

ASSESSMENT OF CRITICAL CARE NURSES' KNOWLEDGE AND PRACTICE REGARDING ADVANCE SUCTIONING TECHNIQUE IN A TERTIARY CARE SETTING

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Abstract

Background: Airway suctioning is a routine procedure in intensive care units, acute care units, and sub-acute care settings, performed when patients are unable to effectively clear respiratory secretions. Accumulation of secretions in the upper and lower respiratory tracts can result from excessive production or inadequate clearance, leading to airway obstruction, impaired airflow, and compromised gas exchange of oxygen and carbon dioxide. Maintaining airway patency through suctioning is therefore essential for optimal cellular function. However, lack of interest among nurses has been identified as a key factor contributing to inadequate professional competence in suctioning practices. Factors influencing lack of interest include forced placement in intensive care units, unfavorable working conditions, poor patient recovery outcomes, and limited professional expertise. This study examined the role of lack of interest and negative attitudes toward medical errors in suctioning malpractice, with interventional errors considered as a mediating factor, guided by the Theory of Planned Behavior. *Methodology:* The study adopted a positivist epistemological stance, viewing reality as objective and empirically measurable. A deductive research paradigm was applied to test theoretical assumptions through observable data. A quantitative cross-sectional design was used, involving 350 nurses selected through purposive non-probability sampling. Data were collected using a structured questionnaire to assess lack of interest, attitudes toward medical errors, interventional errors, and suctioning malpractice. *Results:* The findings demonstrated that lack of interest and negative attitudes toward medical errors significantly contributed to malpractice in suctioning procedures among intensive care unit nurses. Interventional errors played a mediating role in this relationship, indicating that psychological and behavioral factors influence procedural outcomes. The results highlight that beyond technical training, motivational and attitudinal dimensions are critical determinants of safe suctioning practices. *Conclusion:* The study concludes that lack of interest and adverse attitudes toward medical errors significantly affect suctioning malpractice, primarily through the mediating role of interventional errors. In line with the Theory of Planned Behavior, interventions should address psychological readiness and behavioral intentions in addition to skill-based training to enhance professional competence and patient safety in airway management practices.

INTRODUCTION

Suctioning is an invasive technique used to maintain oxygenation and guarantee patency in patients with artificial airways. In clinical situations, poor

suctioning techniques can lead to serious, sometimes fatal side effects such bradycardia, arrhythmia, and hypoxemia (Blakeman et al., 2022). Therefore, preventing malpractice and guaranteeing patient



safety in hospitals are crucial (Ismail & Ali, 2020; Ryu and Shim 2021; Yinusa & Ogoun, 2024). On the other hand, errors made by nurses are a regrettable fact of life that results from a complicated interaction of different elements. Such errors are a reflection of structural problems in healthcare institutions as well as individual failures (Bilal et al., 2020; Russo, 2022). Environmental factors were also found to be important contributors to errors, including frequent disruptions, various emergency situations, and shortages of supplies and equipment (Khan, 2020; Akbar & Hayat, 2020; Maryniak & Garrett, 2022; Quader, 2024).

In the meantime, one of the primary reasons why nurses lacked the professional abilities necessary for suctioning care practice was their lack of interest (LOI). Participants said that their LOI was influenced by their forced decision to work in the intensive care unit, unsuitable working conditions, patients' minimal recovery, and their lack of professional expertise for working in ICU wards (Rehmani et al., 2021). Professional bodies have created evidence-based guidelines describing safe suctioning techniques during the last 20 years, including pre-oxygenation, avoiding routine saline instillation, using the right catheter size, and keeping suction time between 10 and 15 seconds (AARC, 2025). However, research from a variety of healthcare systems often reveals significant differences between suggested procedures and real nursing practices. For instance, in a multicenter trial, almost 50% of critical care nurses did not do chest auscultation or pre-oxygenate before suctioning (Alkubatiet et al., 2022).

Despite the vital significance of advanced suctioning techniques and its direct impact on patient safety, in Pakistan, there is a dearth of studies especially addressing the knowledge and practice of nursing personnel regarding advanced suctioning techniques in intensive care settings. Therefore, the purpose of this study is to evaluate nursing staff proficiency with the advanced suctioning technique in the intensive care units of tertiary care institutions in Lahore, Pakistan. Additionally, it looks at the relationships

between nursing staff demographics and suctioning practices and expertise. The study aims to close this gap in order to influence institutional training methods, inform curriculum creation and advance the larger goal of improving patient safety and care quality in critical care settings (Mehdi, 2019; Hameed, 2020; Modupe, 2021; Khan et al., 2025; Carlo, 2025).

