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Original Article

Impact of an Ayushvigilance Training Module on Knowledge of Nursing and Allied Health Students in India: A Pre-Post Intervention Study

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ABSTRACT

Background: The increasing integration of Ayurveda, Yoga, Unani, Siddha, and Homoeopathy (AYUSH) into mainstream healthcare necessitates a robust safety monitoring framework. A significant barrier to the National Pharmacovigilance Program for ASU & H drugs is the pervasive misconception that natural products are inherently safe. As future frontline healthcare providers, nursing and allied health students play a pivotal role in adverse drug reaction (ADR) surveillance. **Objective:** To evaluate the impact of a structured 45-minute educational intervention on the knowledge and reporting attitudes regarding Ayushvigilance among nursing and allied health science students. **Methods:** This quasi-experimental, pre-test/post-test study was conducted with 89 unique participants (B.Sc. Nursing: n=69; Allied Health Science: n=20). The intervention consisted of a 45-minute PowerPoint-based module covering the Ayushvigilance framework, reporting channels, and safety misconceptions. Knowledge and attitudes were assessed using a validated structured questionnaire administered via Google Forms. Data were analyzed using Wilcoxon Signed-Rank tests, Cohen's d for effect size, and Spearman's correlation. **Results:** The educational intervention led to a statistically significant improvement in knowledge scores, increasing from a baseline of 7.61 ± 3.19 to 8.78 ± 3.40 post-intervention ($p < 0.001$). The intervention demonstrated a medium effect size (Cohen's $d = 0.398$). A significant negative correlation was found between baseline knowledge and score improvement (rho = -0.313, $p = 0.002$), indicating the module was particularly effective for students with lower initial awareness. Furthermore, the proportion of students "Very Likely" to report a suspected AYUSH-related ADR increased from 53.9% to 70.8%. Subgroup analysis showed no significant difference in knowledge gain between nursing and allied health students ($p = 0.268$). **Conclusion:** A brief, targeted educational intervention is highly effective in enhancing the knowledge and reporting intent of nursing and allied health students regarding traditional medicine safety. Integrating such modules into healthcare curricula is essential for the success of national pharmacovigilance initiatives and the assurance of patient safety in pluralistic healthcare settings.

Keywords*: Ayushvigilance, Pharmacovigilance, Nursing Students, Allied Health Sciences, Educational Intervention, Patient Safety.*

INTRODUCTION

The integration of traditional medicine into mainstream healthcare has seen a significant global resurgence, with India leading this transition through its AYUSH systems—Ayurveda, Yoga & Naturopathy, Unani, Siddha, and Homoeopathy [1]. As these traditional therapies become increasingly popular for both chronic and acute conditions, the volume of consumption for ASU & H (Ayurveda, Siddha, Unani, and Homoeopathy) drugs has reached unprecedented levels. This growth, however, brings a critical responsibility: ensuring the safety and quality of these products.

A pervasive challenge in the clinical application of AYUSH therapies is the common public and professional misconception that "natural" products are inherently "safe" and devoid of side effects [2]. Historically, this belief has led to a culture of under-reporting adverse drug reactions (ADRs). In reality, safety concerns can arise from several factors, including the inherent toxicity of certain medicinal plants, improper processing, heavy metal contamination, or drug-drug interactions when used alongside conventional medicines [3].

To address these concerns, the Ministry of AYUSH, Government of India, launched the National Pharmacovigilance Program for ASU & H drugs. This program aims to develop a robust database of adverse effects and misleading advertisements, centered around the National Coordinating Centre (All India Institute of Ayurveda) and various Intermediary and Peripheral Pharmacovigilance Centres [4]. The success of this initiative depends heavily on the vigilance and reporting practices of healthcare professionals.

Nursing and Allied Health Science (AHS) students represent a vital segment of the future healthcare workforce. Often serving as the primary point of contact for patients in hospital and community settings, their ability to recognize and report suspected ADRs is crucial for the success of any surveillance program [5]. However, studies have consistently shown that while students may have a positive attitude toward pharmacovigilance, their actual knowledge of reporting protocols and the specific nuances of Ayushvigilance is often suboptimal [6].

Educational interventions have been identified as a highly effective tool for bridging this knowledge gap. Short-duration, targeted training modules can significantly improve the "Knowledge, Attitude, and Practices" (KAP) of healthcare students, fostering a more proactive safety culture [7]. While conventional pharmacovigilance is well-integrated into medical and nursing curricula, specific training on the Ayushvigilance framework remains limited.

