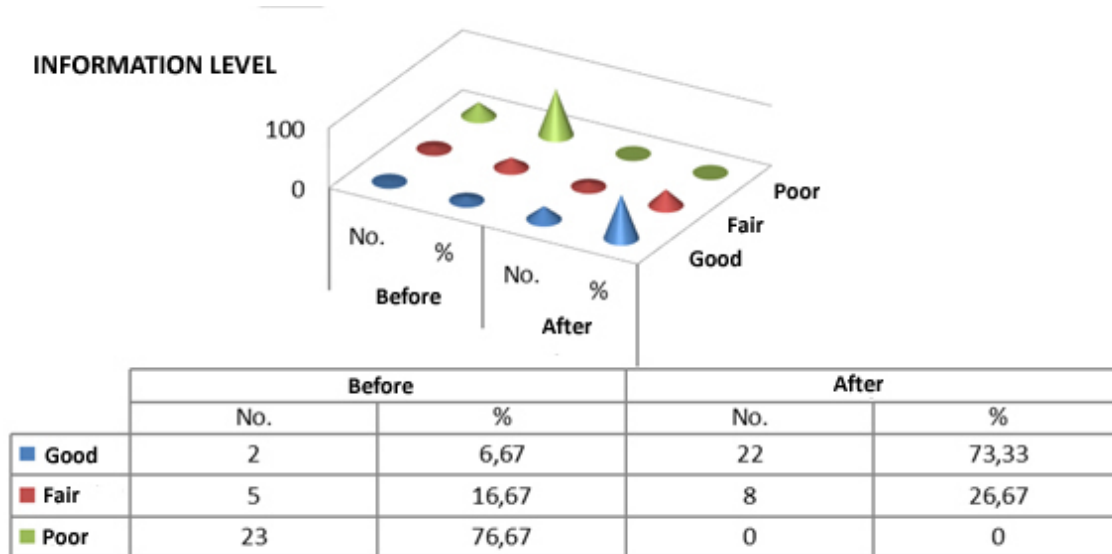
The educational intervention program on cervical cancer prevention in adolescents, entitled "Prevention gives life," took into account the Nola Pender nursing model of health promotion.<sup>(9)</sup> It was structured into six topics:

- Generalities on cervical cancer
- Behavior as a health problem, concept, clinical picture
- Associated risk factors
- Sexually transmitted diseases and their relationship with cervical cancer
- Human papillomavirus (HPV): genesis of cervical cancer
- Diagnostic means used in the early detection of the disease: organic cytology
- Cervical cancer prevention and adolescent risk perception as a starting point

100% of the specialists rated the educational intervention program as Excellent in relation to relevance, feasibility, quality, and usefulness. The majority: six of them (80%) also considered its structure Excellent and one rated it as Very good. The proposal was considered adequate.

The applied program achieved its objective, contributing to increasing the level of information on cervical cancer prevention. This was demonstrated in the evaluation carried out during the sessions, through the very development of these sessions, where the aim was to put into practice what had been learned.

Figure 1 shows the distribution of adolescents according to their level of information on cervical cancer before and after the application of the educational intervention program. It can be seen that in the initial stage, the Poor level predominated in 76.6% of the adolescents. After its application, none of them obtained that level, and the Good level increased to 73.3%. These changes were highly statistically significant based on the application of the Wilcoxon test, with values below 0.01. The significance obtained in this test indicates that the change in the level of information regarding the topic was favorable.



**Fig. 1.** Level of information on cervical cancer before and after the intervention. Julio Pino Machado Basic Secondary School. Santa Clara. Villa Clara. October 2023-2024

Wilcoxon test  $Z = -4.636$   $p < 0.000$

Source: questionnaire.

These results show that the adolescents acquired information on cervical cancer prevention: they learned about the risk factors that influence its appearance, perceived whether they are exposed to or have a condition that could cause this or another disease, and became familiar with the methods for diagnosis, once the educational intervention was applied.

The initial deficiencies detected in the level of information on the topics addressed show that the guidance work of the basic health teams (EBS) is still insufficient. The benefits of the intervention constitute a positive factor for the adoption of healthy behaviors and self-care that support changing inappropriate behaviors that threaten the health and life expectancy of the female population.

In this final stage of the evaluation, the result of the satisfaction survey was obtained, processed using the Iadov Technique.

The number resulting from the interrelation of the answers to the three questions, observable in Table 1, indicated the position of each adolescent within the six levels of satisfaction covered by the Iadov Technique.

**Table 1.** Relationship of individual satisfaction with the satisfaction scale. Julio Pino Machado Basic Secondary School. Santa Clara. Villa Clara. October 2023-2024

Scale	Meaning	Individual satisfaction
+ 1	Maximum satisfaction	26
+ 0,5	More satisfied than unsatisfied	2
0	Undefined and contradictory	2
- 0,5	More unsatisfied than satisfied	0
- 1	Maximum dissatisfaction	0

Source: satisfaction survey.