LITERATURE REVIEW

The Theory of Planned Behavior proposes that an individual's behavior is determined by behavioral intention, which in turn is predicted by three constructs: attitude toward the behavior, subjective norms, and perceived behavioral control, perceived ease or difficulty of performing the behavior. Ajzen's model has been widely applied in health-care research to explain and predict clinical behaviors, including adherence to protocols and uptake of new clinical practices. Theory of Planned behavior's utilized for modelling professional behaviors and interventions designed to change them (Ufaq, 2019; Paul et al., 2023; Hagger et al., 2024; Modibbo & Inuwa, 2020; Marc & Roussel, 2024). In the suctioning context, 'attitude' captures nurses' beliefs about the importance and outcomes of correct suctioning; 'subjective norms' reflect unit culture and supervisory expectations; 'Perceived Behavior Control' covers perceived competence, access to equipment, and time constraints. Intention represents nurses' readiness to perform suctioning correctly, and actual behavior is the observable adherence to protocols and avoidance of malpractice (Ajzen, 1991).

Several recent cross-sectional studies document wide variability in nurses' knowledge and adherence to endotracheal and artificial airway suctioning guidelines. In Indian ICUs reported inconsistent monitoring of physiological parameters before and after suctioning and gaps in aseptic technique (Singh et al., 2023). A multicenter audit showed that many ICU nurses practiced ad-hoc methods instead of standardized protocols, which increased the risk of

complications (Raja & Iqbal, 2019; Tekle et al., 2024).

Competency-based suctioning training resulted in a reduction in technical errors and procedural deviations conducted in a controlled trial in Brazil, showing a significant reduction in procedural deviations after an evidence-based training program (Muhammad & Yan, 2019; Mendes et al., 2024). Similarly, systematic reviews highlight that continuing professional development and simulation-based interventions markedly improve both knowledge and safe practice (Rehman & Malik, 2020; Santos et al., 2025; Marc et al., 2025). International behavioral research shows that TPB components predict clinical intentions and adherence across nursing behaviors (Ali & Senturk, 2019; Hagger et al., 2024). Similarly, In Pakistan, several cross-sectional and descriptive studies have assessed ICU nurses' knowledge and practice regarding suctioning and related infection prevention practices. Local studies have repeatedly found knowledge deficits, inconsistent application of protocols, and limited opportunities for refresher training in tertiary hospitals (Rashid et al., 2024). A 2024 tertiary-care study in Lahore documented that more than half of ICU nurses had suboptimal adherence to ventilator-associated pneumonia prevention bundles and airway management protocols, which may reflect broader deficits in suctioning practice (Imran & Jabeen, 2023).

Nationally, additional point to system level barriers staffing shortages, limited time for procedures, and scarce simulation resources that reduce Planned Behavior Control and make adherence difficult even for motivated staff. Despite progress internationally to document suctioning variability and the benefits accruing from structured training, substantial theoretical and methodological gaps persist. International studies seldom extend the adherence to link behavioral constructs with clinical safety or malpractice outcomes. While procedural deviations and suctioning complications are well documented, the mediating mechanism through which attitudes

or motivation translate into malpractice is rarely modeled (Shah et al., 2025).

No Pakistani study has integrated behavioral constructs with interventional errors or malpractice indicators. System-level constraints such as staff shortages, workload, and equipment limitations—central to perceived behavioral control—are notably absent from theoretical modeling.

The present study attempts to address these gaps by using psychometrically validated measures to assess cognitive determinants, modelling interventional errors as mediators linking psychological predictors to malpractice outcomes, and testing a comprehensive hypothesis model in a tertiary-care sample of critical care nurses.

H1: A lack of interest is directly linked to errors in interventions.

Interest is a reflection of a nurse's personal motivation to be engaged and committed to correct clinical procedures. A lack of interest means that nurses are less likely to be focused on the procedures, and thus their attention to detail during suctioning will be compromised. Lack of interest will also affect a nurse's participation in refresher courses and their retention of new clinical procedures. A lack of motivation will make nurses resort to shortcuts and old habits, thus increasing the chances of errors in procedures. Collectively, these factors heighten the risk of interventional errors in advanced suctioning techniques. Multiple studies link low motivation or disengagement with higher technical errors in clinical tasks (Zhao et al., 2023). Nurses reporting low motivation had increased rates of procedural deviations during airway management. In an observational study of ICU staff, units with lower staff engagement recorded higher frequencies of suctioning-related complications (Tekle et al., 2024). Attitude is a key determinant of how consistently and accurately nurses perform clinical procedures. When nurses hold negative attitudes toward suctioning such as viewing it as a low-priority, burdensome, or unnecessarily complicated task they are less motivated to adhere to evidence-based guidelines (Singh et al., 2023).



H2: Negative attitude is indirectly associated with interventional error.

Additional empirical support comes from educational research where intrinsically motivated learners showed better retention of practical skills and fewer technical errors after simulation training (Mendes et al., 2024). Likely, Rashid et al. (2024) reported that among Pakistani ICU nurses, lack of interest measured by attendance at optional training and self-reported engagement was associated with poorer adherence to suctioning protocols. This unfavorable perception reduces their willingness to prepare adequately, double-check equipment, or follow required steps with precision. Negative attitudes also contribute to the weakening of intention, causing nurses to hasten the procedure, disregard recommended precautions, or forego important assessments. Over time, this disengagement of behavior leads to increased procedural variability and a greater incidence of interventional errors. Therefore, attitude is a cognitive barrier that directly affects the quality of suctioning procedures. Intervention trials that changed attitudes via targeted education or reflective practice reported reductions in procedural errors (Mendes et al., 2024). Cross-sectional surveys also show correlations between negative attitudes and self-reported noncompliance with airway protocols and a TPB application in clinical practices found that attitude was a consistent predictor of intention and subsequent task performance (Paul et al., 2023). Interventional errors during suctioning, such as inserting the catheter too deeply, applying suction for excessive durations, or performing the procedure without maintaining aseptic technique directly increase the likelihood of patient harm. When such errors occur repeatedly, they reflect not only technical lapses but also a pattern of deviation from established clinical standards (Tekle et al., 2024). In legal and professional terms, malpractice is defined as a consistent failure to adhere to accepted protocols resulting in preventable adverse outcomes. A 2024 clinical Study conducted in Istanbul ICUs found that nurses who frequently committed