Therefore, the present study was designed to evaluate the impact of a structured 45-minute educational intervention on the knowledge and reporting attitudes of Nursing and Allied Health students. By utilizing a pre-test and post-test model, this study seeks to quantify the immediate gain in knowledge and the shift in student perceptions regarding the safety of AYUSH medicines and their role in the national surveillance program.

MATERIALS AND METHODS

Study Design and Setting

We employed a quasi-experimental, pre-test and post-test design to evaluate the impact of the structured educational intervention. The study was conducted at a tertiary care hospital in India in September 2025.

Participants and Sampling

The target population included students enrolled in B.Sc. Nursing and Allied Health Science (AHS) programs. Participants were selected using purposive sampling. Inclusion criteria required students to be currently enrolled in their respective undergraduate programs and willing to participate in both the pre-test and post-test phases. A total of 89 unique participants successfully completed all components of the study.

The Educational Intervention

The intervention consisted of a 45-minute PowerPoint-based educational module. The content was designed to cover the fundamental pillars of the National Pharmacovigilance Program for ASU & H drugs. Key topics included:

- The definition and etymology of Pharmacovigilance.
- The primary objectives of Ayushvigilance and the role of the Ministry of AYUSH.
- Identification of the National Coordinating Centre (All India Institute of Ayurveda) and the reporting hierarchy.
- Clarification of misconceptions regarding the safety of natural products.
- Protocols for reporting Adverse Drug Reactions (ADRs) and identifying misleading advertisements.

Study Instrument

A structured questionnaire was developed to assess Knowledge and Attitude (KA). The instrument consisted of 14 multiple-choice questions focusing on the technical and administrative aspects of Ayushvigilance, along with a Likert-scale question to gauge the likelihood of reporting ADRs in future clinical practice. The questionnaire was administered digitally via Google Forms immediately before and after the 45-minute session.

Data Collection Procedure

The study was conducted in three sequential phases:

1. **Phase I (Pre-test):** Participants completed the baseline questionnaire to assess their existing knowledge.
2. **Phase II (Intervention):** The 45-minute educational session was delivered by a subject matter expert.
3. **Phase III (Post-test):** Participants completed the same questionnaire immediately following the session to measure the gain in knowledge and shift in attitude.

Statistical Analysis
Data were analyzed using Python (SciPy and Pandas libraries). To account for the non-normal distribution of scores, the **Wilcoxon Signed-Rank Test** was used to compare pre- and post-intervention scores. **Cohen's d** was calculated to determine the effect size. Subgroup comparisons between Nursing and AHS students were performed using **Welch's t-test**, while the correlation between baseline knowledge and improvement was assessed using **Spearman's rank correlation coefficient**. A p-value of <0.05 was considered statistically significant.

7. Ethical Considerations
The study was conducted in accordance with ethical standards. Informed consent was obtained from all participants prior to data collection. Participation was voluntary, and the anonymity and confidentiality of the respondents were maintained throughout the study.

Statistical Analysis
Data were analyzed using Python (version 3.10) with the SciPy and Pandas libraries. To ensure data integrity, duplicate entries were removed, and only unique participants with both pre- and post-test scores were included (N=89). The normality of score distributions was assessed using the Shapiro-Wilk test; given that the scores were not normally distributed ($p < 0.05$), non-parametric tests were primarily employed.

- **Knowledge Gain:** The significance of the change in knowledge scores from pre-intervention to post-intervention was determined using the **Wilcoxon Signed-Rank Test**.
- **Effect Size:** To measure the magnitude of the educational impact, **Cohen's d** (paired) was calculated.
- **Correlation: Spearman's rank correlation coefficient** (rho) was used to evaluate the relationship between students' baseline knowledge and their subsequent improvement.
- **Subgroup Analysis:** A **Welch's t-test** was performed to compare the mean knowledge gain between Nursing and Allied Health Science (AHS) students to assess the universal applicability of the intervention.
- **Reporting Attitude:** Changes in reporting likelihood (Likert scale) were analyzed using percentage frequency distributions.

