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Educational intervention in medical students to raise the level of knowledge about chikungunya in community screening

Educational intervention in medical students to increase knowledge levels on chikungunya in community screening

Educational intervention in medical students to raise the level of knowledge about chikungunya in community research

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SUMMARY

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Chikungunya fever is an emerging arboviral disease of increasing importance in the field of global public health. With the aim of evaluating the effectiveness of an educational intervention for medical students, in order to raise their level of knowledge about chikungunya and improve their performance in community screening in at-risk areas of the municipality of Manzanillo, a pre-experimental educational intervention study was conducted with first-year medical students from the University of Medical Sciences of Granma, during the period of September to December 2025. The study population consisted of 200 students who agreed to participate voluntarily in the study using a non-probabilistic, purposive sampling method. The results of the educational intervention, as measured by the final survey (post-test), showed a significant improvement in the students' knowledge of Chikungunya: causative agent (95.5%), clinical presentation (94.5%), stages of the disease (93.5%), transmission route (95.5%), criteria for confirming a suspected case (93.5%), prevention measures (97.5%), and established steps for adequate community screening. 195 students answered the questions correctly, representing 97.5%. In conclusion, it can be stated that the implemented educational intervention proved effective, as it raised the level of knowledge of first-year medical students regarding Chikungunya, thus facilitating better disease screening within the population.

Keywords: Aedes; Arboviruses; Medical Students; Early Educational Intervention; Chikungunya Virus; Mosquito Vectors.

ABSTRACT

Chikungunya fever is an emerging arboviral disease of increasing importance in global public health. With the objective of evaluating the effectiveness of an educational intervention in medical students—to raise their level of knowledge about chikungunya and improve their performance in community screening in high-risk areas of the municipality of Manzanillo—a pre-experimental educational intervention study was conducted. The intervention targeted first-year medical students from the University of Medical Sciences of Granma during the period from September to December 2025. The study universe consisted of 200 students who voluntarily

agreed to participate, using a non-probabilistic, intentional sampling method. After applying the educational intervention, the final survey (post-test) showed a significant improvement in students' levels knowledge: causal agent (95.5%), clinical presentation (94.5%), stages of the disease (93.5%), transmission route (95.5%), criteria for confirming a suspected case (93.5%), preventive measures (97.5%), and steps established for adequate community screening, with 195 students answering correctly, representing 97.5%. In conclusion, the implemented educational intervention proved to be effective, as it increased the knowledge level of first-year medical students about chikungunya, thereby promoting improved community screening for the disease.
Keywords: Aedes; Arbovirosis; Medical Students; Early Educational Intervention; Chikungunya Virus; Vector Mosquitoes.

SUMMARY

In February, chikungunya constituted an emerging arbovirose of increasing importance in the global public health arena. As an objective of evaluating the effectiveness of an educational intervention in medical students, aiming to raise the level of knowledge about chikungunya and improve the performance in community research in risk areas of the municipality of Manzanillo, a pre-experimental study of educational intervention aimed at medical students was developed. first year of Medicine at the Universidade de Ciências Médicas de Granma, during the period from September to December 2025. The universe was constituted by 200 students who were willing to voluntarily participate in the study, using a non-probabilistic and intentional sample. As a result, after the application of the educational intervention without final inquiry (post-test), a significant improvement was observed at the level of knowledge of the universities: causal agent (95.5%), clinical picture (94.5%), stages of the procedure (93.5%), transmission route (95.5%), criteria for confirmation of a suspected case (93.5%), preventive measures (97.5%) and steps established for adequate community research, with 195 students responding correctly, representing 97.5%. In conclusion, it is possible to affirm that the educational intervention implemented has proven to be effective, because it raises the level of knowledge of first-year

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Medicine students about chikungunya, favoring the realization of a better research of teaching in the population.

Key words: Aedes; Arbovirose; Medical Students; Early Educational Intervention; Chikungunya virus; Vector Mosquitoes.

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Introduction

Chikungunya fever (CHIKF) is an emerging arboviral disease of increasing importance in global public health. It is a viral disease transmitted by mosquitoes of the genus Aedes, especially the species Aedes aegypti and Aedes albopictus. (1-3) The causative agent, the chikungunya virus (CHIKV), belongs to the alphavirus genus of the family Togaviridae. Human-to-human transmission occurs almost exclusively through the vector. (4,5)

The virus was first identified in Tanzania, Africa, in 1953 by Ross et al. Since then, it has spread to various regions of the world: Africa, the Indian Ocean, India, Southeast Asia, Europe, the Caribbean, and finally to Latin America in 2013. (6-8)

According to recent research estimating the global burden of chikungunya from 2011 to 2020, CHIKV was reported to be responsible for 18.7 million cases in 110 countries, with 19.5 million disability-adjusted life years (DALYs). During these ten years, the total economic burden was assessed at US$2.8 billion, with direct and indirect costs at US$47.1 billion, respectively. (8)

