

Teaching styles in the core integrative discipline of the Medical curriculum

Estilos de enseñanza en la disciplina principal integradora en la
carrera de Medicina

Liset Rodríguez Martínez^{1*} <http://orcid.org/0000-0002-6097-4048>

Pedro Augusto Díaz Rojas¹ <http://orcid.org/0000-0003-4897-363X>

Elizabeth Katiuska Leyva Sánchez¹ <http://orcid.org/0000-0002-1512-4757>

Solvey del Río Marichal¹ <http://orcid.org/0000-0003-0477-9472>

¹University of Medical Sciences of Holguín. Mariana Grajales Coello Faculty of Medical Sciences. Holguín. Cuba.

*Corresponding author. Email: lisetamanda@gmail.com

ABSTRACT

Background: Special attention to teaching styles to face learning situations in practical application environments is a current trend, reflected in the assimilation of content, achievement of objectives, and adequate training and development of skills.

Objective: to characterize teaching styles among faculty members of the main integrating discipline in the Medicine degree program.

Methods: a descriptive study was conducted in 2025 at the University of Medical Sciences of Holguín. Theoretical methods were used: analysis-synthesis, historical-logical, and induction-deduction; and empirical methods: the Teaching Styles Questionnaire (CEE).

Results: among the faculty teaching the main integrating discipline in the Medicine degree program, the highest mean score corresponded to the structured teaching style, followed by the functional, formal, and open styles. High preferences were found in the functional and open styles, while low preference corresponded to the formal style.

Conclusions: the diagnosis identified areas requiring attention, with a very high prevalence in the functional teaching style, and a moderate prevalence in the open style, consistent with the demands of the main integrating discipline. This provides scientific evidence for the design of pedagogical improvement programs focused on diversifying teaching styles, especially those that foster autonomy and reflective learning.

MeSH: education, medical, undergraduate; faculty; education, professional; learning; education, medical

RESUMEN

Fundamento: la atención especial a los estilos de enseñanza para enfrentar situaciones de aprendizaje en ambientes prácticos de aplicación es una tendencia actual traducida en asimilación de contenidos, alcance de objetivos, adecuada formación y desarrollo de habilidades.

Objetivo: caracterizar los estilos de enseñanza en docentes de la disciplina principal integradora de la carrera de Medicina.

Métodos: se realizó una investigación descriptiva en 2025, en la Universidad de Ciencias Médicas de Holguín. Se utilizaron métodos teóricos: análisis-síntesis, histórico-lógico e inducción-deducción; y empíricos: el cuestionario de estilos de enseñanza (CEE).

Resultados: entre los docentes que imparten la disciplina principal integradora de la carrera de Medicina, la media más alta se correspondió con el estilo de enseñanza estructurado, seguido de los estilos funcional, formal y abierto. Las preferencias altas se ubican en los estilos funcional y abierto; mientras que la preferencia baja se corresponde con el estilo formal.

Conclusiones: el diagnóstico realizado identificó áreas de atención, con una prevalencia muy alta en el estilo de enseñanza funcional, y moderada en el abierto, coherentes con las exigencias de la disciplina principal integradora, lo cual proporciona evidencia científica para el diseño de programas de superación pedagógica focalizados en diversificar los estilos de enseñanza, especialmente aquellos que fomentan la autonomía y el aprendizaje reflexivo.

DeCS: educación de pregrado en Medicina; docentes; educación profesional; aprendizaje; educación médica

Received: 02/06/2026

Accepted: 09/08/2026

INTRODUCTION

Higher education bears the social responsibility of training professionals with adequate theoretical-practical preparation, capable of solving problems related to their profession.

Current trends impose formative processes that go beyond traditional styles of teaching and learning.⁽¹⁾ Medical education, based on the social responsibility of health professionals, reflects a particularly complex perspective. Within this framework, teaching-learning methods must aim for an active and productive stance towards knowledge that contributes to the development of independent, creative, and responsible thinking—essential for future professional practice.⁽²⁾

The implementation of Curriculum E for the Medicine degree program poses a challenge for faculty regarding the quality of the teaching-learning process, reflected in the assimilation of content, achievement of objectives, and adequate training and development of skills. It declares General Medicine as the main integrating discipline, with a guiding role due to its

involvement in the development of professional performance modes through workplace-based education activities.^(3,4)