suctioning errors (particularly incorrect catheter depth and failure to pre-oxygenate) had significantly higher rates of documented airway trauma, desaturation episodes, and post-procedure complications (Yildirim & Aksu, 2024). Recurrent technical deviations often escalate into malpractice-level events when they persist despite training and established guidelines. Thus, interventional errors serve as the immediate behavioral mechanism through which unsafe suctioning practices translate into malpractice (Eid et al., 2025). Systematic reviews and incident analyses link clusters of procedural errors with higher rates of complications such as ventilator-associated pneumonia, hypoxia episodes, and mucosal injury events that can meet malpractice criteria if negligence or gross deviation from standards is present (Santos et al., 2025). Case-audit series further document that recurring technical deviations often precede formal malpractice claims or disciplinary actions (Singh et al., 2023).

H 3: Interventional errors mediate the relationship between negative attitude and malpractice of Suctioning.

Negative attitude affects behavior indirectly by shaping the quality of actions performed during clinical procedures. When nurses hold unfavorable views toward suctioning seeing it as tedious, unnecessary, or overly risky they are less motivated to follow procedural steps carefully and are more likely to become careless during practice. These attitudinal barriers often manifest first as interventional errors, such as improper catheter insertion, insufficient patient assessment, or failure to maintain sterility. Over time, these errors can compound and potentially lead to clinically significant complications, which are malpractice. A quasi-experimental study completed in Iran in 2024 found that ICU nurses who had negative attitudes toward suctioning demonstrated significantly more technical errors, and these errors statistically mediated the relationship between attitude and adverse airway outcomes (Karimi & Darvishi, 2024). Similarly, respiratory care procedures found that negative attitudes toward invasive suctioning predicted more

occurrences of unsafe procedures, and, importantly, error frequency completely mediated the relationship between attitude and patient safety incidents (O'Connor & McBride, 2023). These findings reinforce that negative attitude alone does not directly cause malpractice rather, it influences malpractice through the proximal mechanism of repeated procedural errors. Therefore, mediation analysis is essential in understanding how cognitive factors gradually translate into malpractice events in critical care suctioning. There is growing empirical support for mediation models in clinical behavior research. Interventions improved attitudes which reduced procedural errors, and reduced errors mediated improvements in patient-centered outcomes (Hagger et al., 2024). Mediation analyses of TPB constructs in healthcare settings show that errors or non-adherent behaviors often function as mediators between cognitive predictors and adverse outcomes (Paul et al., 2023).

H4: Interventional errors mediate the relationship between negative attitude and malpractice of suctioning.

Negative attitudes toward suctioning is characterized by perceptions that the procedure is burdensome, low-priority, or uncomfortable can influence nurses' engagement and execution of evidence-based practices during suctioning. Although negative attitude does not directly cause malpractice, it shapes clinical behavior in ways that increase the frequency and severity of technical errors (e.g., inadequate pre-oxygenation, breaches in aseptic technique, incorrect suctioning duration). These errors act as the proximal behavioral mechanism linking cognitive dispositions to outcomes that may qualify as malpractice when adverse events occur (Durmuş et al., 2025).

Cross-sectional studies focusing on nurses' knowledge, attitudes, and practices regarding suctioning have identified significant trends that support the indirect route. While Malaysian ICU nurses had moderate knowledge and positive attitudes toward endotracheal suctioning, the relationship between attitude and practice was weak,

indicating that attitudes by themselves were not enough to guarantee correct clinical practice a gap that could be filled by procedural mistakes when attitudes are negative (Afandi & Ludin, 2020). Likewise, a study on the competency of airway suctioning among nursing interns in Pakistan found that attitudes were generally neutral and that training increased practice scores, indicating that attitudinal preparedness affects the performance of nurses regarding procedures and the potential for mistakes when attitudes are negative (Saidu et al., 2025).

Studies evaluating the various methods for suctioning have shown that although many people are aware of the proper techniques, nurses often fail to use these proven methods consistently. The nurses did not appropriately assess patients prior to suctioning and did not use the correct size of suction catheters or practice correct hand hygiene practices, which show errors in procedures even when the nurses had some level of procedural knowledge (Pinto et al., 2020). The educational intervention on endotracheal tube suctioning improved the knowledge and practices of the nurses, which shows that there were errors in procedures prior to the intervention, which are associated with competency gaps that may be related to attitudinal barriers (Latif et al., 2025). Similarly, quasi-experimental research in neonatal settings has shown that implementing structured clinical guidelines substantially improved both suctioning knowledge and practice quality, implying that prior to guideline implementation, practice errors were common and modifiable through targeted training (Ahmed, 2022).

