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Original article

Information literacy competencies in Family Medicine residents

Competencias informacionales en residentes de Medicina Familiar

Habilidades de alfabetização informacional em residentes de medicina de família

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ABSTRACT

Introduction: the absence of structured training in information literacy may result in professionals possessing fragmented knowledge. Residents must master research methods, optimize the effectiveness of their practice, and generate new knowledge.

Objective: to identify the information literacy competencies of Family Medicine residents at the "Adrián Sansaricq" Teaching Polyclinic in the municipality of Artemisa during the second period of the 2024–2025 academic year.

Methods: an observational, descriptive cross-sectional study was carried out. The study population consisted of 24 residents, and census sampling was used. The variables analyzed were: information needs, information searching, information use, information evaluation, information communication, and self-assessment elements. Data were collected using a questionnaire administered through the Google Forms tool.

Results: a total of 66.67% reported always or almost always requiring information for the development of their activities, with examinations being the main catalyst for information seeking. Printed books were routinely consulted by the entire sample. Only 45.83% were familiar with the services available on

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Infomed. *Google* Scholar was used by 95.83 % of the participants. Limitations were identified in advanced searching and information evaluation.

Conclusions: the information literacy competencies of the residents were considered fair. There is a need to implement educational strategies to strengthen their skills and attitudes, with particular emphasis on access to information sources and resources, mastery of specialized databases, and the use of bibliographic management tools.

Keywords: computer literacy; family and community medicine; information literacy; information seeking behavior.

RESUMEN

Introducción: la ausencia de una formación estructurada en alfabetización informacional puede derivar en que los profesionales posean conocimientos fragmentados. El residente debe dominar los métodos de investigación, optimizar la efectividad de su práctica y generar nuevos conocimientos.

Objetivo: identificar las competencias informacionales en los residentes de Medicina Familiar del Policlínico Docente “Adrián Sansaricq” en el municipio Artemisa durante el segundo período del curso 2024-2025.

Métodos: estudio observacional, descriptivo transversal. El universo estuvo conformado por 24 residentes y el muestreo fue censal. Las variables analizadas fueron: necesidades de información, búsqueda de la información, utilización de la información, evaluación de la información, comunicación de la información y elementos de autoevaluación. Para la recolección de los datos se aplicó un cuestionario mediante la herramienta *Google Forms*.

Resultados: 66,67 % reconoció requerir información siempre o casi siempre para el desarrollo de sus actividades y los exámenes fueron el principal catalizador para la búsqueda. Los libros impresos fueron explorados habitualmente por la totalidad de la muestra. Solo 45,83 % se encontraba familiarizado con los servicios disponibles en Infomed. Acudieron al motor *Google* Académico 95,83 %. Se identificaron limitaciones para la búsqueda avanzada y la evaluación de la información.

Conclusiones: las competencias informacionales de los residentes se consideraron regulares. Se identifica la necesidad de aplicar estrategias formativas que fortalezcan sus habilidades y actitudes, con especial atención al acceso a fuentes y recursos de información, al dominio de las bases de datos especializadas y al empleo de herramientas de gestión bibliográfica.

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Palabras clave: alfabetización digital; alfabetización informacional; conducta en la búsqueda de información; medicina familiar y comunitaria.

RESUMO

Introdução: a ausência de treinamento estruturado em letramento informacional pode levar a que os profissionais possuam conhecimentos fragmentados. O residente deve dominar métodos de pesquisa, otimizar a eficácia de sua prática e gerar novos conhecimentos.

Objetivo: identificar as competências informacionais dos residentes de Medicina de Família da Policlínica de Ensino "Adrián Sansaricq", no município de Artemisa, durante o segundo semestre do ano letivo de 2024-2025.

Métodos: estudo observacional, descritivo e transversal. A população do estudo foi composta por 24 residentes, e a amostragem foi censal. As variáveis analisadas foram: necessidades de informação, busca de informação, uso da informação, avaliação da informação, comunicação da informação e elementos de autoavaliação. Os dados foram coletados por meio de um questionário aplicado via Google Forms.

Resultados: 66,67 % dos residentes reconheceram que necessitam de informação sempre ou quase sempre para o desenvolvimento de suas atividades, sendo as provas o principal catalisador para a busca. Apenas 45,83% estavam familiarizados com os serviços disponíveis no Infomed. 95,83% utilizaram o mecanismo de busca *Google* Acadêmico. Foram identificadas limitações na busca avançada e na avaliação da informação.