In this setting, the formative process takes place in learning situations that respond to real conditions of professional practice. Therefore, special attention to teaching styles is a necessity in order to face new content and learning situations in practical application environments; it is essential to know how faculty teach and the best way to effectively influence student learning.^(3,4)

Research on teaching styles dates back to the 20th century. Among its main exponents are Weber, Sánchez, Beltrán, Guerrero, Delgado, Grasha, Guerrero, De León, and Martínez Geijo. The main classifications correspond to Lippit and White, Anderson, Gordon, Bennett, Flanders, and Renés *et al.*⁽⁵⁾ These authors agree on addressing teaching styles as the ways in which teachers develop the teaching-learning process and integrate stable behaviors that shape student-teacher relationships, expressed in a defined educational environment, in relation to class group organization and their affective relationships, for decision-making in the classroom.

Notable contributions in Mexico include Figueroa Sandoval;⁽⁶⁾ in Uruguay, Vega Román *et al.*⁽⁷⁾; and in Spain, Bou Sospedra *et al.*,⁽⁸⁾ who add the family perspective to the topic. These authors provide essential elements for the determination, characterization, and classification of teaching styles and their preferences in different contexts and specialties of higher education with a descriptive approach.

From 2016 onwards, Martínez Geijo *et al.*⁽⁹⁾ and Chipana Limachi⁽¹⁰⁾ stand out, with important contributions in systematizing theoretical positions, classic classifications of teaching styles, and their relationship with learning styles. In Peru, Yana *et al.*⁽¹¹⁾ address learning-centered teaching styles and their influence on academic performance, and in Colombia, Montenegro Mora *et al.*⁽¹²⁾ revisit the analysis of theoretical elements for their understanding.

Martínez Geijo *et al.*,⁽⁹⁾ in particular, consider that in the teaching-learning process, teaching styles are categories closely related to learning styles and propose the need to establish criteria to characterize teachers' behaviors (intellectual, pedagogical, and ethical attitudes). To this end, they link their conceptualization of teaching styles with the theoretical reference of the learning styles of Alonso, Gallegos, and Honey from 1994; and recognize four teaching styles: open, formal, structured, and functional. It is this classification framework that the authors of the present study adopt, based on the questionnaire designed by Martínez Geijo *et al.*⁽⁹⁾ for its diagnosis, validated by Chiang *et al.*⁽¹³⁾ This proposal and validation offer an important instrument for diagnosis and classification, especially in the areas of education and sciences.

In Cuba, noteworthy contributions in Holguín include Aguilera Pupo⁽¹⁴⁾ and Ortiz Torres,⁽¹⁵⁾ who systematize the theoretical foundations that favor the process of characterizing teaching styles in their relationship with learning styles, and research in educational practice.

The results of the epistemological study on the topic highlight theoretical inconsistencies related to its descriptive nature and insufficiencies in its approach from an integrative perspective. They reveal scarce systematization and ambiguity regarding the factors that characterize it and the necessary connections. Furthermore, no research was found at the disciplinary level within the undergraduate training area in medical education.

Therefore, knowledge and understanding of the influence of predominant teaching styles on student learning, in addition to promoting attitude changes and contributing to planning and implementing pedagogical actions that favor learning, would also allow for the design of more appropriate methods for addressing individual differences in the educational context and for increasing the quality of the process and its outcomes in line with formative objectives. Always based on adjustment to content, academic year, and professional problems, and in response to the occupational profile, number of students, group characteristics, and the socio-educational context.⁽³⁾

Within this framework, the research objective is stated as: to characterize teaching styles in the main integrating discipline in the Medicine degree program.

METHODS

A cross-sectional descriptive study was conducted in 2025 at the Mariana Grajales Coello Faculty of Medical Sciences, University of Medical Sciences of Holguín. To control for design biases, an exhaustive review was carried out regarding the application of the questionnaire used, validated as an international instrument and recognized for the study of teaching styles.

The target population consisted of 290 professors from the main integrating discipline of the Medicine degree program. The final sample included 103 faculty members selected through intentional sampling, based on criteria of accessibility, voluntariness, and a minimum teaching experience of five years. These criteria were defined to ensure that participants had sufficient academic and practical experience in teaching General Medicine, which contributes validity to the analysis.

Theoretical methods used:

- Analysis-synthesis: for processing the obtained theoretical and empirical information, discussing the results, and reaching conclusions.
- Historical-logical: to examine the historical background that has characterized the object of study and the logic of its evolution and current manifestation, in relation to the relevance of the study.
- Induction-deduction: in the analysis and establishment of the research logic, moving from the object to the field of action, from the general to the particular and vice versa.

