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KNOWLEDGE, ATTITUDE AND BARRIERS TOWARDS BIOMEDICAL RESEARCH AMONG UNDERGRADUATE MEDICAL STUDENTS – A CROSS SECTIONAL STUDY IN A NEW MEDICAL COLLEGE, TAMIL NADU

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Keywords:

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ABSTRACT: Background: Biomedical research plays a pivotal role in enhancing the prevention, diagnosis, and treatment of diseases, and it has a profound effect on the policies related to health care programs. **Aims:** The objectives of this study are to assess the current level of knowledge among medical students regarding biomedical research, to explore the attitudes of medical students toward participating in and contributing to biomedical research and to identify perceived barriers that may hinder medical students from actively engaging in biomedical research. **Methods:** This was a cross sectional study done in Government Medical College and Hospital Krishnagiri between February 2024 to August 2024. Around 327 undergraduate students were given a structured questionnaire (hard copy / google form) containing 21 questions [Questions 1 to 6 about 'Knowledge', Questions: 7 to 14 about 'Attitude', and Questions: 15 to 21 about 'Barrier'] and their responses recorded. **Results:** Out of 327 study participants, 90% study participants had understood the purpose of doing the biomedical research. 27% study participants have mentioned that research feels stressful. 48% study participants agreed that research is indispensable in professional life. Around 62% study participants were not much aware of the content that introduction should contain. 67% of study participants felt difficult with getting started for research and 60% of study participants agree that there is lack of time which is the main hindering factor in doing the biomedical research. **Conclusion:** Biomedical research among health care professionals enhances their confidence in evidence-based decision-making, improving overall healthcare quality.

INTRODUCTION: Biomedical research plays a pivotal role in enhancing the prevention, diagnosis, and treatment of diseases, and it has a profound effect on the policies related to health care programs [1].

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Aspiring medical professionals are in dire need of cultivating knowledge and awareness in the realm of biomedical research, which is crucial for their professional development [2].

Conducting research in biomedical research not only contributes to the betterment of health outcomes but also provides a comprehensive view of our field. In this context, exploring the knowledge, attitude, and potential barriers to engaging in biomedical research among medical students becomes imperative. This study seeks to uncover insights that can enhance the integration of

research into our academic journey and future medical practice. Research outcomes demonstrate a positive correlation between medical students' engagement in biomedical research and improved patient care outcomes. This underscores the potential long-term benefits for both individuals and the healthcare system [3].

By synthesizing these findings, this study aims to contribute to the existing body of knowledge, filling gaps and providing valuable insights into biomedical research awareness among medical students. Previous studies underscore the significance of integrating biomedical research education into medical curricula, emphasizing its positive impact on students' understanding of medical concepts and critical thinking skills [4]. Hence this study was planned to assess the knowledge, attitude and barriers towards biomedical research among undergraduate medical students in a new medical college in Tamil Nadu.

Objectives:

1. To assess the current level of knowledge among medical students regarding biomedical research.
2. To explore the attitudes of medical students toward participating in and contributing to biomedical research.
3. To identify perceived barriers that may hinder medical students from actively engaging in biomedical research.

MATERIALS & METHODS:

Study Design: Cross-sectional study design.

Study Population: I and II-year MBBS Students (450 students) in Government Medical College, Krishnagiri.

Study Centre: Government Medical College and Hospital Krishnagiri (GMCHK), Krishnagiri.

Study Period: February 2024 to August 2024 (7 months).

Inclusion Criteria: MBBS students studying in GMCHK (I and II year students – 400 to 450 students).

Exclusion Criteria: MBBS students who were not willing to participate in the study and the ones who were on leave were excluded.

Data Collection Method: Data was collected using a structured questionnaire encompassing quantitative and qualitative elements. The questionnaire included sections addressing knowledge assessment, attitude exploration, and identification of potential barriers.

Methodology: Study commenced after getting Institutional Ethics Committee approval. Informed consent was obtained from the undergraduate students studying at GMCHK during the study period.

