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Research Article

Develop and Validate Intubation Checklist for Critically Ill Patients Admitted in Intensive Care Units of the Teaching Hospital of Navi Mumbai

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Abstract

Aims: This study aims to develop and validate intubation checklist for critically ill patients admitted in intensive care units of the teaching hospital of Navi Mumbai.

Materials and Methods: Expert data for an intubation checklist for critically ill patients are gathered using the Delphi method. The Delphi method is a structured communication technique or method that uses a panel of experts to make decisions. In three rounds, the experts respond. A facilitator or change agent summarizes the experts' predictions and the reasons they gave for their predictions after each round. Experts are thus encouraged to revise previous responses in light of the responses of other panelists.

Results: The findings show that agreement for development intubation has increased. One hundred percent of the 15 experts strongly agreed. Endotracheal intubation complications are reduced by 86.7% when using the endotracheal intubation checklist. The content of this endotracheal intubation checklist is appropriate in 80% of cases. The checklist for endotracheal intubation is superior to the protocol.

Conclusion: A critically ill patient intubation checklist was created and validated. In total, 42 items were suggested by experts. In rounds two and three, the expert consensus was accepted, and the majority of items in both rounds had no significant differences in opinion. Item-Content Validity Index (CVI) (below 0.78) and slightly different opinions were removed. The final checklist included 41 items with 100% expert agreement, a high CVI-I of ranking agreement, and an inter-rater reliability of 0.94, indicating that the tool is highly valid and reliable.

Keywords: Critically Ill patients, intensive care unit, intubation

Introduction

Patients in critical care units are those who are facing serious and life-threatening conditions. The critical care area focuses on caring for seriously ill patients. In their critical care units, these patients are best treated by experienced personnel.[1] Their situation necessitates constant monitoring by life support equipment to maintain their normal physiological functions.[2] A critical emergency invasive procedure is required to provide this life support and maintain the patient's physiological function. Intubation is the medical term for this procedure.

Intubation is a common and emergency medical procedure in the intensive care unit that entails inserting a flexible plastic tube into the patient's trachea.[3] The first priority in the resuscitation of any critically ill patient is to secure the airway and persuade adequate ventilation.[4] Intubation is required for at least one of the reasons listed below. Inability

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to maintain airway patency, failure to protect the airway from aspiration, failure to ventilate, failure to oxygenate, anticipation of a deteriorating course leading to respiratory failure, acute respiratory distress syndrome, respiratory rate >40 breaths/min, PCO_2 >60 mmHg, PO_2 <60 mmHg on a Fio_2 1.0, head injury, and Glasgow Coma Scale (GCS) score less than eight, and so on.[5]

Because of their unstable and weak circumstances, critically sick patients have highly deranged vital organs and functions, have a very poor immunity, and are susceptible to a variety of life-threatening illnesses as a result of their severely deranged vital organs and functions. In addition to being often out of breath, they require help with spontaneous breathing, which is given by artificial ventilation. In addition, this helps to avoid the collapse of patients' physiological systems as well as inadequate gas exchange inside the lungs, allowing their condition to recover.[2]

In an emergency, intubation is the gold standard for airway management. It entails inserting a tube into the trachea through the mouth, after which a patient can be placed on a ventilator to help with breathing during severe illness and sedation. The intubation indicates that the patient is unable to maintain their airway or breathe on their own. Hypoxia, trauma, lung failure, and an inability to protect the airway from aspiration are all possible causes.[6]

According to an article, SARS, ARDS, and respiratory issues affect 35 million critically ill patients intubated around the world. The decision to intubate is usually made solely on the basis of real or potential airway compromise, expected medical course, ventilatory failure, or a GCS score of less than eight, among other factors. Endotracheal intubation can cause life-threatening complications and is often regarded as a high-risk procedure, resulting in high morbidity and mortality, with up to 40% of cases resulting in marked hypoxemia or hypotension. Intubation of critically ill patients is also linked to an increased risk of hypoxia, cardiovascular collapse, and aspiration with a failed first pass attempt or a few tries, as well as death. Intubation is frequently required for these critically ill and injured patients. Because of the urgency of the situation, the lack of time for guidance, the presence of a full stomach, and hemodynamic and breathing decompensation, these patients are frequently prone to damaging events during intubation.[7]