Empirical methods:

Teaching Styles Questionnaire (CEE) – to obtain information from the study subjects. The internationally validated CEE was administered in person. It consists of 71 dichotomous-response items distributed across nine categories (classroom practice, planning, student intervention, class dynamics, assessment instruments, content, activities, personal attitudes, and social relationships). Its objective is to diagnose teaching styles, based on learning styles, assessed by the Honey-Alonso Learning Styles Questionnaire (CHAEA). It facilitates statistical treatment between both styles.⁽¹³⁾

The measured variable investigated was the behavior of teaching styles, understood as the categories of behaviors that teachers habitually exhibit in each phase of the teaching activity. The operational design was carried out through four dimensions: open, formal, structured, and functional, each with specific indicators defined in the CEE.

Dimensions:

Open: do not strictly adhere to didactic planning; motivate with novel activities centered on real problems; stimulate originality and teamwork. They favor, with high or very high preference, the active learning style.

Indicators: Items 1, 7, 16, 17, 23, 28, 33, 37, 41, 46, 48, 52, 57, 60, 62, 66, 69, 70.

Formal: strictly follow detailed planning and promote individual work. They encourage reflection, analysis, and rationality, and value accuracy, order, and detail in responses. They favor, with high or very high preference, the reflective learning style.

Indicators: Items 2, 3, 8, 10, 14, 21, 25, 31, 34, 36, 39, 44, 47, 51, 54, 56, 59, 63.

Structured: place great importance on coherent, structured, and well-presented planning; impart content integrated into a broad, articulated, and systematic theoretical framework. They develop complex activities of relating and structuring; demand demonstrations and objectivity. They favor, with high or very high preference, the theoretical learning style.

Indicators: Items 6, 12, 13, 18, 22, 24, 27, 29, 30, 35, 38, 42, 45, 50, 61, 64, 65, 67.

Functional: advocates of viable, functional, and concrete planning. They assign greater significance to the final result, procedural and practical content, examples, and real problems. They advocate teamwork; guide task execution to avoid errors. They demand brief responses and value results more than procedures. They favor, with high or very high preference, the pragmatic learning style.

Indicators: Items 4, 5, 9, 11, 15, 19, 20, 26, 32, 40, 43, 49, 53, 55, 58, 68, 71.

Data collection procedures: the questionnaire was administered directly by the researcher in individual sessions, ensuring comprehension of the items and confidentiality of responses. Additionally, the general teaching style preference scale was used to describe results and faculty scores.

Processing and analysis: data were processed using Microsoft Excel. Descriptive statistics techniques (simple frequencies and percentages) and methodological triangulation were applied, integrating theoretical and empirical methods to strengthen the validity of the results.

Ethical aspects: the research was conducted in accordance with the Declaration of Helsinki and the code of ethics of the Cuban National Health System. All participants provided informed consent, and the confidentiality of the information was guaranteed.

RESULTS AND DISCUSSION

Based on the application of the CEE, Table 1 shows the mean scores obtained for the teaching styles of the faculty.

Table 1. Average scores of faculty teaching styles. University of Medical Sciences of Holguín; 2025

Teaching styles			
Open	Formal	Structured	Functional
11	11.5	13	12.9

Source: faculty questionnaires. n: 103

In the specific analysis of each teaching style, the item frequency analysis yielded the following results:

Open teaching style: the highest percentages (ranging from 96% to 88%) supported teamwork, novelty, and spontaneity; while the lowest percentages (ranging from 30% to 8%) were related to planning, logical character, and activity methodology.

Formal teaching style: the high values (ranging from 98% to 93%) were associated with analysis, logic, and reaching conclusions; while the lowest percentages (ranging from 34% to 23%) were related to prior planning of activities and participation.

Structured teaching style: the highest percentages (ranging from 97% to 85%) supported the importance of logical structuring, coherence, and theoretical analysis; while the lowest percentages (ranging from 27% to 22%) were related to the dynamics and flexibility of activities.

Functional teaching style: the highest percentages (ranging from 99% to 85%) were associated with the practical application of content and the recognition of progress in learning; while the lowest percentages (ranging from 42% to 29%) were related to the importance of final results and the achievement of objectives.