CHIKV has a positive-sense, single-stranded RNA genome of 11,438 base pairs. After a mosquito bite, the incubation period ranges from three to seven days (range 1 to 12 days). The most frequent signs and symptoms are sudden onset of high fever, rash, arthralgia or arthritis,

lymphadenopathy, conjunctival hyperemia, eyelid edema, and pharyngitis. Headache, myalgia, nausea, and vomiting may also occur. (3, 9, 10)

The course of chikungunya disease is described as having three phases: an acute phase lasting one to 21 days (some citations include only the first two weeks), followed by a post-acute phase (from the third week to three months), and a chronic phase (after 3 months). (11,12)

Acute phase (1–21 days): This phase is generally characterized by high fever and intense joint pain accompanied by inflammation. Joint manifestations can cause temporary or prolonged functional limitation. The rash usually appears between the second and fifth day. Most patients improve within 7–10 days. Severe forms can occur during this phase, especially in newborns, infants, the elderly, pregnant women, immunocompromised individuals, and patients with comorbidities such as hypertension, heart failure, diabetes mellitus, obesity, renal failure, liver disease, or chronic respiratory diseases. (9,11,12)

Post-acute phase (three weeks to three months): joint symptoms persist continuously or intermittently. (10-12)

Chronic phase (>3 months): characterized by persistent joint pain, stiffness, or swelling, which may progress to chronic arthritis. It is necessary to rule out other causes of inflammatory arthritis. (11,12)

Severe forms can manifest with complications such as uveitis, retinitis, myocarditis, hepatitis, nephritis, bullous lesions, hemorrhages, meningoencephalitis, myelitis, Guillain-Barré syndrome, and cranial nerve palsies. (13)

The diagnosis is established by clinical-epidemiological criteria and can be confirmed by detection of viral RNA by RT-PCR, viral isolation, or serological tests. Early identification of suspected cases is essential to break chains of transmission and guide control measures. (14)

Suspected case: a person who resides in or has traveled within the last 14 days to areas with CHIKV transmission and presents with fever accompanied by arthralgia or arthritis not explained by other causes. (14)

Confirmed case: detection of viral RNA by RT-PCR, viral isolation, or molecular identification from post-mortem tissues. (14)

The ideal sample is serum obtained during the first five days of symptoms, although viremia can persist until day eight. CHIKV is a notifiable disease requiring immediate notification. (14)

In Cuba, the increase in international mobility and the consolidated presence of the vector have allowed the occurrence of autochthonous and suspected events in several provinces. In Matanzas, the first autochthonous case was reported in July 2025 in the municipality of Perico, followed by spread to other territories, including the Granma territory in September 2025. (14)

In the municipality of Manzanillo, a progressive increase in suspected febrile cases has been observed, with the first case reported in October 2025, which requires strengthening prevention actions, epidemiological surveillance and community participation as fundamental pillars of vector control.

Currently, the role played by medical students is vital in combating these arboviral diseases. Community-based screening has become a fundamental pillar for detecting suspected cases and identifying potential risk factors that could lead to the spread of these diseases. Therefore, one of the key objectives of health education institutions overseen by the Ministry of Public Health is to train students and professors to promote community interventions and prevent and avoid the spread of these viruses.

Medical students, particularly those in initial training, play a vital role in active case finding and public health education. However, gaps have been identified in their knowledge related to the clinical aspects, transmission, prevention, and management of suspected chikungunya cases. In this context, educational interventions represent an effective strategy to strengthen their skills and improve the impact of fieldwork.

In Granma province, there are still no interventional scientific studies that allow for the evaluation of medical students' knowledge of chikungunya. This study aims to assess the effectiveness of an educational intervention for first-year medical students to increase their knowledge of chikungunya and improve their performance in community-based case finding in

high-risk areas of the municipality of Manzanillo. Its results are intended to contribute to strengthening local epidemiological surveillance and preparing healthcare personnel for public health emergencies.

Methods

A pre-experimental educational intervention study was developed targeting first-year medical students at the University of Medical Sciences of Granma, during the period from September to December 2025. The universe consisted of 200 students who agreed to participate voluntarily in the study with a non-probabilistic, intentional sampling.

Empirical methods

1. Applied with a closed questionnaire (Annex 1) to measure knowledge about: arbovirus, chikungunya, clinical aspects, transmission, prevention, community screening.
2. Performance observation during community screening (use of guide or control sheet).

Participatory techniques, workshops, simulations, case studies, and educational materials were used.