The main indications for intubation were acute respiratory failure, shock, and coma, according to a prospective multi-center observational study conducted to assess the clinical practice and risk factors for immediate complications of Endotracheal Intubation in the Intensive Care Units. Residents performed 148 endotracheal intubations (59%), with one severe complication occurring in 71 ETIs (28%): Severe hypoxemia (26%), hemodynamic collapse (25%), and cardiac arrest (25%). Difficult intubation (12%), cardiac arrhythmia (10%), esophageal intubation (5%), and aspiration (5%) were the other complications (2%). The presence of acute respiratory failure and the presence of shock as a reason for endotracheal intubation were found to be independent risk factors for complications.[8]

Objectives

The objectives are as follows:

- To identify the existing practices in relation to intubation
- To develop intubation checklist using Delphi technique
- To validate the content and construct the intubation checklist for critically ill patients.

Materials and Methods

Research approach

The Delphi approach is being utilized to collect data from specialists in order to construct an intubation checklist for critically sick patients, which is being developed. In its initial form, the Delphi method was a structured communication approach or process that was designed as a methodical, participatory forecasting method that relied on a panel of experts to provide forecasts. Three rounds of questions are administered to the experts. At the conclusion of each round, a facilitator or change agent delivers an anonymized summary of the experts' projections from the previous round, as well as the explanations they gave for their decisions in the previous round. Because of this, experts are encouraged to alter their prior responses in light of the responses from other members of their panel.

Sample size

To select and list the items for the intubation checklist, a group of 15 experts participated in three Delphi rounds, which were done in this study.

Identification and selection of Delphi experts

Criteria to identification of Delphi experts

To conduct the current study, non-probability purposive sampling was used to identify and choose specialists from a variety of hospitals, with the results being published online. The following criteria were used to choose the Delphi specialists for the Delphi project.

- Registered nurse with GNM/BSc/MSc/Nurse practitioner qualification and 5 years' experience in Intensive Care Unit
- Intensive Care Unit consultants with MBBS/MD in medicine
- Anesthetist with MD in anesthesia
- Willing to participate in all three rounds
- Available at the time of study

Selection of Delphi experts

Intensive care unit nursing team consists of five registered nurses: Nurse practitioners, staff nurses, in charge nurses, and nurse management. Five anesthetists and five intensive care unit consultants consented to serve as the study's expert witnesses. The researcher contacted each expert and received informed consent for them to participate as one of the experts

after explaining the objective and method of this study to each individual expert.

Description of the tool

Tool 1: Observation checklist to assess the existing practices in relation to endotracheal intubation in intensive care units

The observational checklist consisted of total ten items in relation to existing practices of endotracheal intubation. The items were arranged: -

1. Endotracheal intubation protocol available in the hospital
2. Checklist available to assess the pre-, intra-, and post-procedure of endotracheal intubation
3. Types of intubation performed in the hospital
4. Identifying all indications for endotracheal intubation priorly
5. Obtaining informed consent from concerned person
6. Availability of written protocol for endotracheal intubation related to immediate complication
7. Availability of well-equipped endotracheal intubation trolley
8. Endotracheal intubation supervised by higher authority/ senior consultant
9. Strict aseptic techniques followed during procedure
10. Documentation policy available for endotracheal intubation.