Regarding prevalence, the scores shown in Table 2 reveal that the majority of faculty members were grouped into the functional teaching style (55) and the open style (43), with very high and moderate preferences respectively; and into the formal style (41) with low

preference. The very high preference corresponding to the functional style yielded the highest mean among the 103 faculty members (53.4), followed by the mean generated by the moderate preference (41.7).

Table 2. Preferences by teaching style and mean. University of Medical Sciences of Holguín; 2025

Preferences by style	Open		Formal		Structured		Functional		Mean
	n.	%	n.	%	n.	%	n.	%	
Very high	13	12.6	0	0	30	29.1	55	53.4	23.79
High	37	35.9	8	7.8	17	16.5	26	25.2	21.36
Moderate	43	41.7	22	21.4	37	35.9	14	13.6	28.16
Low	4	3.9	41	39.8	13	12.6	0	0	14.08
Very low	6	5.8	32	31.1	4	3.9	8	7.8	12.14

Source: faculty questionnaires. n: 103

The formal and functional styles showed the lowest distribution (zero), with the former grouped under very high preference, and the latter under low preference. The open and structured styles generated the second lowest mean value (3.9).

As observed in Table 3, high preferences are found in the functional and open styles, while low preference corresponds to the formal style.

Table 3. Summary of preferences by teaching styles. University of Medical Sciences of Holguín; 2025

High preferences		Low preferences	
1st preference	2nd preference	1st preference	
Functional	Open	Formal	

Source: faculty questionnaires. n: 103

In general, there is an undifferentiated balance among teaching styles with a medium level of development. Taking as reference the research conducted by Vega Román *et al.*⁽⁷⁾ and Martínez Geijo *et al.*,⁽⁹⁾ these results reflect coherence, since there is a balance and a medium score level, and therefore, development in the evaluated styles, with a preference for the functional style.

Frequency analysis of the items measuring each teaching style:

Open teaching style: the high scores confirm the importance of teamwork in the process of assimilation and systematization of new knowledge. They alert to the need to present current problems related to the content received as a means to promote the formation and development of skills at productive and creative levels. All of this is supported by the active role of the student in flexible activities in the search for alternatives.⁽³⁾

The low scores point to the teacher's objectivity in the delivery of content, and especially in evaluation. They indicate the importance of planning and organization of the formative process, where stability in performance is essential. However, the latter should not constitute a limitation to the necessary implementation of non-traditional teaching methods, which would favor the deployment of alternatives to address the variability of learning styles, especially in workplace-based education activities.^(3,4)

Formal teaching style: the high scores raise the need for planning in its relationship with the logical character of the teaching-learning process, where the establishment of structured steps and procedures constitutes the basis for the formation and development of habits and skills, linked to professional performance modes. They indicate the importance of analysis for the comprehension and interpretation of content, and reflect difficulties related to the identification and management of essential content cores and the precise orientation of activities to enhance the active character of the student.^(2,3) The lower scores again demonstrate the importance given to planning and the development of activities through teamwork.

Structured teaching style: the high scores warn of the importance of intending the construction and assimilation of theories and procedures, in a logical and coherent manner, and consequently, the analysis underlying them. They recognize the importance of the teacher's scientific preparation, and that activities in the different settings respond to formative objectives, especially those stated in the graduate's profile.^(1,2,3,4) The low scores announce the need to plan the time required for the assimilation of content, and especially for the development of inherent skills, as well as the flexibility and adaptation of teaching strategies. They express difficulties related to guidelines and the level of complexity of teaching tasks.

Functional teaching style: the high scores justify the priority of content application as a response to the necessary theory-practice linkage and its translation into professional performance modes. They reflect the importance of the precise orientation of teaching tasks in relation to objectives and expected outcomes.^(4,7) The low scores illustrate confidence and security regarding their preparation. They could also indicate the existence of contradictions related to the objective-subjective nature of teaching practice.

In summary, the analysis of the high percentages accounts for the relevance of the active role of the student and teamwork, and reinforces the need to foster analysis, comprehension, and interpretation of content for its subsequent application through professional performance modes. They recognize the role of evaluation in controlling the formative process and its results.⁽³⁾

The low percentages warn of the need to design and implement alternatives for a flexible teaching practice with better orientation and approach to essential content cores. They highlight the importance of addressing individual differences in learning styles according to the graduate's profile and professional performance modes.^(1,3)

Based on the diagnosis, it is necessary to emphasize the analysis of the prevalence of teaching styles in light of their impact on the formative process of the Medicine degree program.^(2,3)

The third year of the Medicine degree program, as an integrative link between basic and clinical sciences, plays an essential role since it systematically incorporates the planning and development of practical and evaluative activities based on medical practice problems.