For the purpose of study, a structured questionnaire (hard copy / google form) was used. It consisted of a total of 21 questions. Among these questions, 6 of them (Qs: 1 to 6) were about 'Knowledge', 8 of them (Qs: 7 to 14) were about 'Attitude', and rest 7 (Qs: 15 to 21) about the 'Barrier for Biomedical Research'. Results were tabulated in Microsoft Excel sheet & analyzed using descriptive statistics.

RESULTS:

Knowledge: Out of 327 study participants, around 77% Study participants knew how to define the scientific truth. 65% students were unaware about MEDLINE. 49% study participants were aware of the essential characteristic of science. Around 62% study participants were not much aware of the content that introduction should contain.

86% study participants knew the definition of biomedical research and 90% study participants had understood the purpose of doing the biomedical research. 60% study participants were aware of the regulatory body for biomedical research in India **Table 1, Fig. 1.**

TABLE 1: KNOWLEDGE TOWARDS RESEARCH

Knowledge	Correct Answer	Incorrect Answer
Define scientific truth	N= 252 (77%)	N=75(23%)
Medline	N=116(35%)	N=212(65%)
Essential characteristic of science	N=161(49%)	N=166(51%)

Introduction should have all except	N=124(38%)	N=203(62%)
Define biomedical research	N=281(86%)	N=47(14%)
Purpose of biomedical research	N=293(90%)	N=35(10%)
Regulatory body responsible for taking research in India	N=197(60%)	N=132(40%)

Number of study participants N=327.

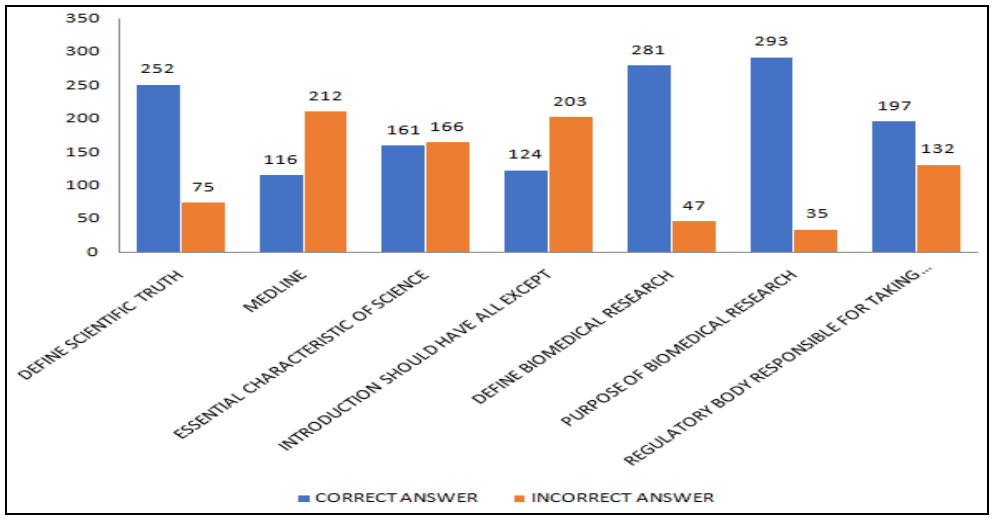

FIG. 1: KNOWLEDGE TOWARDS RESEARCH. Number of study participants N=327

Attitude: Out of 327 participants, 85% of study participants felt that the idea of doing research makes them anxious and 85% study participants also felt that research would be useful for their career. 27% study participants have mentioned that research feels stressful. 56% of them felt that research is complicated to do. 67% of students felt that research is irrelevant to their life. 48% study participants agreed that research is indispensable in professional life **Table 2, Fig. 2.**

TABLE 2: ATTITUDE TOWARDS RESEARCH

Attitude	Agree	Neutral	Disagree
Research makes me anxious	N=279(85%)	N=43(13%)	N=6(2%)
Research is useful for my career	N=279(85%)	N=43(13%)	N=6(2%)
Research is stressful	N=87(27%)	N=166(51%)	N=53(22%)
Research is complicated	N=184(56%)	N=107(33%)	N=36(11%)
Helpful in future	N=279(85%)	N=36(11%)	N=9(4%)
Irrelevant to life	N=26(8%)	N=80(24%)	N=221(68%)
Indispensable in professional life	N=158(48%)	N=117(36%)	N=52(16%)
Research is complicated subject	N=156(48%)	N=127(39%)	N=44(13%)

Number of study participants N=327.