Tool 2: Open ended questionnaire

To obtain the opinions from Delphi experts the researcher divided the questionnaire into two sections:

Section A

Demographic data with the following five items:

1. Code of the expert
2. Designation
3. Qualification
4. Area of experience
5. Year of experience.

Section B

Contains five open ended questions which included:

1. Identification data
2. Pre preparation Information
3. During procedure information
4. Post management information.

The Delphi experts must fill the blank space with their opinions under the respective questions by listing the items to be included in the intubation checklist.

Tool 3: Five-point Likert scale to assess the level of agreement of Delphi experts in round three

A five-point Likert scale was prepared to find the level of agreement of the Delphi experts in round three. The level of agreement given in the tool was (1) strongly disagree, (2) disagree, (3) neutral, (4) agree, and (5) strongly agree. There were tool five items in the tool.

Tool 4: Intubation checklist

In Tool 4, checklist was prepared based on the consolidated list of opinions discovered from Tool 2 in round one. The researcher organized the items in the checklist under four sub-headings:

1. Identification Data – 9 items
2. Pre preparation Information – 11 items
3. During procedure information – 11 items
4. Post management information – 11 items.

The tool had three columns against each item. In round two The Delphi experts were asked to give their opinion by instructing them to put trick against the columns with options Yes or No. Yes, option must be ranked according to the perceived priority of the experts in the adjacent column.

Results

Analysis of the study is organized and presented in the following sections

Section 1: Analysis of the existing practices in relation to endotracheal intubation in intensive care units

Section 2: Distribution of demographic variables of Delphi experts

Section 3: Distribution of response in round one

Section 4: Opinion of experts for inclusion of items in round two and three

- Section 4.1: Opinions of experts for inclusion of items on identification data in round two and three.
- Section 4.2: Opinions of experts for inclusion of items on pre-preparation information in round two and three.
- Section 4.3: Opinions of experts for inclusion of items on during procedure in round two and three.
- Section 4.4: Opinions of experts for inclusion of items on post management in round two and three.

Section 5: Analysis of level of agreement of Delphi experts in round three

Section 6: Content validity of tool

- Section 6.1: Content validity index (CVI) of experts or inclusion of items in round three
- Section 6.2: Item wise CVI
- Section 6.3: Items with low CVI.

Section 1: Analysis of the existing practices in relation to endotracheal intubation in intensive care units

Table 1 illustrates that out of five intensive care units, all the units 5 (100%) had a endotracheal intubation protocol in the hospital, 5 (100%) had a laryngoscopy assisted type of endotracheal intubation performed in their unit, 5 (100%) identifying indications for endotracheal intubation priorly, 100% obtains informed concern from the concerned person

Table 1: Existing practices in relation to endotracheal intubation in various intensive care units (*n*=5)

S. No.	Content	Frequency	Percentage
1.	Endotracheal intubation protocol available in the hospital	5	100
2.	Checklist available to assess the pre, intra and post procedure of endotracheal intubation	0	0
3.	Types of intubation performed in the hospital		
3a.	Laryngoscopy-assisted endotracheal intubation	5	100
3b.	Video Laryngoscopy-assisted endotracheal intubation	0	0
4.	Identifying all indications for endotracheal intubation priorly	5	100
5.	Obtaining informed consent from the concerned person (family members)	5	100
6.	Availability of written protocol for endotracheal intubation related to immediate complication	0	0
7.	Availability of well-equipped endotracheal intubation trolley	5	100
8.	Endotracheal intubation supervised by higher authority/senior consultant	2	40
9.	Strict aseptic techniques followed during procedure	5	100
10.	Documentation policy available for endotracheal intubation	2	40

(family members), 100% had a well-equipped endotracheal intubation trolley, but 2 (40%) endotracheal intubation supervised by higher authority/senior consultant, 100% strict aseptic techniques followed during procedure, and 2 (40%) had a documentation policy for endotracheal intubation. None of the intensive care unit had a checklist to assess the pre-, intra-, and post-procedure of endotracheal intubation and written protocol for endotracheal intubation related to immediate complication.