Conclusões: as habilidades de letramento informacional dos residentes foram consideradas médias. Há necessidade de implementar estratégias de treinamento que fortaleçam suas habilidades e atitudes, com atenção especial ao acesso a fontes e recursos de informação, ao domínio de bases de dados especializadas e ao uso de ferramentas de gestão bibliográfica.

Palavras-chave: alfabetização digital; alfabetização informacional; comportamento de busca de informação; medicina familiar e comunitária.

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INTRODUCTION

The contemporary physician has the obligation to remain informed in order to perform successfully in the professional environment in which they practice. The growth of information and the increasing need to use it require precise mastery of how it is employed.[1] Today, the challenge is to train medical science professionals with competencies to manage information and generate knowledge, share their contributions, innovate, and collaborate.[2,3]

Information literacy (IL) is conceived as a continuous learning process that encompasses the domains of information, knowledge, and intelligence.[4] It constitutes a set of skills to identify information needs, as well as abilities and capacities to locate, evaluate, organize, communicate, and use information creatively and effectively.[5]

IL is intrinsically associated with lifelong learning and critical thinking—formal educational objectives that, at times, are not adequately integrated into curricula.[6]

In the health sector, IL is oriented toward the sustainability of processes through the empowerment of its actors, making it a task of great relevance and complexity.[7] It is considered both an opportunity and a necessity for professional practice and education, as it contributes to the building of an informed and ethical scientific community.[4] From this perspective, the timely and methodical use of information resources and sources by professionals is recognized as an essential condition to facilitate information and knowledge management processes in scientific research.[4,8–10]

Postgraduate education represents the culminating stage of professional training, a space in which knowledge is deepened to respond to current academic, social, and ethical demands. Professionals not only consolidate their expertise, but also acquire tools to transform their daily practice into a driver of innovation; however, this process requires more than the simple theoretical assimilation; it requires the development of the capacity to construct critical knowledge, integrating attitudes and learning that enable the effective application of what has been assimilated.

The absence of structured IL training during this period can result in professionals having outdated or fragmented knowledge. In this regard, the national and international scientific production that points out

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informational deficiencies in the health field is considerable, and the proposed solutions are varied.[4,11–13]

Thus, studies carried out in hospital institutions in Santiago de Cuba[5] and Matanzas[14] have revealed significant deficiencies among residents in training at the second level of care, which undermine the quality of their research.

Some authors[9,12,15,16] have proposed and developed training and postgraduate programs with the purpose of addressing the identified difficulties, updating knowledge, optimizing practices related to information processing and use, and increasing information competencies, with pertinent and satisfactory results.

This topic has been little explored in the context of Primary Health Care, a space where the Family Medicine resident must master research methods, optimize the effectiveness of their practice, and generate new knowledge. To achieve this, it is crucial that they fulfill the academic and research activities included in their training plan, such as the development of the research project for the completion of the specialty, the presentation of papers at scientific events, and the publication of scientific articles. However, the residency program in its workshops and courses on scientific research methodology does not specifically address fundamental elements for the development of an information culture.[17,18]

Although the need to implement training programs and carry out modifications regarding attitudes, knowledge, and the development of skills for the consolidation of information competencies in health sciences is emphasized, it is essential to initially identify which competencies are required by a specific group for their subsequent evaluation and accreditation.

For these reasons, the importance of identifying the deficiencies present in first-level care residents is emphasized, and consequently, training them to access, analyze, verify, and manage scientific information responsibly, reflectively, and consciously, as a contribution to their literacy and professional performance.

The objective of this article is to identify the information competencies of Family Medicine residents at the “Docente Adrián Sansaricq” Polyclinic, in the municipality of Artemisa, during the second period of the 2024–2025 course.

METHODS

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An observational, descriptive, and cross-sectional study was carried out to determine the information competencies of Family Medicine residents at the "Docente Adrián Sansaricq" Polyclinic in the municipality of Artemisa, during the second period of the 2024–2025 course, in the month of May. The universe consisted of 24 residents, and a census sampling was chosen by including all available cases that met the following criteria:

Inclusion criteria: residents enrolled in the specialty during the study period, who were not on maternity leave or temporary leave, who had an intelligent device for the application of the instrument, and who gave their consent to participate in the research.

Exclusion criteria: residents who chose not to participate in the study.

The variables considered in the analysis were: information needs, information seeking, information use, information evaluation, information communication, as well as elements of self-assessment.