RESULTS
A total of 89 unique students completed both the pre-test and post-test. The cohort consisted primarily of **B.Sc. Nursing students (n=69, 77.5\%)** and **Allied Health Science students (n=20, 22.5%)**. The majority of the participants were female (n=81, 91%). (See **Table 1**).

Table 1: Demographic Characteristics of Participants (N=89)

Variable	Category	Frequency (n)	Percentage (%)
Gender	Female	81	91.00%
	Male	8	9.00%
Course of Study	B.Sc. Nursing	69	77.50%
	Allied Health Science	20	22.50%
Year of Study	Second Year	73	82.00%
	Third Year	8	9.00%
	Fourth Year	8	9.00%

The educational intervention led to a statistically significant increase in knowledge regarding Ayushvigilance. The mean score rose from **7.61 ± 3.19** at baseline to **8.78 ± 3.40** following the 45-minute session (**$p < 0.001$**, Wilcoxon Signed-Rank Test). The calculated **Cohen's d was 0.398**, indicating a medium effect size and a meaningful practical impact on student knowledge. (See **Figure 1** and **Table 2**).

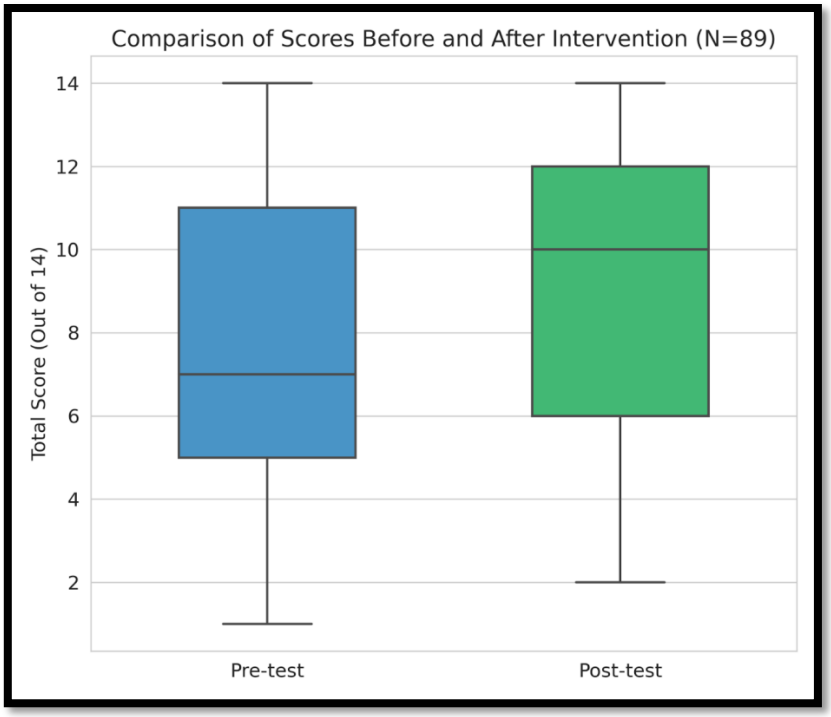

Figure 1: (N=89) *The boxplot illustrates the median, interquartile range (IQR), and overall distribution of student scores. A statistically significant improvement in knowledge was observed (Mean: 7.61 to 8.78; $p < 0.001$), with a notable upward shift in the median score following the 45-minute session.*

Table 2: Comparison of Knowledge Scores Before and After Intervention

Metric	Pre-test	Post-test	Statistical Significance
Mean Score (± SD)	7.61 ± 3.19	8.78 ± 3.40	$p < 0.001$*
Median Score	8	9	
Cohen's d (Effect Size)	0.398		Medium Effect

Item-wise Analysis and Baseline Correlation

The most substantial knowledge gains were observed in identifying the **National Coordinating Center** for Ayushvigilance (21.3% increase in correct responses) and understanding the **etymology and definition of Pharmacovigilance** (20.2% increase). There was also a notable 14.6% improvement in the awareness that AYUSH medicines are not "100% safe" simply because they are natural. (See **Figure 2** and **Table 3**).