Study variables:

- ✓ Level of knowledge about chikungunya. Categories: correct / incorrect (Annex 1).
- ✓ Secondary variables: performance in the investigation (Adequate / Inadequate)
- ✓ Sex: female - male.
- ✓ Age 17–18; 19–20; >20.
- ✓ Correct identification of suspected cases correct / incorrect (Annex 1)

The intervention was designed in four consecutive stages, with the purpose of increasing the level of knowledge about chikungunya and strengthening the skills necessary for community investigation.

1. Diagnostic stage

A survey was administered to assess prior knowledge of clinical characteristics, transmission, prevention, management of suspected cases, and screening procedures. This questionnaire was validated by the Scientific Committee and the Ethics Committee of the University of Medical Sciences of Granma. This information allowed for the identification of learning needs and the planning of the intervention.

2. Implementation of the educational intervention

Based on the initial results, a program was developed that included interactive talks, practical workshops, simulations of the research process, analysis of clinical cases, and educational materials.

The students were organized into groups of 25, forming eight training classrooms. The sessions were held three times a week, lasting 90 minutes, in classroom #4 of the Faculty of Medical Sciences in Granma, over the course of a month. Each week included two lectures and one day of hands-on learning. Emphasis was placed on the importance of attendance and punctuality to ensure a proper understanding of the topics.

The program covered five topics:

Topic 1 Arbovirus: generalities.

Topic 2 Clinical characteristics of chikungunya.

Topic 3 Transmission and prevention measures.

Topic 4: Behavior in suspected cases.

Topic 5. Investigation procedure.

3. Post-intervention stage

At the end of the sessions, the initial survey was administered again, with new questions included to compare the results and evaluate the effectiveness of the educational program. This

questionnaire was approved by the Scientific Committee and the Ethics Committee of the University of Medical Sciences of Granma.

The data were analyzed using percentages, and the following indicator was used: percent variation (PV) = (Initial value – Final value) / Initial value x 100

The intervention was considered effective when the PV was equal to or greater than 70%.

4. Implementation of community investigation

The trained students conducted screening in areas of the Ángel Ortiz Vázquez Polyclinic #2. Under supervision, during the screenings, acute febrile syndromes were identified. The homes of the patients received focal treatment, intradomiciliary adulticide, and sanitation and health promotion actions. Those who presented symptoms compatible with chikungunya underwent a structured interview, completed screening forms, and received health education. The febrile cases were also reported and referred to the medical office.

Sanitation actions were carried out by the community management according to risk stratification and priorities discussed in the temporary group, artificial deposits were destroyed, and the collection of solid waste was prioritized, avoiding the formation of micro-dumps.

The transmission of educational messages was intensified, not only informative but also by carrying out demonstrations of positive behaviors that promote health (self-focus, brushing of tanks and other water containers). These were carried out face-to-face with 100% of the population.

The research was approved by the Scientific Council and the Ethics Committee. Participants were informed about the study's objective, its voluntary nature, confidentiality, and the possibility of withdrawing from the study at any time.

Results

In the distribution of students according to sociodemographic variables, the majority belonged to the 19-20 age group (134; 67%), and females predominated (145; 72.5%). Attendance at the educational sessions was over 95%, with 191 students present at all teaching activities, which ensured uniform exposure to the program content. (Table 1)

Table 1. Distribution of students according to sociodemographic variables.

Variable	Category	Total	
		No	%*
Age	17–18	23	11.5
	19–20	134	67.0
	>20	43	21.5
Sex	Female	145	72.5
	Male	55	27.5
Attendance	Present	191	95.5
	Missing	9	4.5

*Percentage calculated based on the total number of students = 200.

It was evident that before the intervention, only a small number of university students correctly answered the questionnaire on chikungunya in essential aspects such as: causative agent (31, or 15.5%), clinical picture of the disease (25, or 12.5%), stages of the disease (23, or 11.5%), route of transmission of the virus (29, or 14.5%), criteria for confirming a suspected case (29, or 14.5%), prevention measures (31, or 15.5%), and the steps established for adequate community screening; only 19 students answered correctly, which is equivalent to 9.5%. (Table 2)

After implementing the educational intervention, the final survey (post-test) showed a significant improvement in the students' level of knowledge: causative agent (191, 95.5%), clinical presentation (189, 94.5%), stages of the disease (187, 93.5%), transmission route (191, 95.5%), criteria for confirming a suspected case (187, 93.5%), prevention measures (195, 97.5%), and established steps for adequate community screening. 195 students answered the questions correctly, representing 97.5%. (Table 2)

Table 2. Level of knowledge before and after the intervention.