For data collection, a questionnaire previously applied to university students[19] was used, which was adapted to the study context. For this purpose, items in each section were modified, deleted, and added, as well as the way questions were evaluated, with the aim of aligning the instrument with the particularities of the residents' performance.

In the initial section, a subsection on information needs was organized based on the original question about the need to search for information for research and study, reformulating it to explicitly cover clinical, teaching, and research activities, and expanding the response scale from three to five frequency categories. Likewise, the factors influencing information seeking (teachers, exams, professional training, others) were replaced with motivations more appropriate to the studied context, such as exams, academic assignments, professional updating, personal interest, and scientific research; the multiple-choice response format was maintained.

In the information-seeking subsection, the questions about the places visited to obtain information were retained, but the response options were adjusted to replace the Central Library and Faculty Library with the institutional library, and references to the classroom as a central space were removed, incorporating neutral formulations (teachers or tutors, peers).

The list of information sources was restructured: student-environment-specific media were removed, and sources directly linked to clinical practice and health information management were added, such as clinical records, technical regulatory documents, medical encyclopedias, digital libraries, proceedings of scientific events, and professional social networks. Additionally, items related to the training received at

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the university for working with information on the Internet and Intranet, the knowledge and use of generic search engines, and the way the student had learned to search for information were removed. At the same time, the question about databases was reformulated to include biomedical databases such as *PubMed,* Embase, Redalyc, DOAJ, and Dialnet.

In addition, new questions specific to the medical-information field were introduced, such as knowledge and use of Infomed resources (and the specific identification of its services), as well as the frequency of use of DeCS and MeSH descriptors, the development of advanced search equations, and the use of Boolean, proximity, range, and truncation operators; using five-category frequency scales (always to never).

Regarding information use, a specific subsection was defined that incorporated questions about respect for ethical and legal principles in the use of information and plagiarism; both were evaluated using frequency scales. The list of options on the use of reference managers was expanded, and a question was added on knowledge of the Vancouver citation style, as well as another to assess the frequency with which the resident applied it in their work.

In the information evaluation subsection, the criteria were reformulated and expanded; they were replaced with more rigorous options typical of critical reading in health, such as source authority, scope of the topic, timeliness, target audience, accuracy and validity, relevance for the consultation, objectivity, and ease of access; evaluation was maintained through multiple-choice selection.

Regarding information communication, dissemination means specific to the university context were replaced by the use of social networks: Facebook, Instagram, and X, and academic and professional profiles (Mendeley, ResearchGate, LinkedIn, ORCID), which were evaluated through multiple-choice selection.

In the self-assessment subsection, the questions were reformulated to focus on the resident's perception of their knowledge, skills, and attitudes in searching, using, evaluating, and communicating information, and on the importance of developing information competencies for their professional and academic performance. The question on the implementation of actions for competency development was modified to address the relevance of educational strategies during training.

The questionnaire was applied by the author using the *Google Forms* tool, and the link (https://forms.gle/8oYBCLtLj1HznG8X8) was sent to the *WhatsApp* group of the polyclinic residents

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for subsequent completion. The collected information was recorded in a database using *Microsoft Excel* 2022.

The research was approved by the Scientific Council and the Ethics Committee of the institution. The ethical principles established in the *Declaration of Helsinki*[20] were respected, and written informed consent was obtained from the participants who voluntarily collaborated in the study.

RESULTS

In the characterization of the studied population, it was determined that 25.00% of the residents were in the first year of the specialty, 33.33% were in the second year, and 41.67% in the third year.

Regarding information needs, 66.67% of respondents reported requiring information always or almost always for the development of their teaching, research, or clinical activities. Likewise, the entire sample identified exams as the main catalyst for information seeking, followed by academic assignments inherent to the study program (58.33%), professional updating (50.00%), personal interest (37.50%), and scientific research (25.00%).

Participants most frequently turned to their teachers or tutors (70.83%) and to the Internet to obtain information, while institutional sources, such as the library, were used with a noticeably lower frequency (29.17%).

According to the type of sources consulted (Fig. 1), printed books and brochures were regularly consulted by 100% of the sample. Similarly, medical encyclopedias and conferences were used by 75.00% in both cases. Clinical records and other sources (41.67%), particularly of a documentary type such as guides and manuals, were also examined more frequently. In contrast, sources that require the use of information and communication technologies are not regularly employed: academic databases (33.33 %) and electronic journals (20.83%).

