BOHR International Journal of General and Internal Medicine
2024, Vol. 3, No. 1, pp. 1–10
DOI: 10.54646/bijgim.2024.21
www.bohrpub.com

RESEARCH

Exploring evidence-based decision-making competencies among homoeopathic medical students: insights from a cross-sectional pilot investigation

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Received: 09 November 2023; **Accepted:** 11 December 2023; **Published:** 19 January 2024

Background: The healthcare landscape requires integrating traditional principles with evidence-based practices. This study addresses the vital need to assess and enhance Evidence-Based Decision-Making (EBDM) understanding among students in homeopathic medicine.

Challenge: Homeopathic medicine, rooted in tradition, must align with modern healthcare standards emphasizing evidence-based approaches. Bridging this gap is crucial for optimizing patient outcomes and maintaining the relevance of homeopathic practices.

Objective: This study aimed to scrutinize the comprehension and implementation of EBDM among undergraduate homeopathic medical students. Identifying discrepancies in perception and actual understanding, the goal was to outline interventions enhancing EBM competence and harmonizing traditional and evidence-based practices.

Methodology: Using a cross-sectional design, data were collected through a questionnaire distributed via Google Forms. 203 undergraduate students from Vinayaka Mission's Homoeopathic Medical College participated, providing insights into their EBDM grasp, ability to discern reliable evidence sources, understanding of research study designs, and self-reported EBM practices.

Expected results: Initial analyses reveal a misalignment between perceived and actual understanding of EBDM concepts. Academic progression correlates with increased use of evidence-based resources and improved statistical literacy. Barriers include resource constraints, insufficient critical appraisal skills, and time limitations. Facilitators include user-friendly resources, institutional policies, curriculum integration, and mentor support. Anticipated outcomes stress the need for tailored educational interventions, enhancing EBM competence, and integrating EBM principles into traditional homeopathic practice.

Keywords: cross-sectional design, evidence-based decision-making (EBDM), homoeopathy medical system, questionnaire survey, traditional practice

1. Introduction

Homoeopathy, as a medical discipline, is based on the principles of individualization, minimum dose, and the law of similia. Homoeopathic medical system has been practiced for centuries and continues to attract a significant number of patients seeking alternative and complementary healthcare options (1). In the context of modern healthcare, evidence-based decision-making has gained increasing importance to ensure effective and safe patient care. (2) The integration of evidence-based medicine principles into homoeopathic practice can enhance treatment outcomes and foster the integration of homoeopathy within the broader healthcare system. While evidence-based decision-making has been extensively studied in conventional medicine, its understanding and practice among homoeopathic medical students remain underexplored (3). Homoeopathic medical education plays a crucial role in shaping the future practitioners who will deliver homoeopathic care to patients. This study focuses on minimizing the disparity by performing a cross-sectional study to evaluate the understanding and practice of evidence-based decision-making (EBDM) amid students of homeopathic medical sector. This study assesses future homoeopathic practitioners' knowledge, critical appraisal skills, understanding of research study designs, and self-reported practice of evidence-based decision-making. The intent is to gain valuable insights into their current level of competence in this domain (4).

TABLE 1 | Demography of homoeopathic medical students according to age.

Age	Frequency	Percentage
Under 20	47	23%
20–25	156	77%

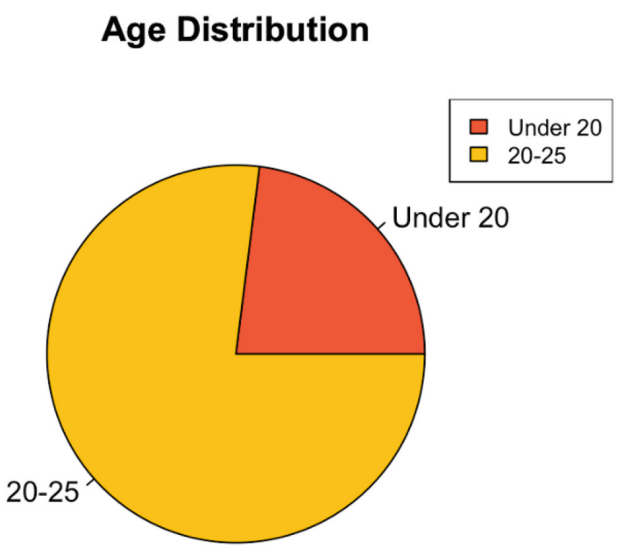

FIGURE 1 | Pie chart showing the age distribution of homoeopathic medical students.

TABLE 2 | Demography of homoeopathic medical students according to gender.