Section 2: Analysis of the distribution of demographic variables of Delphi experts (*n*=15)

Figure 1 illustrates that out of 15 expert's majority experts were 5 (33.3%) anesthetists as well as 5 (33%) were intensivists of various hospital, 2 (13.3%) were nurse practitioners, and only 1 (6.7%) remaining were nurse manager, in charge nurse and staff nurse.

Figure 2 illustrates that out of 15 experts, majority were MD in anesthesia 5 (33.3%), 3 (20%) were MD in emergency medicine and B.sc Nursing, 2 (13.3%) were nurse practitioner in critical care, and 1 (6.7%) were MD in geriatric medicine and MD in pediatrics.

Figure 3 illustrates that out of 15 experts, equal number of the experts' 5 (33.3%) had an experience in EMSICU as well as ICU and OT, 3 (20%) had PICU experience, and 1 (6.7%) had cardiac ICU and MICU experience.

Figure 4 illustrates that out of 15 experts, majority of 7 (46.7%) had 0–5 years of experience, 3 (20%) had 5–10 years of experience and 6–10 years of experience, and only 2 (13.3%) had 15–20 years of experience.

Section 3: Distribution of response in round one

Table 2 shows that in identification data, 15 (100%) experts suggested patient name, age and sex, 12 (80%) suggested indication for intubation, in pre-preparation information, 15 (100%) suggested preoxygenation, 7 (46.7%) suggested obtain informed consent, in during procedure 15 (100%) suggested 3 min pre-oxygenate the patient and drug administration 7 (46.7%) suggested connect the $ETCO_2$, in post management 11 (100%) suggested initiate the mechanical ventilation and watch for immediate

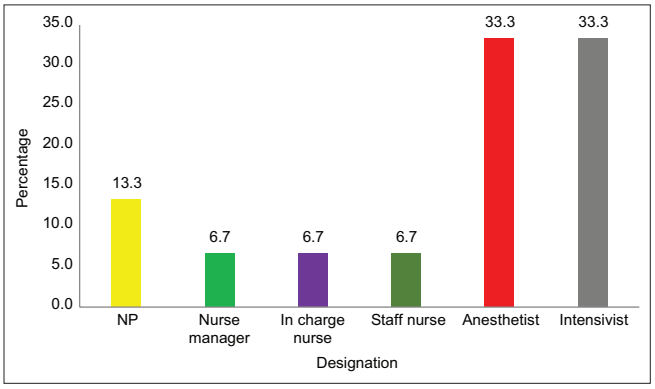

Figure 1: Designation of Delphi experts

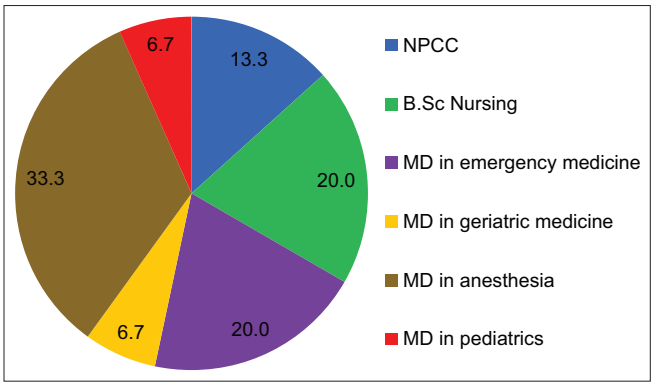

Figure 2: Qualification of Delphi experts

complication, and 11 (73.30%) suggested any special information.