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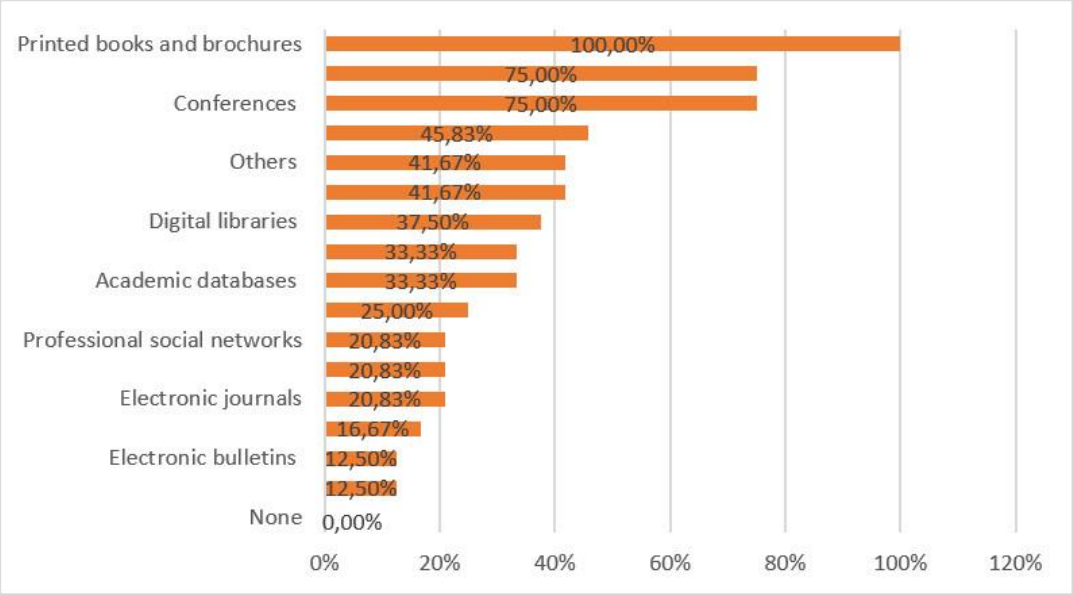

Fig.1 - Sources of information consulted by residents.

Less than half of the respondents (45.83%) were familiar with the resources and services available on the Infomed portal; among them, most accessed the Virtual Health Library and the health news section "Al Día", at rates of 90.1% and 72%, respectively (Fig. 2).

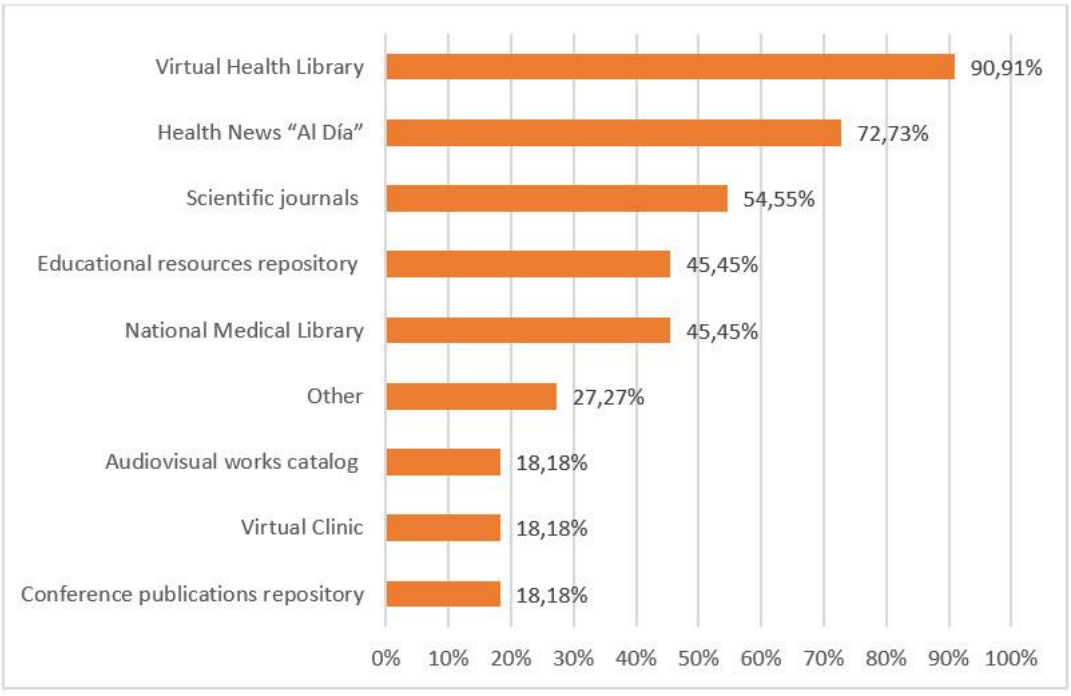

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Fig. 2 - Infomed resources and services consulted by residents.