Gender	Frequency	Percentage
Male	148	27.10%
Female	55	72.90%
Prefer not to say	0	0

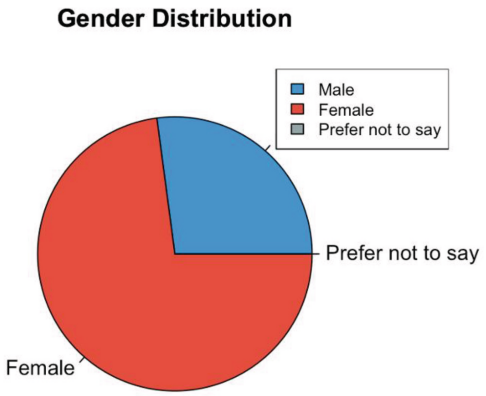

FIGURE 2 | Pie chart showing the gender distribution of homoeopathic medical students.

TABLE 3 | Distribution of homoeopathic medical students across different academic years.

Academic Year	Frequency	Percentage
First Year	30	14.78%
Second Year	43	21.18%
Third Year	52	25.62%
Fourth Year	76	37.44%

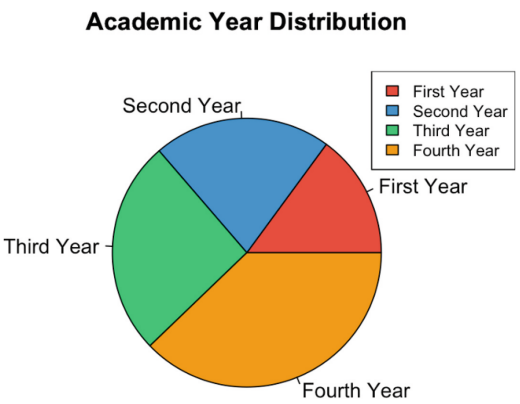

FIGURE 3 | Pie chart showing the distribution of homoeopathic medical students across different academic years.

TABLE 4 | Students' perspectives on EBM, evidence, RCTs, p-values, and self-assessment.

Students' Perspectives on	Affirm	Strongly Affirm	Neutral	Disaffirm	Strongly Disaffirm
Perspectives on EBM n(%)	45 (22%)	65 (32%)	70 (34%)	14 (7%)	9 (4%)
Perception of Evidence n(%)	54 (27%)	41 (20%)	85 (42%)	15 (7%)	8 (4%)
Perspectives on RCTs n(%)	47 (23%)	46 (23%)	82 (40%)	20 (10%)	8 (4%)
Significance of p-values n(%)	51 (25%)	37 (18%)	97 (48%)	15 (7%)	3 (1%)
Self-Assessment of EBM Principles n(%)	26 (13%)	12 (6%)	106 (52%)	47 (23%)	12 (6%)

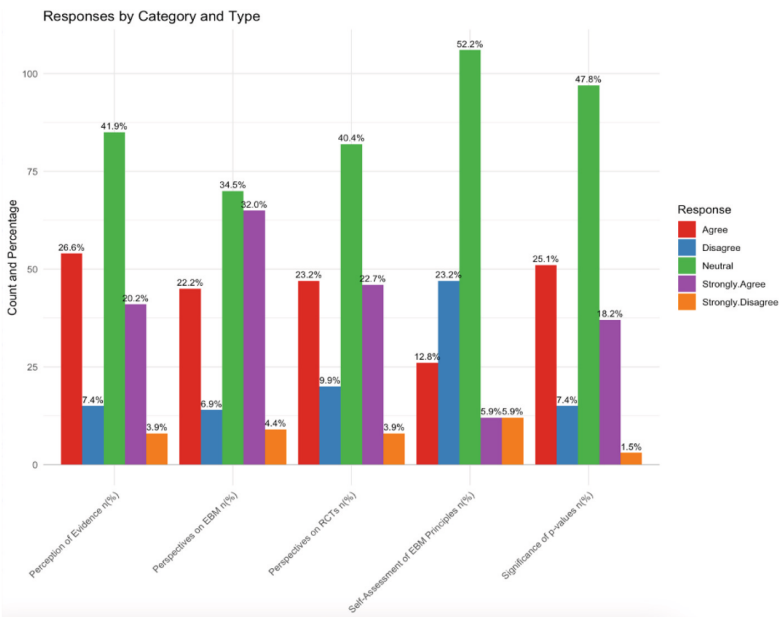

FIGURE 4 | Bar chart depicting perspectives on EBM, evidence, RCTs, p-values, and self-assessment.

1.1. Literature review

Planning, carrying out, assessing, and disseminating decisions related to public health programs are all done using evidence-based decision-making (EBDM), which incorporates the best available scientific findings. This approach can result in more efficient use of limited resources and better community health outcomes (5). To achieve state and national objectives for improved population health, more widespread adoption of evidence-based strategies has been recommended (6). EBDM is the systematic integration of the most reliable research findings, the knowledge of practitioners, and the specific features, requirements, and preferences of the community. EBDM enables practitioners to effectively implement evidence-based public health strategies and customize their approach to suit the specific

TABLE 5 | Students' responses on formal education or training in evidence-based medicine (EBM) principles during homoeopathic studies.