H5: Lack of interest is indirectly related to malpractice of suctioning

Interest is the nurse's personal motivation to be involved, interested, and committed to correctly performing nursing procedures. Lack of interest is related to reduced cognitive involvement in suctioning, reduced involvement in refresher training sessions, and reduced learning of new clinical procedures. Lack of interest in their practice among nurses can result in the use of shortcuts and

outdated practices, which can cause errors in interventions such as incorrect catheterization length, prolonged suctioning, or incorrect aseptic practices (Zhao et al., 2023).

Empirical research has shown that these errors mediate the relationship between lack of interest and malpractice. For example, among Malaysian ICU nurses, lack of professional involvement was related to a lack of accuracy of procedures, and the error mediated the relationship between lack of involvement and patient adverse events (Rahman et al., 2023). Similarly, Ethiopian ICU research demonstrated that nurses who lacked interest demonstrated increased suctioning malpractice, which resulted in increased complications such as desaturation and airway irritation (Tadesse et al., 2024).

H6: Negative attitude is indirectly related to malpractice of suctioning. Attitude impacts the nurses' approach to suctioning procedures.

Negative attitudes, viewing suctioning as a troublesome, low-priority, and unnecessary activity, decrease the motivation to prepare well, follow guidelines, and perform procedures accurately (Singh et al., 2023). This non-adherence is normally explained by mistakes in intervention, such as the lack of verification of equipment, hastening the process, and not performing the necessary assessments. Errors in intervention are the mediator between negative attitude and malpractice (Karimi and Darvishi, 2024). Found that ICU nurses with negative attitudes had more technical errors, and these errors mediated the relationship between attitude and negative airway outcomes. Educational interventions that improved attitude demonstrated a significant decrease in procedural errors, supporting the idea that attitude indirectly influences malpractice through non-adherence and motivation (Mendes et al., 2024).

Negative attitudes may also affect the cognitive and decision-making aspects of suctioning. If the nurses have negative attitudes toward suctioning, they may underestimate the risk, overlook the perception of

critical patient cues, or overlook the anticipation of complications, which may result in adverse events such as inappropriate suctioning time, failure of pre-oxygenation, or failure of aseptic technique (O'Connor & McBride, 2023). The cognitive-perceptual errors can undoubtedly make sense over time, leading to higher risks of patient injury and malpractice-level events (Eid et al., 2025).

H7: Negative attitude is indirectly linked to malpractice of suctioning.

Cross-sectional and quasi-experimental designs confirm the indirect link. ICU nurses with negative attitudes towards suctioning tended to make unsafe decisions during the procedure, and errors in intervention statistically mediated the link between attitude and patient safety incidents (Karimi & Darvishi, 2024). Decision-making errors based on negative attitudes are prone to escalation into malpractice if they continue despite training or following protocols (Yildirim & Aksu, 2024).

This review combines international and Pakistani evidence that links behavioral constructs with suctioning practice. The Theory of Planned Behavior is a robust model that explains the role of interest, attitude, subjective norms, and perceived behavioral control in suctioning practice. There is empirical evidence that suggests that there are knowledge and practice gaps despite the availability of guidelines, and training has been demonstrated to reduce errors. Behavioral factors such as lack of interest and negative attitudes are strongly associated with a higher rate of procedural errors. Interventional errors are proximal mechanisms that plausibly mediate the association between cognitive predictors and malpractice outcome. Perceived behavioral control is a very important moderator that can reduce the negative effect of poor attitudes or low interest. The current study, based on the Theory of Planned Behavior and testing the mediation of interventional errors, fills some very important gaps. Competency-based training, resource enhancement, and attitudinal modification are suggested to decrease malpractice and increase patient safety.