Regarding knowledge and use of databases for information search (Fig 3), the survey results indicated that residents usually used the Google Scholar search engine (95.83%), followed by Scielo (58.33%) and Lilacs (50.00%).

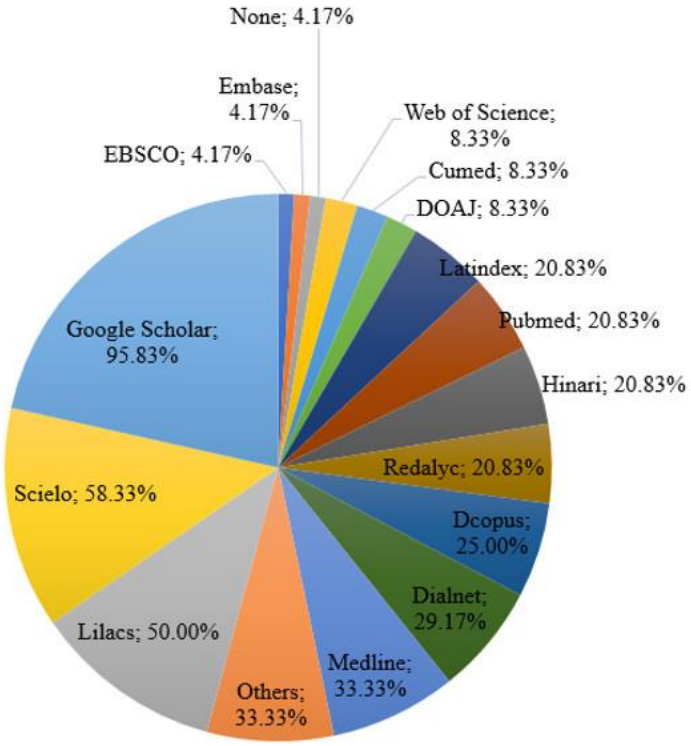

Fig. 3 - Databases consulted by residents.

It was observed that most respondents used advanced search strategies less frequently (Fig 4). Half of the residents stated that they never used the DeCS and MeSH thesauri, a situation similar to that reported with Boolean, proximity, or truncation operators (45.83%).

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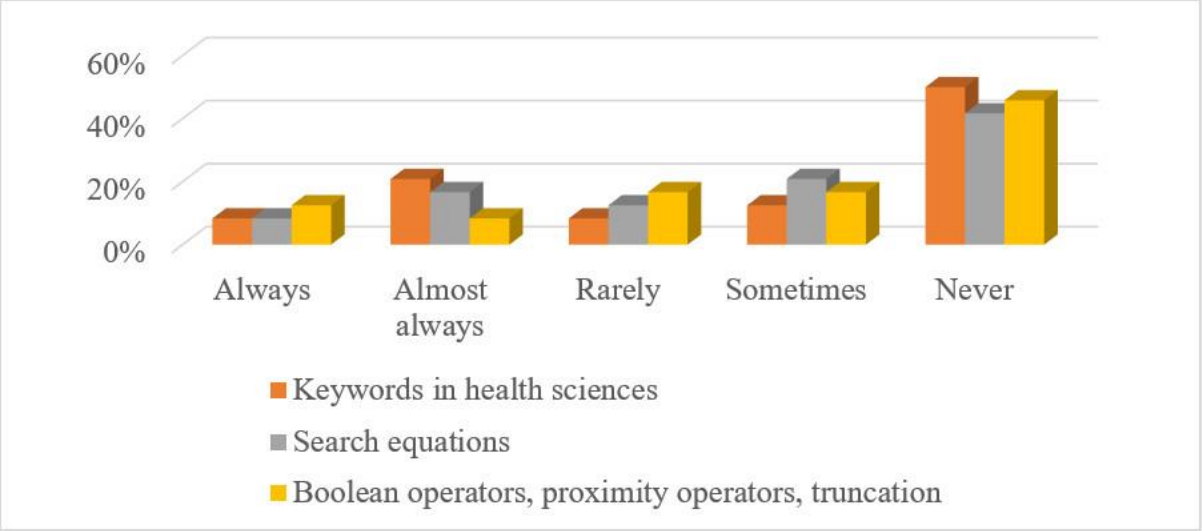

Fig. 4 - Advanced search strategies and frequency of use by residents.