Response	Frequency	Percentage
Yes	66	32.50%
No	69	34%
Maybe	68	33.50%

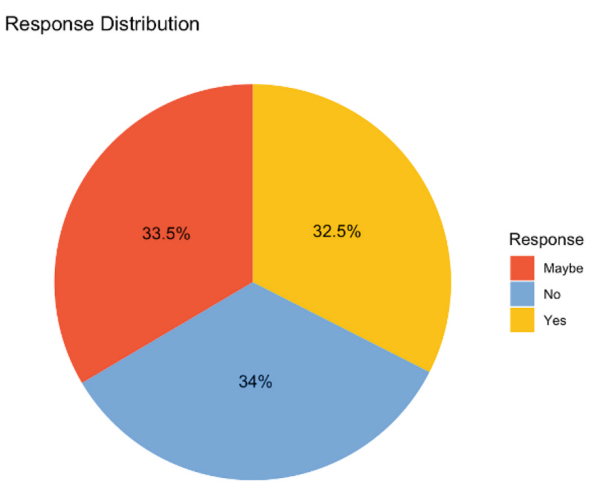

FIGURE 5 | Pie chart depicting students' formal education or training in evidence-based medicine (EBM) principles during homoeopathic studies.

TABLE 6 | Students' familiarity with evidence-based medicine (EBM) concepts.

EBM Concept	Not familiar	Slightly familiar	Moderately familiar	Quite familiar	Very familiar
Systematic reviews and meta-analyses	30	65	80	14	14
Randomized controlled trials (RCTs)	35	62	73	17	16
Bias and confounding	32	64	81	16	10
Appraisal of scientific literature	31	63	80	21	8
Clinical practice guidelines	20	51	88	21	23

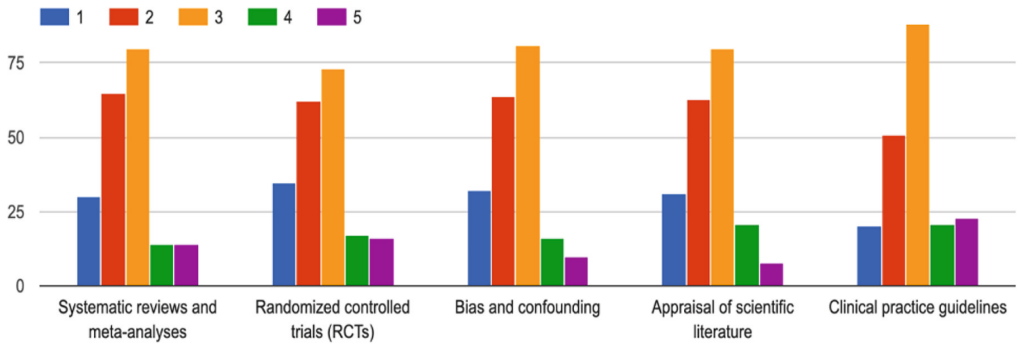

FIGURE 6 | Bar chart depicting students' familiarity with evidence-based medicine (EBM) concepts.

needs of their communities. EBDM enables agencies to optimize the allocation of their limited financial and manpower resources, while also being morally justifiable (7). Inadequate consideration of evidence in health sector decision-making can result in ineffective, inefficient, and unfair health systems. Rather, the benefits of EBDM include implementing interventions that are cost-effective, making the best use of scarce resources, boosting customer satisfaction, reducing harm to individuals and society, obtaining better health outcomes for both, and improving the efficacy and efficiency of public health initiatives (8).

2. Methodology

Research Design: This research endorses a cross-sectional study, enabling a contemporary illustration of homoeopathic medical students' understanding and application of evidence-based decision-making.

Population: The study population encompassed undergraduate homoeopathic medical students ranging from their first year to their final year of study, who were enrolled at Vinayaka Mission's Homoeopathic Medical College.

Survey Tool: Data collection transpired through a meticulously constructed structured questionnaire employing the Google Forms platform. This tool ensures efficient data capture and participant engagement through its user-friendly interface.

Sample Size and Sampling Method: A voluntary participation strategy yielded 203 responses, gathered through WhatsApp groups exclusively dedicated to the student body. Convenience sampling was used to capture willing participants. Responses were collected digitally using Google Forms, accessible from 10/08/2023 to 12/08/2023, spanning three days.

Ethical Considerations: Given the non-inclusion of sensitive inquiries, the study warranted no ethical clearance. The survey was construed as a pilot study in this regard.

Questionnaire Design: The questionnaire comprised sections expounding on various dimensions. These included the assessment of participants' comprehension of evidence-based medicine (EBM) principles, recognition of reliable evidence sources, grasp of research study designs, integration of EBDM in clinical practice, attitudinal dimensions toward EBM, challenges and enablers in EBM adoption, and demographic particulars.