THEORETICAL FRAMEWORK

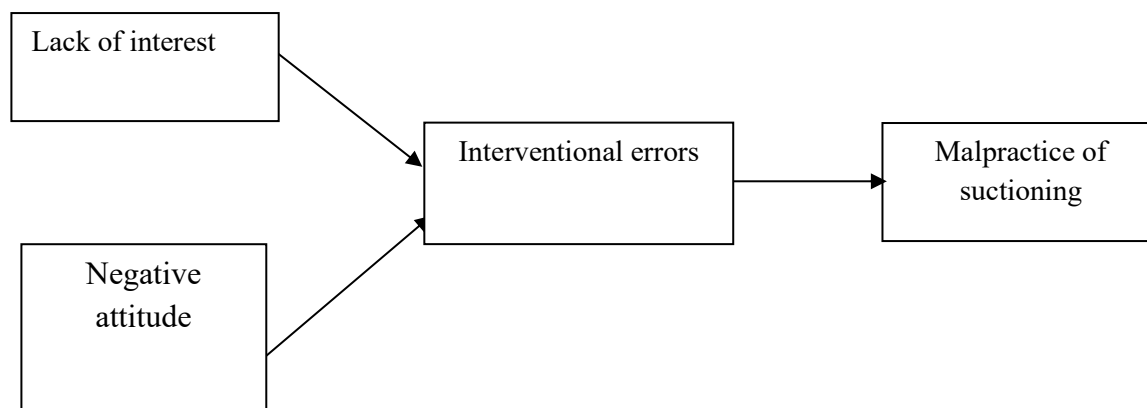


Figure 1: Theoretical framework

METHODOLOGY

This study follows the positivist epistemological approach, which views reality as objective, observable, and empirically measurable (Saunders et al., 2023). This paradigm allows for data collection, statistical analysis, and generalizable results, which are crucial for evidence-based nursing studies (Kumar, 2022). The positivist philosophy improves the reliability of the study by reducing the influence of the researcher's bias and therefore allows for the replication of findings in other settings (Polit & Beck, 2021). A deductive method of research is employed in this study, which starts from the existing theoretical foundations and tests them through empirical evidence using observable data (Saunders et al., 2023). A quantitative method of research is employed, which enables the researcher to collect data in the form of numbers from a large population of nurses efficiently (Leavy, 2023). Quantitative questionnaire based approaches are more appropriate for measuring knowledge and compliance because they yield standardized responses that allow for valid statistical analysis (Taherdoost, 2022). The use of this approach enhances the level of comparability for the findings across comparable clinical settings (Hennink & Kaiser, 2022). In order to objectively assess, this study uses a mono-method quantitative research approach, concentrating only on numerical data (Check & Schutt, 2022). A quantitative option is applicable since the variables in the study can be observed and need statistical analysis to determine the current trends in clinical practice (Walter, 2021).

The research design is descriptive, seeking to provide a true representation of factors. Descriptive designs are effective for finding gaps in clinical practices, particularly in hospital environments where normal operations might influence risks (Daniel, 2022).

A cross-sectional time horizon applied, allowing data to be collected at a single point in time from nurses currently practicing in the selected hospital (Bai, 2022). Cross-sectional studies are appropriate for assessing present attitudes, practices, or knowledge without long-term follow-up (Ponto, 2020). The study sample is made up of registered nurses who work in hospital departments such as emergency rooms, intensive care units, and medical wards (Fowler, 2021). Targeting this group guarantees that the findings appropriately represent real-world clinical practices (Neuman, 2020).

The study employs a sample size of 350 nurses, calculated based on accessibility and feasibility within the hospital context (Vogt & Johnson, 2021). The chosen sample is sufficient to offer relevant descriptive statistics (Rolla, 2023). A non-probability purposive sampling method is followed because we have no availability of sampling frame. Nurses who are available and willing to participate during their working hours are selected for the research (Etikan, 2020). Purposive sampling is justified within hospital settings, where shift rotations and workload pressures make probability sampling impracticable (Acharya, 2021). The sampling unit is individual registered nurses (Zou, 2023). Focusing on individuals permits assessment of personal knowledge, abilities, and adherence, which may

differ based on education, experience, and workload (Ibarra, 2022). Sample was collected from two tertiary care hospitals of big city that is Punjab Institute of Neurosciences and Lahore General Hospital because, these two hospitals provide enough data related to nursing practices of suctioning also feasibility for the researcher to reach the desired population within the resources and time guaranteed for present research. Identifying nurses as the unit of analysis coincides with the study goal and permits accurate measurement of clinical practices (Farrugia, 2021). Data were collected using a structured questionnaire based on relevant literature. All study variables were measured using a 5-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree, with higher scores indicating a greater level of the measured construct. Lack of interest, an independent variable, assessed nurses' inattention to patients' basic care needs such as pain relief and defecation assistance, leading to patient dissatisfaction (Janatolmakan, 2022). Negative attitude, the second independent variable, measured nurses' commitment and perceptions toward patient safety regulations and practices (Niknejad et al., 2019). Interventional errors, the mediating variable, referred to failures in completing planned treatments or standard procedures due to factors such as inadequate knowledge, experience, or negligence (Kırşan et al., 2019). The dependent

variable, malpractices of suctioning, measured deviations from standard suctioning procedures, including negligence or incorrect implementation that may contribute to undesirable patient outcomes (Rodziewicz et al., 2022). Data collection is done through a self-administered paper questionnaire distributed during breaks or at the end of their shifts to prevent the interruption of patient care and analyze on SPSS.

RESULTS

The demographic attributes of the respondents showed that all of them were female nurses, with no male respondents. The majority of nurses (94.8 percent) were of age 26-45, comprising middle-aged nurses, while very few were aged above 45. Most of the nurses (99.0 percent) were holding a bachelors degree in nursing, suggesting that they were of the same level of education. Also, most of the nurses (84.0 percent) were permanently employed, suggesting stability of jobs amongst the respondents. Most of the nurses (71.0 percent) with 2-5 years of experience were identified, while most of those with up to one year of experience were also identified. The results clearly suggest that the study sample was dominated by permanently employed moderately experienced female nurses of bachelors level of education.