Students face subjects that require exposure to real work situations and/or clinical case studies; therefore, they must practice experiential learning and knowledge socialization. All of this takes place in learning situations that respond to real professional practice conditions, where they carry out supervised but real clinical work. It requires a shift in reasoning from the conceptual to the operational, with the intentional and conscious linking of theoretical learning with the usefulness of practical work in the clinical area. Achieving meaningful learning in this area implies the ability to establish relationships and integrate theoretical and practical knowledge, both prior and new. This generates learning environments and seeks different outcomes from those of previous years.

In the authors' opinion, the results may be linked to the characteristics of the subjects that contribute to the main integrating discipline, centered on workplace-based education activities, and therefore, to the necessary intentional work in relation to the skills that contribute to professional performance modes.^(3,4)

Teachers of these subjects have professional experience in medical care, and their teaching activities have a significant practical component, within which the student must be able to integrate and apply the system of knowledge and skills derived from other subjects and disciplines.

The main integrating discipline requires intentional work by the teacher to favor the appropriation of content, which must be consciously applied to the different learning situations, beyond rote memorization procedures. This requires teaching tasks that promote

initiative, creativity, and cognitive independence—qualities necessary for the practice of medicine with patients.^(3,4)

The prevalence of teaching style preferences configures a predominantly practical teaching profile, focused on the usefulness and immediate application of content. It reflects an educational practice that, based on its application, does not abandon the need for theoretical rigor and internal coherence in the teaching of medical sciences.

The characterization obtained favors experiential learning and the theory-practice linkage: essential competencies for the development of the future physician's professional performance modes.

Scientific contribution

It is materialized in the generation of a highly reliable baseline—an indispensable requirement for any evidence-based educational improvement cycle. The robustness of the instrument used made it possible to obtain a diagnostic profile that is not mere appreciation, but a detailed picture of the current state of the issue. The precise identification of predominant styles and preferences, as well as the limitations detected, constitute a strategic contribution for decision-makers. Thus, the study transcends description to become the scientific foundation for future intervention and teacher training programs.

CONCLUSIONS

The teaching styles in the main integrating discipline of the Medicine degree program at the University of Medical Sciences of Holguín were characterized. The diagnosis performed identified areas requiring attention, with a very high prevalence in the functional teaching style and a moderate prevalence in the open style, which strengthens autonomy and reflective learning. All of this is consistent with the demands of the main integrating discipline as scientific evidence for the design of pedagogical improvement programs focused on diversifying teaching styles.

BIBLIOGRAPHIC REFERENCES

1. Andrey Bernate J, Vargas Guativa JA. Desafíos y tendencias del siglo XXI en la educación superior. Ciencias Sociales [Internet]. 2020 [cited 12/03/2026];26:[aprox. 14 p.]. Available in: <http://www.redalyc.org/journal/280/28064146010.pdf>
2. Durante Montiel I, Cruz Montoya MJ. Retos actuales de la Educación Médica. RevSimCS [Internet]. 2023 [cited 12/03/2026];1:[aprox. 6 p.]. Available in: <http://revsimulacion.facmed.unam.mx./index.php/rscsfm/article/view/7>
3. Plan de Estudio E. Carrera Medicina. Comisión Nacional de carrera de Medicina. Universidad de Ciencias Médicas de La Habana [Internet]. La Habana: Minsap; 2019. Available in: <https://www.instituciones.sld.cu/inacv/files/2025/11/Plan-E-Medicina-.pdf>
4. Martínez Asanza D. Acerca de la educación en el trabajo, principio rector de la educación médica cubana. FEM [Internet]. 2021 [cited 12/03/2026];24(6):[aprox. 4 p.]. Available in: <http://scielo.isciii.es/scielo.php?script=sci:arttxt&pid=S2014-98322021000600325&Ing=es>
5. Renés P, Echeverry LM, Chiang MT, Rangel L, Martínez Geijo P. Estilos de enseñanza: un paso adelante en su conceptualización y diagnóstico. Rev Estilos de Aprendizaje [Internet]. 2013 [cited 12/03/2026];6(11):1-15. Available in: <http://www.dialnet.unirioja.es/servlet/articulo?codigo=4324304>
6. Figueroa Sandoval JF. Estilos de enseñanza de docentes del nivel avanzado de la carrera de Medicina en la Universidad de Guadalajara. Expresiones Médicas [Internet]. 2021 [cited 12/03/2026];9(2):[aprox. 16 p.]. Available in: <http://www.erevistas.uacj.mx/ojs/index.php/espemed/aeticle/view/4929>
7. Vega Roman EA, Arancibia Ávila P, Anabalón Anabalón Y. Impacto del estilo de enseñanza docente en el aprendizaje procedimental en estudiantes universitarios Chilenos. Estilos de Aprendizaje [Internet]. 2025 [cited 12/03/2026];18(35):[aprox. 15 p.]. Available in: <http://revistaestilosdeaprendizaje.com/estilosdeaprendizaje/es/article/view/5048>
8. Bou Sospedra C, González Serrano MH, Alguacil Jiménez M. Estudio de los estilos de enseñanza y aprendizaje desde la perspectiva de los tres agentes educativos: Alumnos, docentes y familiares. Retos [Internet]. 2021 [cited 12/03/2026];(39):[aprox. 17 p.]. Available in: <http://www.dialnet.unirioja.es/servlet/articulo?codigo=7595360>