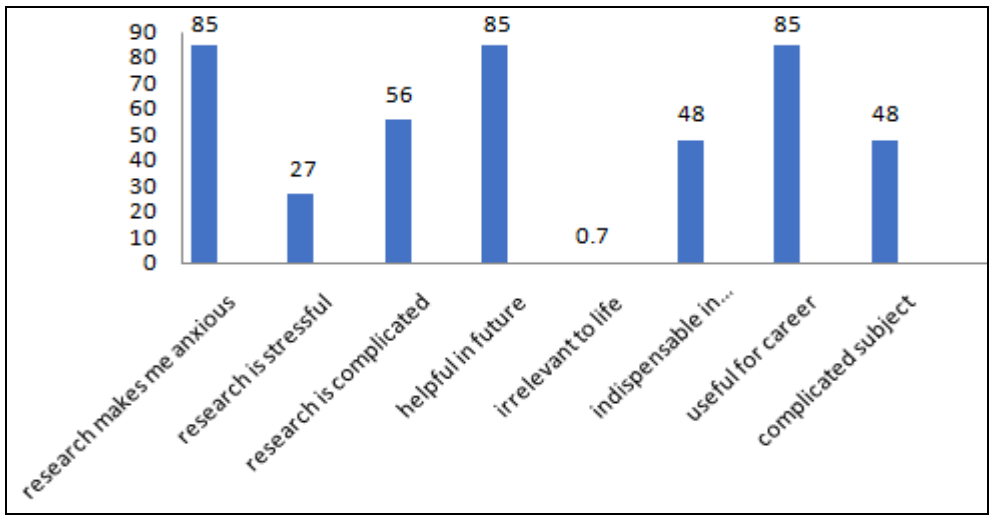

FIG. 2: ATTITUDE TOWARDS RESEARCH. Number of study participants N=327.

Barrier: Out of 327 study participants 67% of study participants felt difficult with getting started for research and 69% found it difficult to find the topic for research. 49% participants felt that there is a lack of structured curriculum and 48% of them felt that there is a lack of technical support. 60% of study participants agree that there is lack of time which is the main hindering factor in doing the biomedical research. 58% participants were unaware of what research is all about **Table 3, Fig. 3.**

TABLE 3: BARRIER TOWARDS RESEARCH

Barrier	Agree	Neutral	Disagree
Difficulty getting started	N=219(67%)	N=78(24%)	N=30(9%)
Lack of time	N=197(60%)	N=87(27%)	N=43(13%)
Lack of structured curriculum	N=160(49%)	N=119(36%)	N=48(15%)
Difficulty finding project	N=224(69%)	N=82(25%)	N=21(6%)
Unaware of what research occur	N=189(58%)	N=103(31%)	N=35(10%)
Difficulty finding faculty members	N=121(37%)	N=126(38%)	N=80(24%)
Lack of technical support	N=157(48%)	N=112(34%)	N=58(18%)

Number of study participants N=327.