Data Collection: Dissemination of the structured questionnaire transpired through electronic channels,

TABLE 7 | Students' perception of reliable sources for evidence-based information.

Source	Frequency	Percentage
PubMed	42	21%
Cochrane Library	32	16%
National Guidelines and Protocols	67	33%
Research journals specific to Homoeopathy	128	63%
Internet search engines (e.g., Google)	87	43%
Social media platforms	51	25%
None	18	9%
Other	6	4%

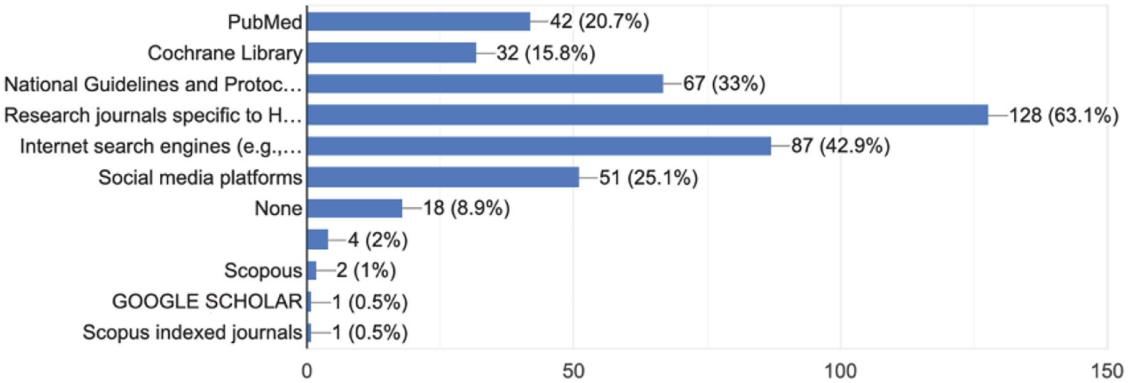

FIGURE 7 | Bar chart depicting students' perception of reliable sources for evidence-based information.

notably email and WhatsApp. Responses were anonymized to uphold confidentiality.

Data Analysis: The amassed data underwent meticulous scrutiny through suitable analytical techniques with the help of analytical tools such as IBM SPSS Statistics and MS Excel. Descriptive statistics were harnessed to unravel patterns, complemented by chi-square tests, regression analysis, ANOVA, and Correlation Coefficient computations for discerning associations.

Interpretation of Findings: The analysis of data was harnessed to decipher cogent insights. An incisive synthesis of these insights prompted a structured interpretation of implications for homoeopathic education and praxis. Recommendations were crystallized for potential areas of intervention.

Limitations: Recognizing the constraints inherent in the study, notably the limited sample size and inherent bias in convenience sampling, a circumspect circumscription of the generalizability of findings beyond the confines of the institution was appraised in line with these limitations.

3. Results

Data Evaluation: IBM SPSS Statistics and Microsoft Excel were employed for the evaluation and statistical analysis in this study. These tools were utilized to conduct comprehensive statistical evaluations and analyses of the gathered data.

TABLE 8 | Utilization of evidence-based resources in clinical practice.

Response	Frequency	Percentage
Very Frequently	22	10.80%
Frequently	28	13.80%
Occasionally	106	52.20%
Rarely	31	15.30%
Never	16	7.90%

Demographic Profile: The surveyed homoeopathic medical students from Vinayaka Mission's Homeopathic Medical College, Salem, exhibited a diverse demographic distribution. Among the respondents, 23% were under 20 years of age, 77% fell within the age bracket of 20–25 (**Table 1**; **Figure 1**).

Gender Distribution: Gender distribution revealed that 72.90% of respondents identified as female, while 27.10% identified as male. No respondents preferred not to disclose their gender (**Table 2**; **Figure 2**).

Academic Year Distribution: The distribution of homoeopathic medical students across different academic years indicated a balanced representation. The largest proportion was in the fourth year, constituting 37.44% of respondents. Other academic years were represented as

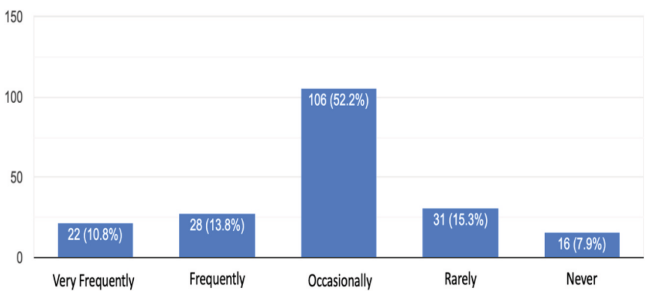

FIGURE 8 | Bar chart depicting utilization of evidence-based resources in clinical practice.

TABLE 9 | Preferred evidence-based resources for clinical decision-making.