	Level of knowledge before the intervention				Level of knowledge after the intervention			
	Correct		Incorrect		Correct		Incorrect	
Indicator evaluated	No	%*	No	%*	No	%*	No	%*
Definition	31	15.5	169	84.5	193	96.5	7	3.5
Causative agent	29	14.5	171	85.5	191	95.5	9	4.5
Clinical picture	25	12.5	175	87.5	189	94.5	11	5.5
Stages of the disease	23	11.5	177	88.5	187	93.5	13	6.5
Transmission	29	14.5	171	85.5	191	95.5	9	4.5
Suspected case	29	14.5	171	85.5	187	93.5	13	6.5
Prevention measures	31	15.5	169	84.5	195	97.5	5	2.5
Investigation procedure	19	9.5	181	90.5	195	97.5	5	2.5

*Percentage calculated based on the total number of students=200.

Between the initial survey, 29 students had knowledge of chikungunya, and in the final survey, 195 students had mastered the concept of chikungunya. The percentage change (PC) was greater than 70%, the established criterion for considering the intervention effective. (Table 3)

Table 3. Effectiveness of the educational intervention.

Indicator	Initial result	Bottom line	PV (%)
Global level of knowledge	29	195	71

The students performed excellently in community health screening, demonstrating the need for training before they conduct screening. 100% of the students provided high-quality health education, and only nine students continued to show deficiencies in their screening performance. (Table 4)

Table 4. Evaluation of performance in community research.

Indicator	Appropriate		Inappropriate	
	No	%*	No	%*
Interrogation	199	99.5	1	0.5
Symptom identification	197	98.5	3	1.5
Use of form	200	100	0	0

Early notification	195	97.5	5	2.5
Health education	200	100	0	0

*Percentage calculated based on the total number of students=200.

During the investigation phase, 4234 homes in vulnerable areas were visited, 2231 febrile cases and 898 suspected cases of chikungunya were identified and referred to the corresponding clinics, and the students provided 4234 educational activities.

Discussion

The results obtained demonstrate that the educational intervention implemented was effective in raising the level of knowledge about chikungunya in medical students, as well as improving their performance during active case finding.

Prior to the intervention, significant gaps in knowledge were evident, similar to those reported in previous studies where students and the general population are confused about symptoms, transmission, and clinical phases of arboviruses such as dengue and chikungunya.

This coincides with reports from the WHO and PAHO, which point to low risk perception and a lack of information on arboviruses as determinants of the increase in vector-borne transmission. (15,16)

After the intervention, the students showed a better understanding of the causative agent, clinical picture, mode of transmission and preventive measures, related to what was described by Weaver and Lecuit, (17) and by Simon et al, (18) who emphasize the importance of health education to improve the capacity to respond to chikungunya.

The significant increase in knowledge, measured by the percentage of variation, supports the usefulness of structured pedagogical programs and demonstrates that participatory teaching (workshops, case studies, simulations) is very effective, as also suggested by Staples and Powers. (19)

Regarding performance in community screening, the students correctly applied the steps of the protocol, identified suspected cases, and provided health education, which is consistent with studies showing that prior training improves performance in the field during epidemiological emergencies. (20)

This result is relevant in the context of Manzanillo, where the presence of the vector and viral circulation justify immediate surveillance and control actions.

The research confirms that timely training strengthens teaching and care capacity, raises the quality of screening, facilitates early case identification, and contributes to community transmission control, as suggested by WHO and PAHO guidelines.

In summary, the study supports the importance of integrating systematic educational strategies into medical training to address epidemiological emergencies associated with arboviruses.

The main limitation of the study was the scarce bibliography on research that addresses educational interventions as fundamental pillars for the training of health personnel in the face of the chikungunya virus, this made it impossible for the authors to compare the results obtained with others reported by the international scientific community.

The research's contribution lay in its being the first interventional study in Granma conducted with medical students to measure their level of knowledge about chikungunya. The deficiencies identified allowed researchers to develop a training program for first-year medical students, thereby improving the quality of community-based case finding. Implementing the educational intervention in teaching settings contributed to better training for students as future healthcare professionals.

Conclusions

The educational intervention implemented proved to be effective as it raised the level of knowledge of first-year medical students about chikungunya, which favored a better detection of the disease in the population.

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Recommendations

1. Maintain and institutionalize educational intervention programs on arboviruses in undergraduate training, with periodic updates according to the national epidemiological behavior.
2. Strengthen ongoing training for students before periods of increased arboviruses, especially regarding early diagnosis, prevention, and community actions.
3. Consolidate student participation in active research, ensuring adequate supervision and pedagogical feedback.
4. Incorporate complementary teaching tools such as clinical simulations, case studies, and practical exercises on the identification of breeding sites and environmental risks.
5. Recommend that health authorities strengthen community health education to raise risk perception, a critical factor noted by PAHO/WHO in the control of chikungunya.
6. Promote lines of research associated with the clinical follow-up of patients, especially those with persistent symptoms, to enrich local evidence.

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Conflicts of Interest

The authors declare that there are no conflicts of interest.

Authorship contribution

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