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ASSESSMENT OF KNOWLEDE ATTITUDE PRACTICE AMONG FIRST SECOND AND THIRD YEAR ALLIED HEALTH SCIENCE STUDENTS ON BIOSAFETY PRECAUTIONS

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ABSTRACT

Biosafety precautions are safety measures taken in laboratories and clinical settings to protect personnel, patients, and the environment from harmful biological agents. Laboratory workers are exposed to various occupational risks, and their health may be endangered if adequate preventive measures are not taken. In addition to trained staff, students in medical and laboratory sciences are also at risk, as they handle biological samples during practical sessions. Studies have shown that students often lack adequate knowledge and may not consistently adhere to the biosafety precautions, which increases the risk of laboratory-acquired infections. Therefore, the present study aimed to assess the knowledge attitude and practice on biosafety precautions among first second third year Allied Health sciences students.

In this study A questionnaire-based survey was conducted among Allied Health Sciences students of Dhanalakshmi Srinivasan Medical College and Hospital and the study indicates that knowledge attitude and practice regarding biosafety precautions improve progressively with advancing academic year.

Keywords: Biosafety**,** Allied Health Science(AHS), Knowledge, Attitude and practice(KAP), Biosafety precautions, Personal Protective Equipment (PPE), Infection control, Laboratory safety, Occupational health, Standard precautions.

1.INTRODUCTION

Biosafety is a critical component of healthcare and laboratory practice, aiming to protect individuals, communities, and the environment from accidental exposure to infectious agents and hazardous materials. In academic and clinical settings, particularly within Allied Health Sciences (AHS), students are routinely exposed to biological samples, laboratory procedures, and clinical environments that may carry significant risk. Therefore, awareness and adherence to biosafety precautions are essential to minimize occupational hazards and ensure safe practices[1,2,3]. Knowledge, Attitude, and Practice (KAP) studies serve as an important tool to evaluate how well students understand biosafety principles, how they perceive their importance, and how consistently they implement them in practice. A strong foundation in biosafety knowledge helps students recognize risks, while a positive attitude fosters responsibility, and effective practice ensures compliance with safety protocols such as the use of personal protective equipment (PPE), hand hygiene, proper waste disposal, and adherence to standard precautions[4]. Previous studies indicate that although healthcare students are generally aware of biosafety measures, gaps often exist between knowledge and actual practice, mainly due to insufficient training, lack of resources, or negligence. The World Health Organization (WHO) and Centers for Disease Control and Prevention (CDC) emphasize that biosafety training should be integrated into the curriculum for all healthcare and laboratory-based courses to build a culture of safety. Moreover, ensuring that AHS students adopt correct practices not only safeguards their personal health but also reduces the risk of cross-infection among patients, peers, and the wider community. This study assesses the knowledge, attitude, and practice regarding biosafety precautions among AHS students[5]. By identifying strengths and gaps, the findings can inform educational strategies, improve biosafety training, and enhance compliance with standard safety protocols in both academic and clinical settings.

2.MATERIALS AND METHODS

2.1Study Factors

*Study design***:** A prospective questionnaire study

*Study settings***:** The study was conducted in the department of MLT, Dhanalakshmi Srinivasan Medical College and Hospital, Allied Health Science, Siruvachur, Perambalur, Tamil Nadu.

Study period: The study was conducted for 6 months (July 2025 – January 2026)

Inclusion criteria:

- Both genders
- Allied Health Sciences Students

Exclusion criteria : Not willing to give consent
Groups:

Group-I: First year (n=20)
Group-II: Second year (n=20)
Group-III: Third year (n=20)

2.2 Procedure

A study selected first, second and third year allied health science students with each year 20. Study procedure is explained each students and informed consent was obtained. A questionnaire was given to all the students asked to fill within the 30 minutes. After time over all the answer sheets were collected and analysed.

2.3Statistical analysis

The data was expressed in number and percentage (%). Statistical package for the Social Science (SPSS 20.0) version used for analysis. Chi square test applied to find the statistical significant between the groups. p value less than 0.05 considered statistically significant at 95% confidence interval.

3.RESULTS

The study conducted in first, second and third year allied health science students. Group-I first year, group-II second year and group III third year each of 20 students. The questionnaire assessed knowledge, attitude, and practice regarding biosafety precautions.