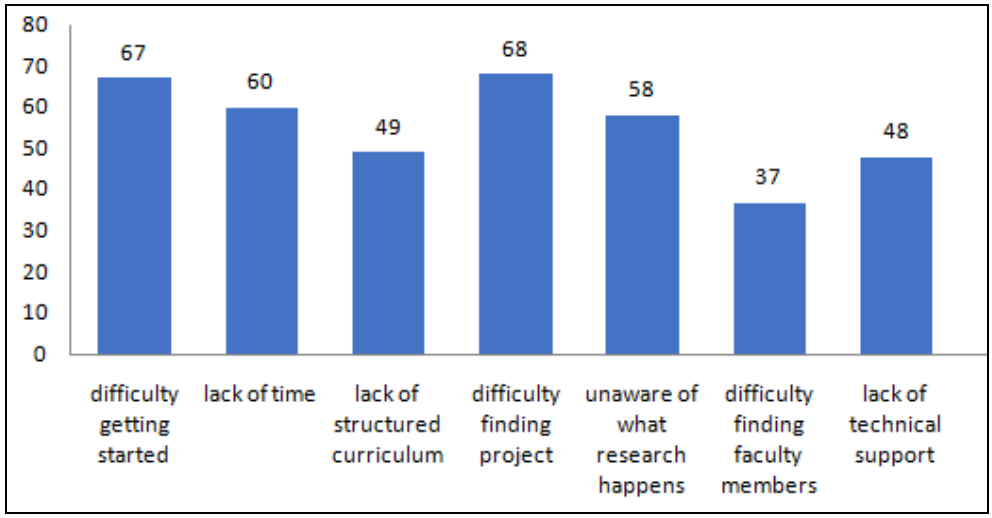

FIG. 3: BARRIER TOWARDS RESEARCH. Number of study participants N=327.

DISCUSSION: Though our students have better knowledge about research, around 85% of students have mentioned that the idea of doing research makes them anxious. This is in contrast with the study by Chenfouh *et al* [5] which implies that the students are anxious irrespective of their knowledge about research.

A small group learning model should be adopted to train students in research and provide supervision to group research projects. This model would improve academic learning, skills acquisition, encourage student interest in research, reduce anxiety among student who would like to pursue research and make better use of limited resources [6].

Around 69% & 67% of students have mentioned that the barrier is due to the difficulty in finding the project and difficulty in getting started. This is completely attributable to their unawareness about the research which may in turn be due to inadequate training of students in research methodologies.

Another major barrier we have identified among our students is a lack of sufficient time due to their academic workload, which affects 60%. This is similar to the higher rates as mentioned in Assar *et al* [7] and Abu- Helalah *et al* [8]. The limited time availability among medical students may be considered a valid barrier attributed to the extensive hours needed for clinical training and the demanding nature of their curriculum. This can be prevented by integrating research projects as part of the curricular requirements so that students can provide enough time and attention to them [8]. Certain studies have reported that the financial constraints and lack of incentives also are major barriers for students to do research [9].

In a study by Manjunath *et al*, the result implies that if any motivation has to be there to conduct research it is only the own interest which has been agreed by most of the participants (90.7%). The other motivating factors for students were pursuing research will add value to their academic performance (54.6%) & give them entry into the scientific forum by means of their presentation (53.7%) [10].

Implications: World Health Organization (WHO) in 1995 defined social accountability of medical schools as "a commitment to focus education, research, and service activities towards acknowledging the leading health concerns of the community and nation they have an obligation to serve" [11].

A strong physician-scientist workforce is key to bridging the gap between medical practice and scientific knowledge [12].

Also, the development of structured research skills learning programs with practical evidence of its affectivity can improve the students' skills and increase their productivity.

Limitations: This study has some limitations owing to its cross-sectional design, as it is unable to demonstrate a causal relationship or evaluate the research question over time. Other factors, such as students' prior research experiences or career aspirations, may have contributed to the observed differences in knowledge and attitudes toward research. The study was conducted at a single centre, which is a significant limitation. The findings may not be generalizable to medical students attending other medical schools.

CONCLUSION: To develop a professional identity, medical schools should focus on research early in their careers. It allows students to develop crucial skills such as writing a study protocol, data collection, data analysis, writing a literature review, and dissemination of results [13].

This not only provides the competencies for quality care but also enhances their confidence in evidence-based decision-making, improving overall healthcare quality. Needless to say, the medical research process improves students' problem-solving and critical thinking skills.

The identified barriers can be minimized to promote student research participation. This may be done by providing mentorship programs for students, integrating research into the medical curriculum, and offering financial incentives [10].

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CONFLICT OF INTEREST: Nil

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