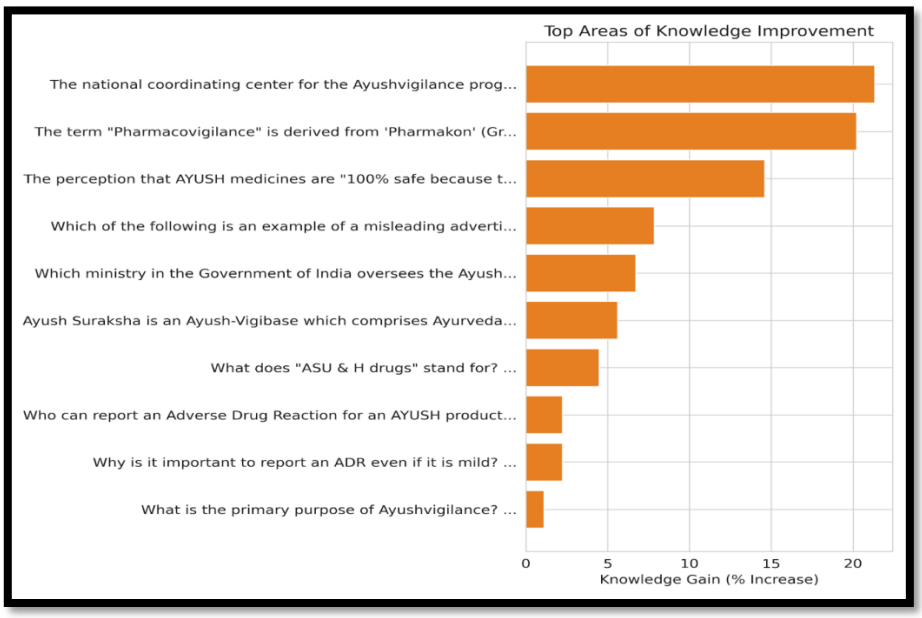

Figure 2: Bar diagram showing Item-wise Analysis

The horizontal bar chart ranks the specific topics where the greatest percentage increase in correct answers was achieved. The most significant gains were found in identifying the National Coordinating Centre (NCC) for Ayushvigilance and understanding the etymology of the term "Pharmacovigilance."

Table 3: Item-wise Analysis of Knowledge Improvement (Top 5 Areas)

Question / Knowledge Area	Pre-test Correct (%)	Post-test Correct (%)	Improvement (Gain %)
National coordinating center for Ayushvigilance	24.70%	46.10%	21.40%
Etymology of "Pharmacovigilance"	53.90%	74.20%	20.30%
Misconception: "AYUSH is 100% safe as it is natural"	48.30%	62.90%	14.60%
Ministry overseeing Ayushvigilance	55.10%	65.20%	10.10%
Identifying misleading AYUSH advertisements	58.40%	66.30%	7.90%

A significant negative correlation was found between baseline scores and knowledge gain (**rho = -0.313, p = 0.002**). This suggests that the intervention was particularly effective for students who initially had lower baseline knowledge, effectively closing the knowledge gap.

Impact on Reporting Attitudes

The session positively influenced the students' intent to report adverse drug reactions (ADRs). The proportion of students who felt **"Very Likely"** to report a suspected AYUSH-related adverse reaction increased from **53.9% to 70.8%**. (**Figure 3**).

This bar chart depicts the change in students' self-reported likelihood of reporting a suspected adverse drug reaction (ADR) from an AYUSH medicine. Post-intervention, the proportion of students who felt "Very Likely" to report increased by 16.9%, indicating a positive shift in professional vigilance.

Subgroup Comparison

No significant difference was found between Nursing students (Mean Gain = 1.09) and Allied Health Science students (Mean Gain = 1.45) regarding the improvement in their scores (p = 0.268, Welch's t-test), indicating that the 45-minute PowerPoint intervention was equally effective across different healthcare disciplines.