3.1Knowledge of Biosafety Precautions

Overall, knowledge regarding biosafety precautions improved progressively with academic year. For recapping of used needles ,70% of first-year, 60% of second-year, and only 30% of third-year students believed it was recommended, whereas 70% of third-year students correctly responded "No", indicating better knowledge among senior students. Regarding touching personal items with contaminated gloves only 35% of first-year students recognized this as a violation, compared to 45% of second-year and a much higher 90% of third-year students, showing a significant improvement in awareness. In, concerning reporting and disinfecting blood/body fluid spills, correct responses ("Yes") were given by 25% of first-year, 40% of second-year, and 80% of third-year students, again showing a strong increase with academic progression. For disposal of contaminated materials in regular trash ,45% of first-year and 50% of second-year students incorrectly believed this was acceptable, while 75% of third-year students correctly answered "No", demonstrating better knowledge in senior students. Concerning hand hygiene after removing gloves, only 35% of first-year students answered correctly, compared to 70% of second-year and 85% of third-year students. Overall, third-year students consistently demonstrated higher knowledge levels, while first-year students showed the lowest awareness across all knowledge questions.

3.2Attitude Towards Biosafety Precautions

Students attitudes improved progressively with academic year. For reporting minor injuries,40% of first-year, 60% of second-year, and 80% of third-year students believed it was necessary, reflecting increasingly positive attitudes. Regarding reasons for overlooking glove hygiene, 50% of first-year, 15% of second-year, and 10% of third-year students believed it was "just a habit." Interestingly, 90% of third-year students selected "all of the above," suggesting deeper insight into multiple contributing factors. In views on cleaning spills without PPE, 30% of first-year students considered it acceptable if minor, compared to only 15% of second-year and 15% of third-year students. The perception that this is "unacceptable and dangerous" was highest among third-year students (80%).For ignoring waste segregation, 35% of first-year, 50% of second-year, and 75% of third-year students selected "all of the above," indicating better understanding of combined factors in senior students. In, about importance of hand hygiene, 45% of first-year, 65% of second-year, and 70% of third-year students considered it extremely important. Overall, attitude was most favourable among third-year students, moderate in second-year, and least favourable in first-year students.

3.3Practice of Biosafety Precautions

Actual biosafety practices improved progressively with academic year. For needle-stick injury management, correct practice (washing and reporting immediately) was reported by 50% of first-year, 60% of second-year, and 75% of third-year students. Regarding frequency of changing gloves, changing after each task was reported by 45% of first-year, 60% of second-year, and 85% of third-year students. For cleaning biological spills, correct practice was observed in 40% of first-year, 55% of second-year, and 90% of third-year students. In disposal of blood-stained gloves, correct disposal in red/yellow biohazard bin was practiced by 50%of first-year, 65% of second-year, and 80% of third-year students. For hand hygiene after removing PPE, "always" performing hand hygiene was reported by 35% of first-year, 60% of second-year, and 70% of third-year students. Overall, third-year students showed the best biosafety practices, while first-year students demonstrated suboptimal compliance (Table-1,2,3).

Table-1: Comparison of knowledge among first, second and third-year students on biosafety precautions

Q.No	Question	Options	Group I n=20		Group II n=20		Group III n=20	
			n	%	n	%	n	%
1.	Is recapping used needles recommended in biosafety protocols?	A. Yes	14	70.00	12	60.00	06	30.00
		B. No	06	30.00	08	40.00	14	70.00
2.	Is touching personal items with contaminated gloves a violation of biosafety?	A. Yes	07	35.00	09	45.00	18	90.00
		B.No	13	65.00	11	55.00	02	10.00
3.	Should all blood / body fluid spills be reported and disinfected property?	A. Yes	05	25.00	08	40.00	16	80.00
		B. No	15	75.00	12	60.00	04	20.00
4.	Should contaminated materials be disposed in regular trash?	A. Yes	11	55.00	10	50.00	05	25.00
		B. No	09	45.00	10	50.00	15	75.00
5.	Is hand hygiene necessary after removing gloves?	A. Yes	07	35.00	14	70.00	17	85.00
		B. No	13	65.00	06	30.00	03	15.00

Table-2 : Comparison of Attitude among first ,second and third-year students on biosafety precautions

Q.No	Question	Options	Group I n=20		Group II n=20		Group III n=20	
			n	%	n	%	n	%
6.	Do you think reporting minor injuries like this is necessary ?	A. Yes	08	40.00	12	60.00	16	80.00
		B. No	05	25.00	05	25.00	03	15.00
		C. Depends on the situation	07	35.00	03	15.00	01	5.00
7.	Why do students often over look gloves hygiene?	A. It's a habit	10	50.00	03	15.00	02	10.00
		B. Lack of awareness	01	5.00	03	15.00	00	-
		C. It doesn't seem serious	02	10.00	04	20.00	00	-
		D. All of the above	07	35.00	10	50.00	18	90.00
8.	What your view on cleaning spills without PPE or Disinfection ?	A. Acceptable if its minor	06	30.00	3	15.00	3	15.00
		B. Unacceptable and dangerous	09	45.00	12	60.00	16	80.00
		C. Depends on the situation	05	25.00	5	25.00	1	5.00
9.	Why do students ignore proper waste segregation ?	A. Lack of training	02	10.00	03	15.00	02	10.00
		B. Carelessness	05	25.00	05	25.00	01	05.00
		C. Time saving	06	30.00	02	10.00	02	10.00