Section 4: Opinion of experts for inclusion of items in round two and three

Section 4.1: Opinions of experts for inclusion of items on identification data in round two and three

Table 3 compares the identification data between the rounds of 2 and 3. The items patient name, age, sex, Op/IP No, and indication for intubation were negatively correlated between the two rounds and were not statistically significant ($P > 0.05$). The admission diagnosis, incubator name/designation,

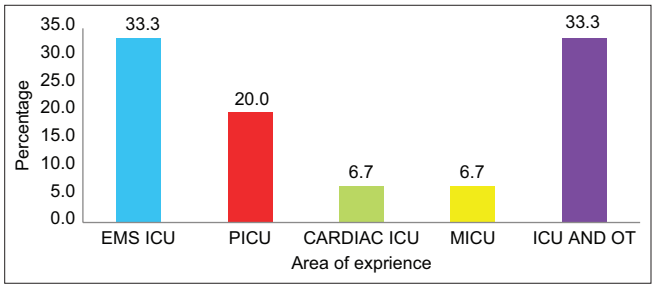

Figure 3: Experience of Delphi experts (area)

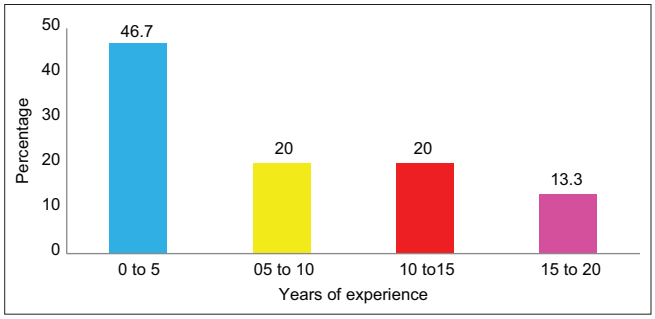

Figure 4: Experience of Delphi experts (years)

supervisor name and designation, and type of intubation were positively correlated and they were also not statistically significant ($P > 0.05$). It shows that there was no significant correlation between round 2 and round 3 inclusion items in identification data.

Section 4.2: Opinions of experts for inclusion of items on pre-preparation information in round two and three

Table 4 states that the comparison between the rounds 2 and 3 in respect of pre preparation. The variables such as Monitor Vitals, Check the O_2 Supply, ET tube keep ready, all intubate medications, and Obtain Consent were negatively correlated between the rounds 2 and 3. They were not statistically significantly differed ($P > 0.05$). The variables patient assessment secure IV line, Check the function, Check the ET tube, Availability of Crash Cart, and Role assignment were positively correlated. However, the correlations were not statistically significant ($P > 0.05$). It shows that there was no significant correlation between round 2 and round 3 inclusion items in pre preparation.

Section 4.3: Opinions of experts for inclusion of items on during procedure in round two and three

Table 5 states the comparison of parts of the during procedure between the rounds 2 and 3. The following variables such as Sniffing, Min 3 With bag Mask, monitor vital Signs, If Needed Suctioning, Insert ET heal Tube, Connect AMBU Bag start Ventilator, Confirm ET placement of 5Pt auscultation and Inflate the Cuff were negatively correlated between the rounds 2 and 3. The correlations were not statistically significant ($P > 0.05$). The drug administration, connect $ETCO_2$ and secure ET tube with tape were positively correlated. The relationships were not statistically significant ($P > 0.05$). It shows that there was no significant correlation between round 2 and round 3 inclusion items in during procedure.

Section 4.4: Opinions of experts for inclusion of items on post management in round two and three

Table 6 states the comparison of post management at rounds-2 and 3. The variables, namely, Initiate Mechanical, Monitor Vital, Head End Elevation, ABG, Insert Oro pharyngeal airway, watch for post Intubation Complications and document the procedures were negatively correlated between the rounds 2 and 3. The correlation coefficients were not statistically significant ($P > 0.05$). The variables, namely, Chest X-ray, sedation and Paralysis and any special information were positively correlated. They were also not statistically significantly correlated ($P > 0.05$). It shows that there was no significant correlation between round 2 and round 3 which means there is no changes in Delphi experts opinion for inclusion items in post management of intubation procedure.