When exploring responsible and ethical information practices (Fig. 5), it was found that the frequency of plagiarism (45.83%) and adherence to ethical principles (41.67%) fell into the "sometimes" category. However, it is important to note that a quarter of the residents stated they had never used information without proper attribution to the original source; 50.00% reported maintaining good ethical practices always or almost always.

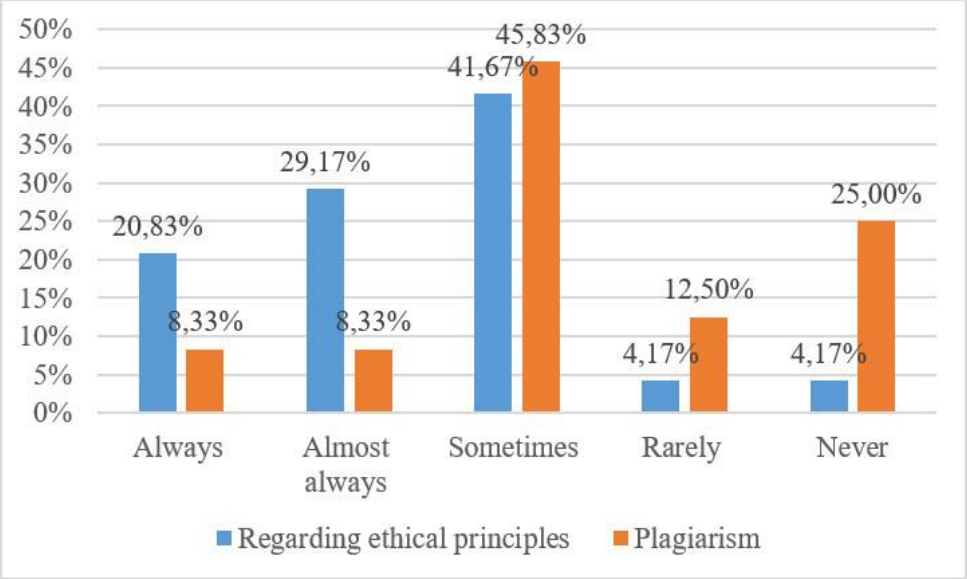

Fig. 5 - Frequency of use of information by residents in an ethical and responsible manner.

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Only 16.67 % of the sample used bibliographic managers for the compilation and organization of information; Zotero and Mendeley were the most well-known. Regarding bibliographic citation standards, 62.50% reported having knowledge of the Vancouver style, but only 13.33% of these always apply it correctly in their work.

When inquiring about the evaluation of information, 54.17 % of respondents stated that they were unfamiliar with the criteria for its assessment. Among those who responded affirmatively, the most frequently considered criteria were ease of access and currency (100% in both cases), relevance (72.73 %), accuracy (54.55%), and scope of the topic (45.45%).

With respect to information communication, responses showed variability. Of the participants, 41.67% reported sharing information rarely; 12.50% never do so, and 8.33% always communicate it. In this area, 79.17% stated that they use their social networks for information dissemination, with a greater preference for Facebook (78.95 %), Instagram (73.68 %), and other channels (63.16 %) such as messaging applications (WhatsApp and Telegram). Professional-oriented services such as LinkedIn (26.32%) and ResearchGate (15.79%) were used to a lesser extent.

Self-assessment of their knowledge, skills, and attitudes in searching for, using, evaluating, and communicating information yielded a significant number of responses in the fair and poor categories, with 41.67% and 33.33%, respectively (Fig. 6).

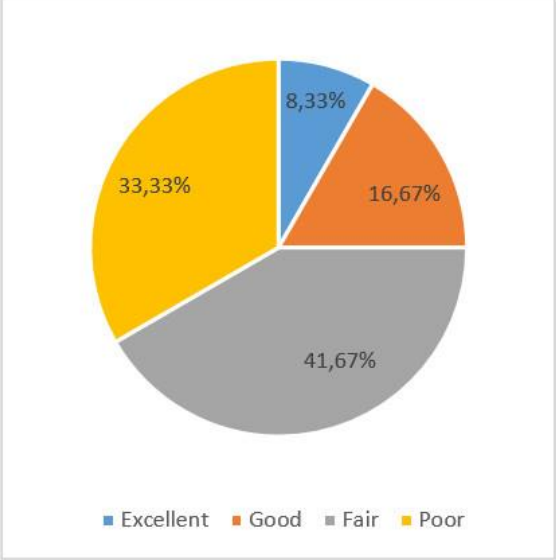

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Fig 6 - Self-assessment of information literacy skills by residents.