Evidence-Based Resource	Frequency	Percentage
Clinical Practice Guidelines	134	66.0%
Systematic Reviews	66	32.5%
Randomized Controlled Trials	60	29.6%
Cochrane Database	30	14.8%
None	26	12.8%
Other	3	1.5%

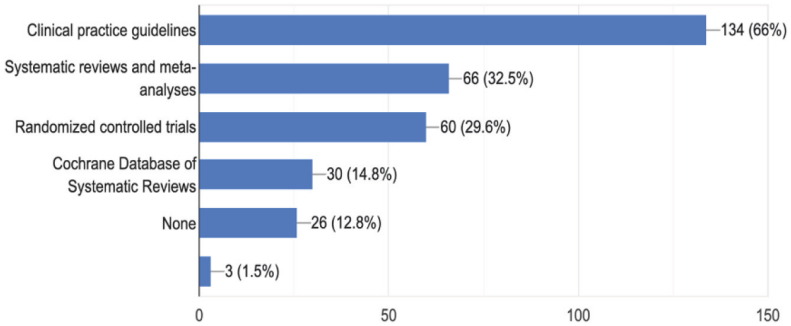

FIGURE 9 | Bar chart depicting preferred evidence-based resources for clinical decision-making.

TABLE 10 | Participant responses on various aspects of evidence-based medicine.

	Affirm	Strongly Affirm	Neutral	Disaffirm	Strongly Disaffirm
Impact of EBM on Patient Outcomes n(%)	49 (24.1%)	44 (21.7%)	86 (42.4%)	14 (6.9%)	10 (4.9%)
Challenges of Keeping Up with Latest Evidence n(%)	54 (26.6%)	23 (11.3%)	108 (53.2%)	12 (5.9%)	6 (3.0%)
Confidence in Critically Appraising Research Evidence n(%)	49 (24.1%)	23 (11.3%)	111 (54.7%)	12 (5.9%)	8 (3.9%)

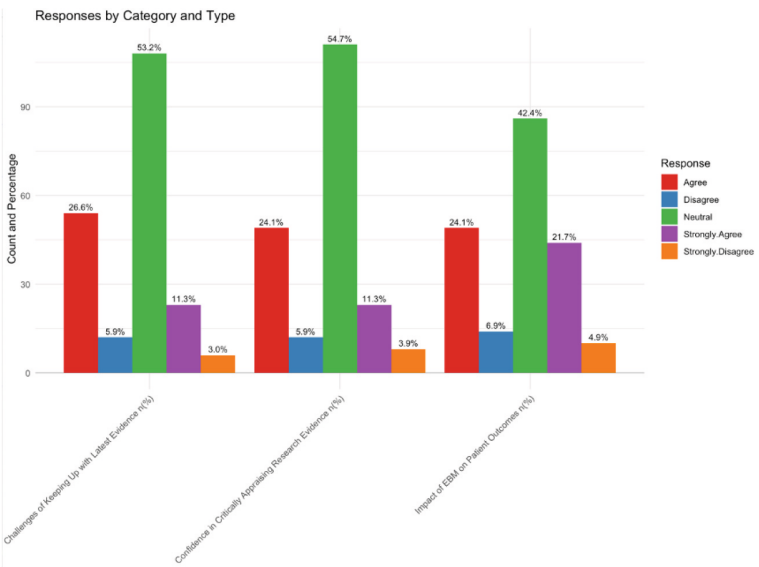

FIGURE 10 | Bar chart depicting participants' responses on various aspects of evidence-based medicine.

follows: third year (25.62%), second year (21.18%), first year (14.78%) (Table 3; Figure 3).

Perspectives on Evidence-Based Medicine (EBM): When assessing respondents' perspectives on EBM principles, 32% strongly affirmed and 22% affirmed that EBM is integral to clinical practice. However, 34% held a neutral stance, while 7% disaffirmed and 4% strongly disaffirmed with the importance of EBM (Table 4; Figure 4).

Perception of Highest Level of Evidence -Systematic Review and Meta-Analysis: Twenty percent of respondents strongly affirmed and twenty-seven percent affirmed that systematic reviews and meta-analyses provide the greatest degree of evidence. But 42% of respondents held this opinion to be neutral, 7% disaffirmed, and 4% strongly disaffirmed (Table 4; Figure 4).

Perspectives on Gold Standard – Randomized Controlled Trials (RCTs): On the gold standard for evaluating treatment

TABLE 11 | Students' self-assessment of statistical knowledge and skills related to evidence-based medicine.