Table 1

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	0	0.0
	Female	350	350.0
Age Group (Years)	Up to 25	7	3.5
	26-45	332	94.8
	46-55	11	3.0
	56+	0	0.0
Educational Qualification	Bachelor's	348	99.0
	Master's	2	0.55
	PhD	0	0.0
Nature of Employment	Contractual	35	2.00
	Permanent	294	84.0
	Others	21	1.00
Length of Service	Up to 1 year	58	29.0

2-5 years	243	71.0
5-10 years	42	0.0
10+ years	7	0.0

The table 2 represents the internal consistency reliability of the study scales measured by Cronbach's alpha. All the scales had acceptable to excellent reliabilities with alpha ranging from 0.77 to 0.88, reflecting that items in each scale are consistently measuring their intended constructs. The Lack of Interest scale had a good reliability ($\alpha = 0.81$), and the Management-Related Factors scale also had a good reliability ($\alpha = 0.80$), the Attitude Toward Medical Errors (SAME) scale had an acceptable internal consistency ($\alpha = 0.79$), and the

Environmental Factors scale also had acceptable internal consistency ($\alpha = 0.77$). A higher reliability was found for the Interventional Errors (TERCAP) scale, $\alpha = 0.82$; the System-Related Factors scale, $\alpha = 0.87$; the Other Contributing Factors scale, $\alpha = 0.85$; the Medication and Nursing Errors scale, $\alpha = 0.88$; and Malpractice of Suctioning scale, $\alpha = 0.86$. In general, the results suggest that all scales have a satisfactory internal consistency and are adequate for further analyses.

Table 2

Scale	No. of Items	Cronbach's Alpha
Lack of Interest	10	0.81
Attitude Toward Medical Errors (SAME)	16	0.79
Interventional Errors (TERCAP)	6	0.82
System-Related Factors	11	0.87
Management-Related Factors	14	0.80
Environmental Factors	9	0.77
Other Contributing Factors	11	0.85
Medication & Nursing Errors	16	0.88
Malpractice of Suctioning	5	0.86

The table 3 illustrates the connection between the lack of interest and attitude towards malpractice and malpractice of suctioning, independent and dependent variables respectively, through Pearson Correlation Analysis. The value shows that there was a positive association between lack of interest and malpractice of suctioning because $r = 0.521$, mea

ning that an increase in the values of lack of interest leads to an increase in malpractice of suctioning. The data was collected from a population of 350 respondents and was significant because $p\text{-value} = 0.0093$ is less than the level of significance of 0.05.

Table 3

	Lack of interest, attitude toward malpractice (IV)	Malpractice of suctioning (DV)
Lack of interest (IV) Pearson Correlation	1	.521*
Sig. (2-tailed)		.0093
N	350	530
Malpractice of suctioning (DV) Pearson Correlation	.521*	1
Sig. (2-tailed)	.0093	
N	350	350

The following table shows the relationship between attitude towards medical errors, the independent

variable, and the malpractice of suctioning, the dependent variable, through the use of the Pearson

Correlation Test. The result shows a strong positive correlation with a coefficient of 0.721. This implies that the attitudes towards medical errors and the malpractice of suctioning are directly correlated, meaning that the higher the negative and careless

attitude towards medical errors, the higher the rate of malpractice of suctioning. The result is significant since the p-value of 0.0093 is less than the significance level of 0.05.

Table 4

		Lack of interest, attitude toward malpractice (IV)	Malpractice of suctioning (DV)
Attitude toward medical errors (IV)	Pearson Correlation	1	.721**
	Sig. (2-tailed)		.0093
	N	350	530
Malpractice of suctioning (DV)	Pearson Correlation	.721**	1
	Sig. (2-tailed)	.0093	
	N	350	350

The ANOVA table examines whether the independent variables, attitude towards medical errors, and lack of interest, are significant in predicting malpractice in suctioning. The ANOVA

table above shows that the value for F is 1.712 with a significance value/p-value of 0.019, which is less than 0.05.

Table 5

ANOVA^a

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	.433	1	.433	1.712	.019 ^b
	Residual	29.109	349	.253		
	Total	29.542	350			

- a. Dependent Variable: malpractice of suctioning
- b. Independent variable: attitude toward medical error, lack of interest

The multiple regression analysis describes the relation of independent variables with attitude towards medical errors and lack of interest, towards the dependent variable, malpractice of suctioning. The constant, representing the intercept, is 1.846, which shows the level of malpractice of suctioning if both the independent variables are zero. The beta value for attitude towards medical errors, one of the predictors, is 0.720; this means that for every increase in one unit in attitude towards medical error, the malpractice of suctioning increases 0.720 units while keeping lack of interest constant. This is

a strong predictor because the standardized coefficient Beta = 0.828. This effect is statistically significant at t = 0.989 and at p < 0.001. Similarly, the unstandardized coefficient for lack of interest is 0.927, indicating that with every one-unit increase in lack of interest, the malpractice of suctioning increases by 0.927 units, when attitude toward medical errors is controlled. This is also reflective of its standardized coefficient, Beta = 3.661, showing a strong effect, and it is highly significant at t = 9.097, p < 0.001