9. Martínez Geijo P, Renés Arellano P. Estilos y enfoques de enseñanza. Estilos de Aprendizaje [Internet]. 2019 [cited 12/03/2026];12(24):28-41. Available in: <http://www.researchgate.net/publication/338913552>
10. Chipana Lymachi F. Dinámica del proceso enseñanza-aprendizaje en educación superior. Ciencia Latina [Internet]. 2022 [cited 12/03/2026];6(1):[aprox. 12 p.]. Available in: <http://ciencialatina.org/index.php/cienciala/article/view/1827>
11. Yana N, Adco H, Puño L, Yana M, Alanoca R. Estilos de Enseñanza y desempeños académicos en educación universitaria. Innova Educación [Internet]. 2021 [cited 12/03/2026];3(4):133-145. Available in: <http://www.dialnet.unirioja.es/servlet/articulo?codigo=8152445>
12. Montenegro-Mora LA, Saa-Rico WH. Claves para la comprensión de los estilos de enseñanza. Espacios [Internet]. 2025 [cited 12/03/2026];46(03):[aprox. 12 p.]. Available in: <http://0798-1015-espacios-46-03-325.pdf>
13. Chiang Salgado MT, Díaz Larenas C, Rivas Aguilera A, Martínez-Geijo P. Validación del Cuestionario Estilos de Enseñanza (CEE). Un instrumento para el docente de Educación Superior. Estilos de Aprendizaje [Internet]. 2013 [cited 12/03/2026];11(12):[aprox. 16 p.]. Available in: <https://www.redalyc.org/html/695/69529816008>
14. Aguilera Pupo E. Los estilos de enseñanza, una necesidad para la atención de los estilos de aprendizaje en la educación universitaria. Estilos de Aprendizaje [Internet]. 2012 [cited 12/03/2026];5(10):[aprox. 5 p.]. Available in: <http://dialnet.unirioja.es/servlet/articulo?codigo=4324205>
15. Ortiz Torres E. Los estilos de enseñanza y la investigación educativa. Didáctica y Educación [Internet]. 2013 [cited 12/03/2026];4(2):[aprox. 4 p.]. Available in: <http://dialnet.unirioja.es/servlet/articulo?codigo=6629791>

Conflict of interest statement

The authors declare that they have no conflict of interest.

Author contributions

Conceptualization: Liset Rodríguez Martínez

Data curation: Liset Rodríguez Martínez and Pedro Augusto Díaz Rojas

Formal analysis: Liset Rodríguez Martínez, Pedro Augusto Díaz Rojas, and Solvey del Río Marichal

Funding acquisition: Liset Rodríguez Martínez

Investigation: Liset Rodríguez Martínez and Pedro Augusto Díaz Rojas

Methodology: Liset Rodríguez Martínez and Pedro Augusto Díaz Rojas

Project administration: Liset Rodríguez Martínez

Resources: Liset Rodríguez Martínez and Pedro Augusto Díaz Rojas

Supervision: Pedro Augusto Díaz Rojas, Elizabeth K. Leyva Sánchez

Validation: Pedro Augusto Díaz Rojas, Elizabeth K. Leyva Sánchez

Writing – original draft: Liset Rodríguez Martínez

Writing – review & editing: Liset Rodríguez Martínez, Elizabeth K. Leyva Sánchez

This article is published under the [Creative Commons](#) licence