Section 5: Analysis of level of agreement of Delphi experts in round three

Table 7 illustrates that in round three out of 15 experts, 15 (100%) strongly agreed with Convenient for the health-care provider, 14 (93.3%) with it is useful to reduce the endotracheal intubation complications, 13 (86.7%) with the endotracheal intubation checklist is appropriate to use in ICUs and content used to design this endotracheal intubation checklist is appropriate, 12 (80%) the endotracheal intubation checklist is better than protocol available ones.

Section 6: Content validity of tool

Section 6.1: Expert wise CVI of tool from round three

Table 8 indicates that 33.3% of CVI-e is 1, 40% of CVI-e is above 0.97%, 20% of CVI-e is above 0.95 and 6.7% is of CVI-e is above 0.92 which shows high CVI. The CVI of tool is 0.97 which shows it is highly valid tool.

Section 6.2: Item wise CVI from round 3

Table 9 represents that CVI-I with 1 are patient name, age, sex, OP/IP number, admission diagnosis, indication for intubation, Monitor Vitals, Check the functioning of Laryngoscope with blade (± 1 size), Check the O_2 supply suction battle, Keep ready of Yank Auer Suction $ETCO_2$ device approximate size ET Tube (± 2 sizes) oropharyngeal airway stylet and bougie, Check the ET Tube Cuff for any leakage, All rapid sequence intubation medications ready to administer, Availability of Crash Cart, Obtain Consent, 3 min Pre-Oxygenation, if needed suctioning, Drug Administration, Insert Endotracheal Tube with direct visualization of the vocal cords with the help of Laryngoscope, Connect AMBU Bag and start ventilation, Confirm ET Placement with help of 5-point auscultation, Inflate the cuff, Connect $ETCO_2$, Secure ET Tube with tape, Initiate Mechanical Ventilation, Chest X-ray, Monitor the vitals, Head-End Elevation (30–45°), Suction if required, Sedation and paralysis infusion started,

Table 2: Distribution of items based on responses of experts from round one (*n*=15)

Item No.	Item to be included in Checklist	Frequency of experts	Percentage of expert
I)	IDENTIFICATION DATA		
1	Patient Name	15	100.0
2	Age	15	100.0
3	Sex	15	100.0
4	OP/IP No	7	46.7
5	Admission diagnosis	8	53.3
6	Indication for intubation	12	80.0
7	Name of the intubator/designation	7	46.7
8	Name of the supervisor/designation	7	46.7
9	Type of intubation	5	33.3
II)	PRE-PREPARATION		
2.1	Patient Preparation		
10	Assessment of the patient Identify H/O difficulty intubation Level of consciousness Allergic status Loose teeth	13	86.7
11	Monitor vitals Pulse Respiration SpO_2 Blood Pressure	15	100.0
12	Secure IV line or check the patent of IV line, start rescue fluid	12	80.0
2.2	Preparation of equipment's		
13	Check the functioning of Laryngoscope with blade (± 1 size)	9	60.0
14	Check the O_2 supply suction battle	9	60.0
15	Oropharyngeal airway stylet both	11	73.3
16	Check the ET Tube Cuff for any leakage	7	46.7
17	All rapid sequence intubation medications ready to administer	11	73.3
2.3	Team Preparation		
18	Availability of crash cart	4	26.7
19	Role assignments: Airway assistant, drug assistant, monitor assistant	4	26.7
20	Obtain consent	7	46.7
III)	DURING PROCEDURE		
21	Sniffing position (if cervical trauma not suspected)	10	66.7
22	3 min pre-oxygenation	15	100.0
23	Monitor vitals		
24	If needed suctioning	7	46.7
25	Drug administration Inj. Atracurium 0.2–0.4 mg/kg/IV Inj. Succinylcholine 1–1.5 mg/kg/IV Inj. Etomidate 0.3 mg/kg/IV Inj. Propofol 1–1.5 mg/kg/IV Inj. Fentanyl 2 mcg/kg/slow IV over 2 min Inj. Midazolam 0.3 mg/kg/IV Inj. Glycopyrrolate 1 ml/IV	15	100.0
26	Insert endotracheal tube with direct visualization of the vocal cords with the help of Laryngoscope	10	66.7
27	Connect AMBU bag and start ventilation	5	33.3
28	Confirm ET placement with help of 5-point auscultation	10	66.7
29	Inflate the cuff	12	80.0
30	Connect $ETCO_2$	7	46.7
31	Secure ET Tube with tape	10	66.7
IV)	POST MANAGEMENT		
32	Initiate mechanical ventilation	15	100.0
33	Chest X-ray	14	93.3
34	Monitor the vitals	12	80.0
35	Head-end elevation (30–45°)	11	73.3
36	Suction if required	10	66.7
37	ABG	8	53.3
38	Insert oropharyngeal airway if required	8	53.3
39	Sedation and paralysis infusion started	7	46.7
40	Watch for post intubation complications Displacement off ET tube Obstructions	10	66.7