Finally, 91.67% of residents considered the development of information literacy skills relevant to their professional and academic performance. Similarly, 79.17% deemed the implementation of educational strategies during their training pertinent in order to improve these skills.

DISCUSSION

Although no attempt was made to establish a direct link between the level of information literacy competencies and the academic year completed, it is considered that the incorporation of educational strategies focused on information literacy (IL), integrated into training programs from the beginning of residency, could be a viable approach to identify strengths and address the educational gaps of this group. If this practice is maintained over time, its effects would be beneficial both for residents and for the institution, as it would contribute to improving the quality of research conducted at the primary health care level, stimulate grassroots scientific production, increase institutional visibility, and enable the achievement of relevant outcomes in scientific events and thesis work.

Along these lines, the study by García-Martín et al.,[4] conducted in Ciego de Ávila, showed high levels of satisfaction, self-management, and self-directed learning among residents in Angiology and Vascular Surgery after the implementation of an information literacy course focused on the search for and use of scientific information through a virtual teaching–learning environment. Similarly, Domínguez-Aroca et al.[13] demonstrated that collaboration between library staff and faculty can promote the acquisition of information literacy competencies and information management by students, as a significant improvement was observed between initial and final learning assessments across various health science disciplines.

Information literacy promotes the development of information competencies, whose purpose is to establish a constructive relationship between individuals and information. This competency ranges from the identification of information needs to the use of information and communication technologies and content, thereby fostering the critical use of information for decision-making in professional, social, and personal contexts.[8]

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Despite the fact that the results reflect a recurrent use of digital media to meet information needs, it is also observed that consultation of printed literature remains a widespread practice. This behavior differs from what was reported by Alonso-Vázquez et al.[5] and other authors.[23,24] Although books represent a high-quality source of knowledge, it is considered that updates to their printed editions usually occur slowly. Consequently, the available printed texts may contain outdated information. In contrast, the use of continuously updated sources offering more recent content, such as electronic journals and newsletters, is limited, which highlights the need to promote greater familiarity with these resources.

In another vein, the findings revealed a rather discouraging panorama regarding knowledge and use of digital tools and information platforms. Fewer than half of the participants identified the Infomed portal as a means of accessing scientific information, which is concerning and underscores the lack of a solid foundation in the use of national sources, as evidenced in studies conducted at both undergraduate and postgraduate levels.[16,25] Having broad knowledge of the resources and services offered by the national health network constitutes a key element in promoting information consultation and continuous, reliable updating in the field of medical education.

Therefore, the need to provide proper guidance on the spaces where high-quality scientific information can be obtained becomes evident. Although Google Scholar represents an accessible and easy-to-use tool, its capabilities for advanced searches or for filtering high-quality sources are limited compared to biomedical databases. Excessive reliance on general search engines may reflect the urgency of strengthening information literacy competencies, with training oriented toward the use of more rigorous and specialized sources.[26]

In the section corresponding to the use of advanced search strategies, the results reveal a general lack of knowledge about the potential and functions of descriptors and operators. This finding is consistent with what was reported by Ramos-Bermúdez and Ramos-Calás[21] and by Alonso-Vázquez et al.,[5] although it differs from that reported by Vargas-Echeverría and Pech-Argüelles[24] and Plasencia-Urizarri and Almaguer-Mederos.[27] While the heterogeneity of the populations included in these studies is acknowledged, deficiencies persist in the ability to redefine search strategies and select appropriate terms among students and professionals.

When contrasting the results related to the ethical and responsible use of information, lower values were observed compared to those obtained by other groups of residents from different specialties. (24,28) From this perspective, the principle is assumed that the development of training strategies fosters

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residents' autonomy, allows them to project themselves on a personal level, and promotes the process of learning–appropriating knowledge. This translates into a self-transformation that entails intentional modifications in their thoughts, beliefs, behaviors, and ways of reasoning, leading to their personal and professional growth.[4]

Most of the respondents stated that they were familiar with the Vancouver standards; however, the lack of mastery in their application for citation and referencing constitutes a critical issue, given that this style is the most widely used in biomedical literature and the one preferred by Cuban medical journals. Accordingly, the limited knowledge and use of reference management software reveal shortcomings in essential skills for organizing, using, and citing scientific sources, which is consistent with what has been reported among university students, both Cuban and foreign.[13,21] Strengthening these competencies is indispensable for improving research quality, as it facilitates access to, organization of, and efficient use of scientific literature.