Table 6

Coefficients ^a		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
Model		B	Std. Error	Beta		
1	(Constant)	1.846	.199		9.295	.000
	Attitude toward medical errors	.720	.053	.828	.989	.000
	Lack of interest	.927	.847	3.661	9.097	.000

a. Dependent Variable: malpractice of suctioning

The table of regression analysis depicts the impact of interventional errors (Mediator) on malpractice of suctioning. The constant term in the regression equation is 1.846, which represents the expected magnitude of malpractice of suctioning when interventional errors are zero. The unstandardized coefficient for interventional errors is 0.720, implying that for each unit rise in interventional

errors, an increase of 0.720 units in malpractice of suctioning can be projected. The Beta coefficient, also known as the standardized coefficient, is 0.828, which depicts that it is an excellent predictor for malpractice of suctioning. The relationship between them is statistically significant since the t-value is 3.9891, and $p < 0.001$, implying that it significantly affects malpractice of suctioning.

Table 7

Coefficients ^a		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
Model		B	Std. Error	Beta		
1	(Constant)	1.846	.199		9.295	.000
	Interventional errors(mediator)	.720	.053	.828	3.9891	.000

. Dependent Variable: malpractice of suctioning

Table 8

Sample

Size: 350

Outcome Variable: IE

Model Summary

R	R ²	MSE	F	df1	df2	p
.0388	.0019	.6018	.5995	1	348	.4392

Model Coefficients

Predictor	Coeff	SE	t	p	LLCI	ULCI
Constant	3.7156	.1264	29.3977	.0000	3.4671	3.9641
LOI	.0355	.0459	.7743	.4392	-.0547	.1258

As indicated above, the R² value of .0015 shows variance in Interventional Errors (IE). that Lack of Interest (LOI) explains only 19% of the

Outcome Variable: MPOS

Model Summary

R	R ²	MSE	F	df1	df2	p
.2399	.0675	.3334	12.1186	2	347	.0000

Model Coefficients

Predictor	Coeff	SE	T	p	LLCI	ULCI
Constant	4.2913	.1675	25.6126	.0000	3.9619	4.6206
LOI	.1237	.0342	3.6184	.0003	.0565	.1910
IE	-.1297	.0373	-3.4761	.0006	-.2031	-.0563

As indicated above R-sq value is .0675 which means approximately 6.75% by NA, an independent MPOS which is dependent variable is get affected variable. P-value .000 means significant relation.

Direct and Indirect Effects (LOI → MPOS)

Direct Effect

Effect	SE	t	p	LLCI	ULCI
.1237	.0342	3.6184	.0006	.0665	.1810

Indirect Effect via IE

Mediator	Effect	BootSE	BootLLCI	BootULCI
IE	-.0045	.0064	-.0177	.0065

According to PROCESS (Hayes) mediation analysis, the direct effect of Lack of Interest (LOI) on Malpractice of Suctioning (MPOS) was positive and statistically significant ($\beta = .1237$, $p = .0006$), indicating that higher lack of interest is associated with increased malpractice of suctioning. This shows that LOI independently predicts MPOS. However, the indirect effect of LOI on MPOS through Interventional Errors (IE) was not statistically significant, as the bootstrapped confidence interval included zero (BootLLCI = $-.0177$, BootULCI = $.0065$). This suggests that interventional errors do not serve as a mediating mechanism in this relationship. Overall, the findings indicate that while lack of interest directly contributes to malpractice of suctioning, its effect is not transmitted through interventional errors, confirming the absence of mediation under PROCESS Model 4.

Negative Attitude (NA) → Mediator: Interventional Errors (IE)

Outcome Variable: IE

Model Summary

R	R ²	MSE	F	df1	df2	p
.0075	.0001	.6027	.0224	1	348	.8811

Model Coefficients

Predictor	Coeff	SE	t	p	LLCI	ULCI
Constant	3.7785	.2061	18.3367	.0000	3.3734	4.1836
NA	.0084	.0562	.1497	.8811	-.1020	.1189

Outcome Variable: MPOS

Model Summary

R	R ²	MSE	F	df1	df2	p
.1741	.0303	.3431	6.2020	2	347	.0022

Model Coefficients

Predictor	Coeff	SE	t	P	LLCI	ULCI
Constant	4.4054	.2112	20.8622	.0000	3.9903	4.8206



NA	.0532	.0424	1.2541	.2106	-.0302	.1365
IE	-.1248	.0378	-3.3004	.0011	-.1992	-.0505

Direct and Indirect Effects (NA → MPOS)

Direct Effect

Effect	SE	T	p	LLCI	ULCI
.0532	.0424	1.2541	.2106	-.0302	.1365

Indirect Effect via IE

Mediator	Effect	BootSE	BootLLCI	BootULCI
IE	-.0010	.0069	-.0149	.0130

The results show that Negative Attitude (NA) is not a significant predictor of Interventional Errors (IE), as it accounted for a negligible amount of variance in IE ($R^2 = .0001$, $p = .881$). The overall model for Malpractice of Suctioning (MPOS) was significant, accounting for 3.03% variance, largely because of the contribution of IE. Interventional Errors were found to have a significant negative impact on MPOS ($\beta = -.125$, $p = .001$), while NA was not found to have a direct impact on MPOS ($p = .211$). The direct effect of NA on MPOS was non-significant, indicating no independent association.