Level of Statistical Knowledge	Frequency	Percentage
None	43	21.2%
Basic	69	34.0%
Intermediate	83	40.9%
Advanced	8	3.9%

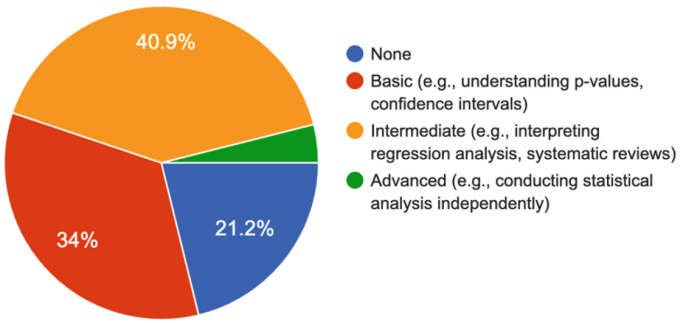

FIGURE 11 | Pie chart depicting students' self-assessment of statistical knowledge and skills related to evidence-based medicine.

effectiveness, 23% affirmed and 23% strongly affirmed that RCTs hold primacy. However, 40% remained neutral, while 10% disaffirmed and 4% strongly disaffirmed with this perspective (**Table 4**; **Figure 4**).

P-value Significance in Research Studies: When appraising *p*-value significance in research, 25% affirmed and 18% strongly affirmed on their importance. Yet, 48% were neutral, while 7% disaffirmed and 1% strongly disaffirmed with their significance (**Table 4**; **Figure 4**).

Self-Assessment of Understanding of EBM Principles: Participants' self-evaluation of their general grasp of EBM principles indicated that 13% confirmed, 6% strongly confirmed, 52% were neutral, 23% disagreed, and 6% strongly disagreed regarding their understanding (**Table 4**; **Figure 4**).

Formal Education or Training in EBM Principles: A notable fraction of respondents (32.50%) had received formal education or training in EBM principles during their homoeopathic studies. In contrast, 34% had not received such education, and 33.50% were uncertain (**Table 5**; **Figure 5**).

TABLE 12 | Students' interest in receiving further training in statistical analysis for evidence-based decision making.

Response	Frequency	Percentage
Yes	145	71.4%
No	14	6.9%
Maybe	44	21.7%

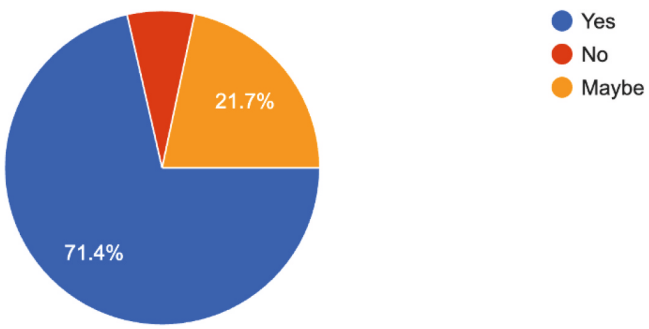

FIGURE 12 | Pie chart depicting students' interest in receiving further training in statistical analysis for evidence-based decision-making.

Familiarity with EBM Concepts: Regarding familiarity with various EBM concepts, students reported varying levels of proficiency: 21.2% claimed no familiarity, 34% basic familiarity, 40.9% intermediate familiarity, and 3.9% advanced familiarity. Concepts like systematic reviews and meta-analyses, randomized controlled trials (RCTs), bias and confounding, appraisal of scientific literature, and clinical practice guidelines were assessed (**Table 6**; **Figure 6**).

Perception of Reliable Sources for Evidence-Based Information: Participants perceived research journals specific to Homoeopathy (63%) and internet search engines (43%) as primary sources for evidence-based information. PubMed (21%), Cochrane Library (16%), and social media platforms (25%) were also considered, while 9% reported no reliable sources (**Table 7**; **Figure 7**).

Utilization of Evidence-Based Resources in Clinical Practice: Respondents' utilization of evidence-based resources in clinical practice was reported as follows: 10.8% very frequently, 13.8% frequently, 52.2% occasionally, 15.3% rarely, and 7.9% never (**Table 8**; **Figure 8**).

Preferred Evidence-Based Resources for Clinical Decision-Making: Student's preferences for evidence-based resources in clinical decisions were as follows: clinical practice guidelines (66%), systematic reviews (32.5%), RCTs (29.6%), and the Cochrane Database (14.8%) (**Table 9**; **Figure 9**).

Impact of Evidence-Based Medicine on Patient Outcomes: Regarding the impact of EBM on patient outcomes, 42.4% were neutral, 24.1% affirmed, 21.7% strongly

TABLE 13 | Main barriers encountered by students in implementing evidence-based medicine in clinical practice.