The global satisfaction index (GSI) can reflect values between +1 and -1. Values between -1 and -0.5 indicate dissatisfaction; those between -0.49 and +0.49 show contradiction, and those between 0.5 and 1 indicate satisfaction.

Analysis of these results with a GSI of 0.98 places the group of adolescents who participated in the intervention within the Very satisfied range. The high GSI value reflects acceptance of the applied educational intervention program, signifying recognition of its usefulness, as the adolescents have expressed opinions showing satisfaction with the contribution to improving their levels of information on cervical cancer and its prevention.

The Iadov Technique also includes two open-ended questions, directly associated with the adolescents' assessment of what they liked most and least about the intervention. As a result, it was found that they liked the group and participatory sessions, the opportunities to interact, exchange knowledge, learn without formalities or "lecturing," the use of mobile phones, the information provided and its importance for life, the reflections on the behavior

of this health problem in themselves, and the active role they have in self-care. They did not like that the activity hours were limited by the duration of the intervention.

Significant in the analysis of these opinions was the preponderance of positive aspects raised, which serves as a foundation for the high value obtained in the GSI.

The results demonstrate the effectiveness of the intervention; its indicators were met. More than 50% of the sample achieved a Good level of information; highly statistically significant changes were obtained when comparing the group's results before and after the applied program, with values below 0.05, based on the Wilcoxon signed-rank test. The adolescents showed satisfaction with the implementation of the program, through favorable opinions.

The program actions correspond to the information needs on cervical cancer prevention identified in this group of adolescents during the initial diagnostic stage; their expectations were met, and satisfaction predominated as evidenced by the GSI results. The previous results confirm the effectiveness of the educational intervention program.

The early diagnosis program for cervical cancer refers to the increase in morbidity and mortality from this cause and includes in its objectives the reduction of rates, proposing to prioritize screening actions to achieve this.<sup>(10)</sup>

In a study conducted in Colombia, in two educational institutions in the municipality of Ricaurte on cervical cancer and the implementation of a formative intervention model, an increase in the level of knowledge about this disease and the development of necessary tools to make informed decisions and promote long-term well-being were reported.<sup>(11)</sup>

Another intervention in Mayabeque province diagnosed insufficient information among the investigated women regarding the performance of the cytological test and the risk factors related to the pathology; this aspect influences risk perception and appropriate behavior to preserve their health.<sup>(12)</sup>

In the authors' opinion, it is important to establish programs on the topics to be addressed to train consultation staff in the mastery of participatory techniques and health education based on the needs identified in schools and within the community itself.

Researchers consider the benefits of educational interventions in cervical cancer prevention and recommend expanding their use in other intervention settings, as well as piloting new methodologies leveraging advanced technology in education applied to health.<sup>(13)</sup> Their use implies disease prevention to avoid deaths of young women and the increase of a country's health burden.

García Rubio,<sup>(14)</sup> in Spain, conducted a review on health education regarding cervical cancer from adolescence. It was found that the prevailing idea is that prevention is possible through educational actions inserted within the framework of health promotion and education activities in primary care; focused mainly on the perception of cervical cancer risk, early detection of the lesion through cervicovaginal cytology, and vaccination before the onset of sexual relations.

In research conducted in Santa Clara<sup>(15)</sup> on the level of knowledge about cervical cancer in females from a doctor's office, it was found that in the majority of patients it is inadequate. The authors defend the value of educational programs and their effectiveness, and draw attention to the need to increase community interventions with the aim of promoting and providing females with information and knowledge about risk factors and how to prevent them.

In Mayabeque province, several authors conducted research on women with risk factors associated with cervical cancer, to determine the effectiveness of an educational intervention on the subject. The results in knowledge were effective with statistical significance between the measurements taken before and after its implementation.<sup>(12)</sup>

The Cuban health system maintains a care and control program for this pathology; having little information on preventive topics diminishes the usefulness of screening measures.

Therefore, it is necessary to promote education in the population, from an early age, preventively, and involve parents and the community; knowledge multiplied among various actors would have an additional benefit.<sup>(15)</sup> The authors of this study share this criterion.

#### Scientific contribution

Nola Pender's health promotion model is contextualized to the Cuban context in the design of an educational intervention program on cervical cancer prevention, in order to promote health-generating behaviors in adolescents with the intervention of Nursing sciences and applicability in future research.

## CONCLUSIONS

An educational intervention program on the prevention of cervical cancer in adolescents was applied, which was assessed by specialists as Adequate. Its implementation raised the level of knowledge about its prevention, confirmed by statistically significant changes; the sampled subjects expressed their satisfaction, which evidenced its effectiveness.

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### **Conflict of interest declaration**

The authors declare that they have no conflicts of interest.

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