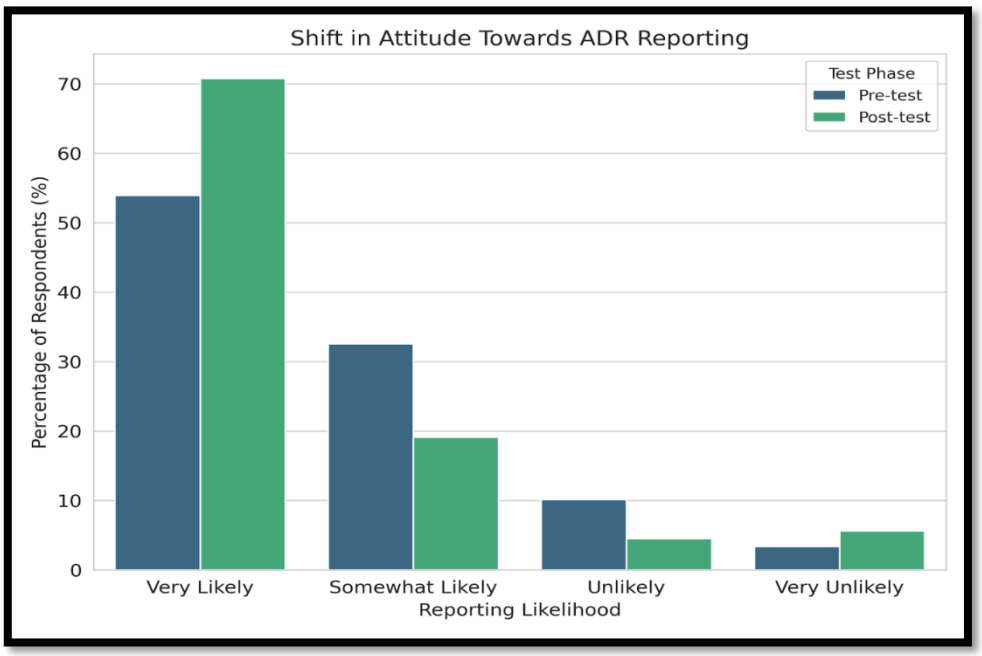

Figure 3: Impact of Intervention on ADR Reporting Attitudes

DISCUSSION

The current study demonstrates that a brief, targeted 45-minute educational intervention can significantly enhance the knowledge and reporting attitudes of nursing and allied health students regarding Ayushvigilance. While the baseline scores

(7.61 ± 3.19) indicated a moderate awareness, the post-intervention scores (8.78 ± 3.40) and a medium effect size (Cohen's d = 0.398) suggest that structured training is effective in correcting common misconceptions and administrative knowledge gaps.

The "Natural is Safe" Misconception One of the most critical findings was the shift in perception regarding the safety of AYUSH medicines. At baseline, fewer than half the students correctly identified the statement "AYUSH medicines are 100% safe because they are natural" as a misconception. Post-intervention, this improved by **14.6%**. This myth is a significant barrier to pharmacovigilance; if practitioners believe products are inherently harmless, they are less likely to monitor patients for adverse effects or report them when they occur [8]. Addressing this "safety paradox" is essential to integrating AYUSH into evidence-based practice.

Bridging the Knowledge Gap The significant negative correlation found between baseline scores and knowledge gain (rho = -0.313, p = 0.002) is a highlight of this study. It indicates that the students with the lowest initial knowledge gained the most from the session. This suggests that even a single educational module can effectively "level the playing field," bringing students from diverse backgrounds up to a minimum standard of safety awareness.

Administrative and Reporting Knowledge The most substantial gains were seen in administrative knowledge, particularly the identity of the **National Coordinating Centre (NCC)** (21.3% increase). Understanding the "who" and "how" of reporting is often the bottleneck in pharmacovigilance programs. While students may recognize an ADR, they frequently do not know where to send the report [9]. By clarifying the role of the Ministry of AYUSH and the NCC (All India Institute of Ayurveda), the intervention provided students with the practical tools needed for future practice.

Attitude and Professional Intent Knowledge alone does not guarantee a change in behavior, but the shift in reporting intent (from 53.9% to 70.8% "Very Likely") is a promising indicator of professional growth. Nursing and Allied Health students are the "eyes and ears" of the clinical ward; their increased willingness to report suspected reactions is vital for the sustainability of the National Pharmacovigilance Program for ASU & H drugs [10].

Limitations While the results are encouraging, the study is limited by its quasi-experimental nature and the assessment of only immediate knowledge gain. Future research should focus on the long-term retention of this knowledge and, more importantly, track whether this training translates into actual reporting rates once these students enter clinical practice.

CONCLUSION

This study confirms that a structured 45-minute educational intervention significantly improves the knowledge and reporting attitudes of Nursing and Allied Health students regarding Ayushvigilance. The intervention successfully addressed critical misconceptions about the safety of AYUSH medicines and clarified the national reporting framework. Given the increasing integration of traditional medicine in India, such targeted training modules should be incorporated into the standard curricula of all healthcare professionals to ensure patient safety and the success of national pharmacovigilance initiatives.

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