Barrier	Frequency	Percentage
Lack of time	76	37.4%
Limited access to reliable resources	79	38.9%
Lack of knowledge and skills in critical appraisal	93	45.8%
Resistance from patients or colleagues	49	24.1%
Insufficient support from supervisors or institutions	42	20.7%
None	26	12.8%
Others	2	1.0%

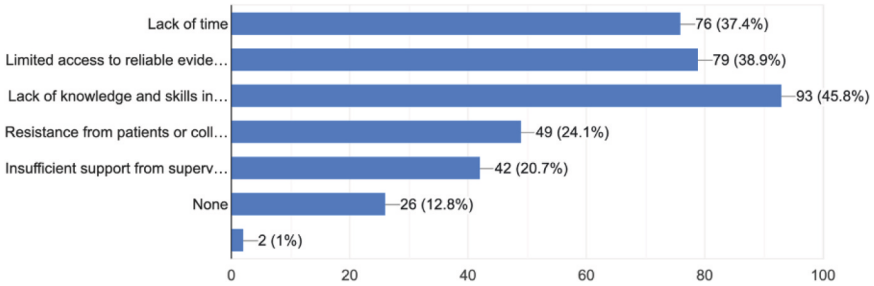

FIGURE 13 | Bar chart depicting main barriers encountered by students in implementing evidence-based medicine in clinical practice.

TABLE 14 | Factors facilitating utilization of evidence-based medicine in clinical practice.

Facilitating Factors	Frequency	Percentage
Availability of user-friendly evidence-based resources	91	44.8%
Supportive institutional policies and guidelines	73	36.0%
Integration of evidence-based medicine training in the curriculum	74	36.5%
Positive attitudes and encouragement from mentors	81	39.9%
Collaborative work with other healthcare professionals	49	24.1%
None	33	16.3%
Others	1	0.5%

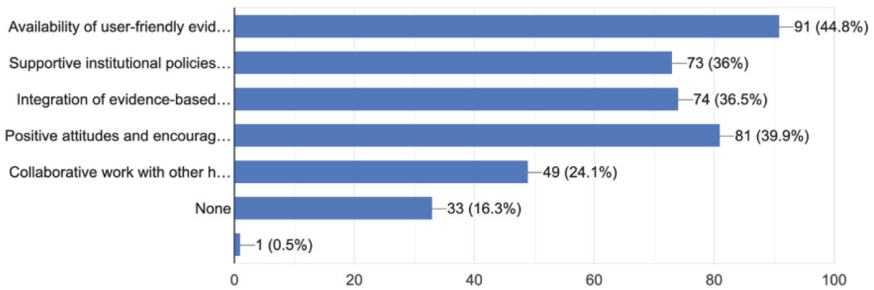

FIGURE 14 | Bar chart depicting factors facilitating utilization of evidence-based medicine in clinical practice.

affirmed, 6.9% disaffirmed, and 4.9% strongly disaffirmed (**Table 10**; **Figure 10**).

Challenges of Keeping Up with Latest Evidence due to Time Constraints: Addressing challenges related to staying updated with evidence, 26.6% affirmed, 11.3% strongly affirmed, 53.2% were neutral, 5.9% disaffirmed, and 3.0% strongly disaffirming due to time constraints (**Table 10**; **Figure 10**).

Confidence in Critically Appraising Research Evidence: Students' self-assessment of confidence in critically appraising research evidence revealed that 24.1% affirmed, 11.3% strongly affirmed, 54.7% were neutral 5.9% disaffirmed, and 3.9% strongly disaffirmed (**Table 10**; **Figure 10**).

Self-Evaluation of Statistical Comprehension and Skills Related to EBM: Students' self-evaluation of statistical comprehension and skills revealed 21.2% reported no knowledge, 34% basic knowledge, 40.9% intermediate knowledge, and 3.9% advanced knowledge (**Table 11**; **Figure 11**).

Interest in Receiving Further Training in Statistical Analysis for EBM: A significant proportion (71.4%) expressed interest in receiving further training in statistical analysis for evidence-based decision-making (**Table 12**; **Figure 12**).

Main Barriers in Implementing EBM in Clinical Practice: Key barriers identified in implementing EBM included limited access to reliable resources (38.9%), lack of knowledge and skills in critical appraisal (45.8%), and lack of time (37.4%) (**Table 13**; **Figure 13**).

Factors Facilitating Utilization of EBM in Clinical Practice: Factors facilitating EBM utilization included the availability of user-friendly evidence-based resources (44.8%), supportive institutional policies (36.0%), integration of EBM training in the curriculum (36.5%), and positive mentor attitudes (39.9%) (**Table 14**; **Figure 14**).

4. Discussion

The study aimed to comprehensively explore different aspects of evidence-based medicine (EBM) understanding, practice, and barriers among homeopathic medical students. Researchers used various statistical methods to analyze the collected data. The study found a discrepancy between how students perceived their understanding of EBM concepts and their actual understanding. Chi-square tests were employed to assess the alignment between perception and understanding of concepts like clinical practice guidelines, systematic reviews, meta-analyses, randomized controlled trials, and P-values. However, the analysis showed no significant relationship between perception and actual understanding (all $p > 0.05$), emphasizing the need for targeted educational interventions. Academic progression did not have a significant association with EBM understanding, as indicated by a chi-square test ($p = 0.2047$). This suggested a consistent void in EBM knowledge across academic years, prompting us to further investigate the underlying factors.