DISCUSSION

The aim of this research was to explore the factors that affect the malpractice of suctioning in intensive care unit nurses, particularly the lack of interest and negative attitudes towards medical errors, and to examine the mediating role of interventional errors. On the basis of the Theory of Planned Behavior, the findings of this research provide significant empirical evidence for the relationship between psychological and behavioral factors and the malpractice of suctioning.

The result of the correlation analysis showed a statistically significant positive relationship between lack of interest and malpractice of suctioning ($r = 0.521$, $p < 0.05$). This result shows that as the interest and involvement of the nurses decrease, the chances of malpractice during suctioning also increase. This result is in line with previous studies that have shown a lack of motivation and disengagement to be associated with a lack of adherence to clinical protocols (Janatolmakan, 2022).

From the viewpoint of the Theory of Planned Behavior, a lack of interest affects the strength of behavioral intention and perceived behavioral control, resulting in decreased performance. Disengaged nurses might be less vigilant about procedural aspects, less likely to update their knowledge, and more likely to take shortcuts, thus being at risk of improper suctioning practices (Tekle et al., 2024). The results showed a strong positive correlation between negative attitudes towards medical errors and malpractice of suctioning ($r = 0.721$, $p < 0.05$). This implies that nurses who display careless and indifferent attitudes towards patient safety and medical errors are more likely to commit malpractice. These results support the existing global and local evidence that negative attitudes towards safety regulations are associated with poor adherence to evidence-based practices (Niknejad et al., 2019).

Regression analysis also supported the attitude towards medical errors as a predictor of malpractice of suctioning ($\beta = 0.828$, $p < 0.001$). This supports the Theory of Planned Behavior, which suggests that attitudes are an important predictor of intentions and actual behavior in a clinical setting. The negative attitude of nurses may result in the perception of suctioning as less important, leading to rushed procedures, unpreparedness, and failure to follow safety protocols (Singh et al., 2023). The ANOVA and multiple regression analysis showed that lack of interest and attitude towards medical errors are significant predictors of malpractice of suctioning ($F = 1.712$, $p = 0.019$). Both variables had strong and significant influence, indicating that malpractice is not due to a single factor but the combined

influence of motivational and attitudinal deficiencies (Hagger et al., 2024).

CONCLUSION

These results support previous studies that indicated knowledge alone is not a guarantee for safe practice and that psychological factors need to be considered to prevent clinical errors (Sunny et al., 2021). Among the most important contributions of this study is the discovery of interventional errors as a mediator between cognitive factors and malpractice of suctioning. Analysis of regression shows that interventional errors were significant predictors of malpractice of suctioning ($\beta = 0.828$, $p < 0.001$). This confirms that procedural errors act as the immediate behavioral mechanism through which lack of interest and negative attitudes translate into malpractice (Yildirim & Aksu, 2024). These findings are strongly supported by prior empirical studies demonstrating that repeated technical errors, such as prolonged suction duration, improper catheter insertion, and failure to maintain aseptic technique, precede adverse patient outcomes and malpractice events (Karimi & Darvishi, 2024). The mediation effect supports the theoretical assumption that attitudes and motivation influence behavior indirectly through execution quality, consistent with the Theory of Planned Behavior.

Despite the strengths, the current research faces some limitations. Being cross-sectional, the research faces limitations in terms of establishing the nature of causality, which is not possible in cross-section studies, as the relationships established cannot ascertain the order of time. Moreover, the application of non-probability purposive sampling faces the possibility of establishing biases within the research. Finally, the failure to apply direct observation in the validation process of the suctioning procedures may indicate that the research was based on self-report data, which may not accurately present the data within the healthcare setting.

Based on the findings from the study, a number of recommendations can be provided. In the clinical

setting, competency-based suctioning skills training should be conducted on a regular basis among ICU nurses. Regular auditing mechanisms should be put in place in the hospital setting to test suctioning procedures. Furthermore, motivational problems that can influence the nurses towards better performance should be addressed by the nurse managers. At the organizational level, the healthcare organizations should put mechanisms in place that define the required suctioning techniques. Patient safety culture programs should also be implemented to promote positive attitudes towards medical errors and support open reporting practices. Providing adequate staffing and resources is imperative to increase nurses' behavioral control and mitigate risk factors related to nurse practices. In further research endeavors, it would be important to conduct longitudinal or intervention research and apply direct observational techniques to test self-reports on practices and behaviors.

A broader study across various provinces and settings can also aid generalizability and increase research relevance and generalizability. In further research, it would also be important to investigate and analyze further variables related to mediating or moderating factors and conduct research on the application and implementation of targeted behavioral and educational intervention practices to mitigate malpractice and promote improved patient safety outcomes. The findings of this study provide strong evidence that a lack of interest and negative attitudes towards medical errors are key factors in malpractice related to suctioning in ICU nurses, primarily through the mediating effect of interventional errors. The application of the Theory of Planned Behavior in this study highlights the importance of considering the psychological and behavioral aspects in addition to technical training.

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