		D. All of the above	07	35.00	10	50.00	15	75.00
10.	How important do you believe hand hygiene is in preventing infection ?	A. Extremely important	09	45.00	13	65.00	14	70.00
		B. Somewhat important	05	25.00	03	15.00	04	20.00
		C. Not important	06	30.00	04	20.00	02	10.00

Table-3 : Comparison of Practice among first ,second and third-year students on biosafety precautions

Q.No	Question	Options	Group I n=20		Group II n=20		Group III n=20	
			n	%	n	%	n	%
11.	What is the recommended immediate step after a needle – stick injury?	A. Wash with soap and water and report Immediately	10	50.00	12	60.00	15	75.00
		B. Cover the injury and continue working	03	15.00	02	10.00	01	5.00
		C.Apply ointment only	04	20.00	04	20.00	03	15.00
		D.Other (please specify)	03	15.00	02	10.00	01	5.00
12.	How often do you change gloves during lab / clinical work?	A.After each task	09	45.00	12	60.00	17	85.00
		B.Only when they tear	04	20.00	05	25.00	02	10.00
		C.Once per session	05	25.00	01	5.00	01	5.00
		D.Rarely	02	10.00	02	10.00	00	-
13.	What is the correct way to clean a biological spill?	A.Use gloves, disinfectant, and dispose of waste in biohazard bin	08	40.00	11	55.00	18	90.00
		B.Wipe with tissue and throw in normal trash	02	10.00	02	10.00	01	5.00
		C.Ask a junior to clean it	06	30.00	03	15.00	01	5.00
		D.Leave it if it's dry	04	20.00	04	20.00	0	-
14.	What is the correct disposal bin for blood – stained gloves?	A. Black bin	03	15.00	02	10.00	02	10.00
		B. Red/yellow biohazard bin	10	50.00	13	65.00	16	80.00
		C. Green bin	05	25.00	02	10.00	01	5.00

		D. Any available bin	02	10.00	03	15.00	01	5.00
15.	How often do you perform hand hygiene after removing PPE?	A. Always	07	35.00	12	60.00	14	70.00
		B. Sometimes	03	15.00	03	15.00	03	15.00
		C. Rarely	06	30.00	04	20.00	02	10.00
		D.Never	04	20.00	01	5.00	01	5.00

4.DISCUSSION

The present study assessed the knowledge, attitude, and practice (KAP) regarding biosafety precautions among Medical Laboratory Technology students across different academic years. The findings revealed a progressive improvement in KAP levels from first-year to third-year students, indicating a positive association between academic advancement and biosafety awareness. In terms of knowledge, third-year students consistently demonstrated higher levels of awareness compared to first- and second-year students [6]. This was particularly evident in critical areas such as needle recapping, hand hygiene, spill management, and biomedical waste disposal. The lower knowledge levels observed among first-year students may be attributed to their limited exposure to clinical training and practical laboratory experience. In contrast, third-year students are more frequently exposed to hospital environments, which likely enhances their understanding of standard biosafety protocols.

Regarding attitude, senior students showed more responsible and positive perceptions towards biosafety measures. A higher proportion of third-year students acknowledged the importance of reporting injuries, proper glove hygiene, and safe spill management[7]. This suggests that continuous academic instruction and real-life clinical exposure contribute to the development of professional attitudes toward infection control practices.

The practice domain also reflected a similar pattern, with third-year students exhibiting better compliance with standard safety procedures such as proper glove use, immediate management of needle-stick injuries, appropriate waste disposal, and consistent hand hygiene. The comparatively lower compliance among first-year students highlights the gap between theoretical knowledge and practical implementation in early academic stages. Overall, the findings of this study emphasize that knowledge alone is not sufficient, and regular training, supervision, and hands-on experience are essential to translate knowledge into appropriate attitudes and practices [8]. The gradual improvement observed across academic years supports the importance of early introduction of biosafety training programs, particularly for first-year students, to strengthen infection control awareness and reduce occupational hazards in laboratory settings [9,10]. Overall this study highlights that the third year students showed better levels compared to first- and second-year students on biosafety precautions. This improvement could be attributed to greater clinical exposure, hands - on training and learning experience. The study emphasizes the importance of providing regular training and awareness programs.

5.CONCLUSION

The study indicates that knowledge attitude and practice regarding biosafety precautions improve progressively with advancing academic year. Third year students showed better levels compared to first and second year students. The study emphasizes the importance of providing regular training and awareness programs.

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