This study employed analysis of variance (ANOVA) to establish a notable disparity in the average scores of using evidence-based resources among different educational levels ($P = 0.0023$). This implies that as students progress in their education, they are more likely to integrate evidence-based decision-making into clinical practice. Mean scores on tests of statistical knowledge and skills relevant to EBM varied significantly (P = 0.0001) between educational levels, as demonstrated by ANOVA. This indicates that the curriculum has a positive impact on enhancing statistical literacy in EBM, with increasing scores as students advance.

The study's frequency analysis of the factors that encourage and hinder the use of EBM identified difficulties such as a lack of critical evaluation abilities and restricted access to trustworthy resources. On the other hand, policies that were helpful and tools that were easy to use were recognized as facilitators. These results underline how critical it is to remove obstacles in order to advance evidence-based treatment. A chi-square analysis did not provide significant evidence of an association between encountered barriers and educational levels ($p > 0.05$). This indicates that barriers remained consistent regardless of academic progression.

Correlation analysis demonstrated a strong positive linear relationship between familiarity with EBM concepts and the frequency of utilizing evidence-based resources ($r \approx 2.9926$, $p < 0.05$). This underscores the crucial role of EBM knowledge in driving evidence-based practice.

In the assessments of reliability and sensitivity, the questionnaire exhibited a Cronbach's alpha surpassing 0.70 and demonstrated a strong intra-class correlation coefficient. Furthermore, the exploratory factor analysis unveiled a cohesive factor structure, augmenting the questionnaire's sensitivity in capturing the intended construct.

5. Conclusion

In conclusion, this pilot study has illuminated the complex landscape of integrating evidence-based medicine (EBM) within the education of Homoeopathic medical students. The extensive statistical analyses have provided insights into the nuanced understandings, practices, and challenges associated with EBM principles. However, it is crucial to acknowledge and address certain constraints that limit the current study's comprehensiveness.

The primary constraint lies in the limited scope and sample size of the study. To truly unlock the potential impact of EBM in Homoeopathic education and practice, it is imperative to expand the research's reach. Collaboration with multiple homoeopathic medical colleges is essential, encompassing a diverse range of students and institutions. This broader approach is necessary to overcome the limitations posed by the current study's focus on a specific subset of students and institutions.

By recognizing and actively working to mitigate these constraints, we can enhance the reliability and generalizability of our findings. The importance of this study extends beyond its current boundaries, resonating with practitioners, educators, and policymakers alike. Undertaking a more expansive investigation is essential to overcoming the constraints of the current research design, establishing a robust foundation for the seamless integration of EBM with traditional Homoeopathic practices. This collaborative effort holds the promise of uniting tradition with innovation and elevating healthcare to unprecedented levels of excellence.

Author contributions

VA: Concepts, Design, Definition of intellectual content, Data acquisition, Statistical analysis, Manuscript preparation, Guarantor. GS: Data analysis, Manuscript review. MP: Literature search, Manuscript editing.

Acknowledgments

We thank Vinayaka Mission's Homoeopathic Medical College and Hospital, Salem, for the support and the students for their remarkable cooperation in this study.

Conflict of Interest

The research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

References

1. Bellavite P, Conforti A, Piasere V, Ortolani R. Immunology and homeopathy. 1. historical background. *Evid Based Complement Alternat Med.* (2005) 2:441–52.
2. Masic I, Miokovic M, Muhamedagic B. Evidence based medicine – new approaches and challenges. *Acta Inform Med.* (2008) 16:219–25.
3. Weymayr C. [Scientability - a concept for the handling of homeopathic remedies by EbM]. *Z Evid Fortbild Qual Gesundhwes.* (2013) 107: 606–10.
4. Jl D, Mk A, Le M. Impact of an evidence-based medicine curriculum on medical students' attitudes and skills. *JMLA.* (2004) 92:4.
5. Jacob R, Allen P, Ahrendt L, Brownson R. Learning about and using research evidence among public health practitioners. *Am J Prev Med.* (2017) 52:S304–8.
6. Brownson R, Fielding J, Maylahn C. Evidence-based public health: a fundamental concept for public health practice. *Annu Rev Public Health.* (2009) 30:175–201.
7. Mazzucca S, Jacob R, Valko C, Macchi M, Brownson R. The relationships between state health department practitioners' perceptions of organizational supports and evidence-based decision-making skills. *Public Health Rep.* (2021) 136:710–8. doi: 10.1177/0033354920984159
8. Shafaghat T, Bastani P, Nasab M, Bahrami M, Montazer M, Zarchi M, et al. A framework of evidence-based decision-making in health system management: a best-fit framework synthesis. *Arch Public Health.* (2022) 80:96.