Several publications are consistent with the findings of the present study in indicating that information evaluation represents a cross-cutting challenge in training processes.[5,13,24,27] From the author's perspective, this capacity requires skill, critical judgment, and a reflective attitude to discern which data are relevant and reliable. It should not be regarded as a fully consolidated competency, but rather as a skill that requires constant updating, accompanied by training processes and continuous practice.

According to González-García et al.,[3] the virtualization of training in the context of specialization in Family Medicine is closely related to technological advances, which have fostered the creation of new educational environments. In these spaces, it is essential to systematically disseminate scientific results, incorporate research findings into teaching and clinical practice, and use various communication media to socialize biomedical scientific production.

In this regard, the exchange of information contributes significantly to professional development. A favorable disposition toward knowledge dissemination constitutes a key element for strengthening collaborative learning environments and consolidating academic communities within health institutions;[29] however, a gap persists between the widespread use of information and communication technologies and the effective practice of scientific dissemination.

Although most respondents use social networks, the preferred platforms tend to be oriented toward entertainment or instant messaging. A study conducted among doctoral candidates showed that only 58%

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reported having sufficient skills to present information, while a smaller group expressed the need for specific training in the use of the academic social network ResearchGate.[27]

In a broader sense, health professionals trained in the digital era do not receive adequate training in technological competencies, which may lead to limited or inappropriate use of the available digital tools.[10] Within this framework, the author argues that any social network can be used as a means to share information and knowledge, provided that ethical principles related to content dissemination are respected, especially when sensitive or confidential material is involved. Nevertheless, it is essential to promote the professional use of networks that encourage collaboration and increase the visibility of research activity.

Strengthening information literacy enables citizens to develop autonomy and adopt procedures and attitudes aimed at recognizing their information needs, defining them accurately, locating and selecting them through different sources and channels, as well as structuring and communicating them appropriately, in accordance with the ethical, social, and economic aspects involved. These competencies are essential in the current context; new information, when integrated with prior knowledge, generates syntheses that contribute to the construction of knowledge.[8]

The residents expressed the need to develop competencies related to the appropriate use of information, thereby promoting teaching strategies oriented toward their instruction. This view is consistent with that reported by various authors,[4,5,24,30] who emphasize that, at the postgraduate level, information literacy acquires particular relevance and that training spaces that facilitate its development should occupy a priority place within study programs.

Within the context of the ongoing digitalization process, the modern physician is required to possess basic digital competencies, including data literacy and an understanding of the fundamental principles of digital systems; therefore, digital training must be integrated as an essential component of continuing medical education. In the case of residents, these training actions should be incorporated into the curriculum through mandatory courses and included in individual work plans.[10] From this perspective, it is essential that future specialists assume an active role in their own process of transformation, so that the development of skills and attitudes in the use and management of scientific information constitutes the basis for the appropriation and generation of new knowledge.[12]

Among the limitations of the study is the limited availability of published research specifically addressing this topic within the field of Family Medicine, which made it difficult to carry out direct comparisons

between the results obtained and those reported in other studies on information literacy competencies. In addition, the small sample size may have limited the ability to generalize the findings to other groups of residents in this specialty. Likewise, the cross-sectional design of the study prevented the establishment of causal links between residents' academic and professional performance and their information-related skills.

CONCLUSIONS

In general terms, the information literacy competencies of Family Medicine residents were considered fair. The need to apply training strategies that strengthen their skills and attitudes was identified, with special attention to access to information sources and resources, mastery of specialized databases, and the use of bibliographic management tools. Likewise, it is essential to promote a critical, responsible, and ethical culture that contributes to improving educational quality and scientific production. Close collaboration between faculty and library staff, together with the use of digital platforms aligned with current demands, may prove to be a relevant, motivating, and beneficial pathway for training from the early years of the specialty. This study provides a characterization of information literacy competencies among Family Medicine residents, which may serve as a basis for informed decision-making and for the design of programs aimed at developing these competencies during the training of future specialists at the primary health care level.

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Conflict of interest

The author declares no conflict of interest.

Author's contributions

Jonatham Veliz-González: conceptualization, investigation, methodology, project administration, supervision, validation, visualization, writing, review, and editing.

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