(Contd...)

Table 2: (*Continued*)

Item No.	Item to be included in Checklist	Frequency of experts	Percentage of expert
	Pneumothorax	15	100.0
	Equipment Failure		
	Stacked breath		
41	Document the procedure		
	ET tube number	12	80.00
	ET fixation number		
	Number of attempts		
	Time duration for endotracheal intubation		
42	Any special information	11	73.30

Table 3: Comparison of inclusion of items based on experts opinion on identification data in round two and three (Kendall's tau-b) (*n*=15)

S. No.	Item/variables	Rounds	Kendall's tau-b	*P* value	Significance at 5% level
1.	Patient name	2 and 3	−0.154	0.565	NS
2.	Age	2 and 3	−0.154	0.565	NS
3.	Sex	2 and 3	−0.196	0.463	NS
4.	Op/IP No	2 and 3	−0.448	0.085	NS
5.	Admission diagnosis	2 and 3	0.419	0.117	NS
6.	Indication for Intubation	2 and 3	−0.105	0.695	NS
7.	Intubator name/designation	2 and 3	0.367	0.170	NS
8.	Supervisor name and designation	2 and 3	0.108	0.679	NS
9.	Type of Intubation	2 and 3	0.083	0.752	NS

*Statistically significant at 5% level i.e., $P<0.05$

Table 4: Comparison of inclusion of items based on experts opinion on pre preparation in round two and three. (Kendall's tau-b) (*n*=15)

S. No.	Item/variables	Rounds	Kendall's tau-b	*P* value	Significance at 5% level
1.	Patient assessment	2 and 3	0.196	0.463	NS
2.	Monitor vitals	2 and 3	−0.154	0.565	NS
3.	Secure IV line	2 and 3	0.327	0.221	NS
4.	Check the function	2 and 3	0.080	0.765	NS
5.	Check the O_2 supply	2 and 3	−0.071	0.789	NS
6.	ET tube keep ready	2 and 3	−0.154	0.565	NS
7.	Check the ET tube	2 and 3	0.294	0.271	NS
8.	All intubate medications	2 and 3	−0.105	0.695	NS
9.	Availability of crash cart	2 and 3	0.423	0.113	NS
10.	Role assignment	2 and 3	0.389	0.110	NS
11.	Obtain Consent	2 and 3	−0.071	0.789	NS

*Statistically significant at 5% level, that is, $P<0.05$

Table 5: Comparison of inclusion of items based on experts opinion on during procedure in round two and three (Kendall's tau-b) (*n*=15)

S. No.	Item/variables	Rounds	Kendall's tau-b	*P* value	Significance at 5% level
1.	Sniffing position	2 and 3	−0.105	0.695	NS
2.	3 Min pre oxygenation with bag Mask	2 and 3	−0.134	0.617	NS
3.	Monitor vital signs	2 and 3	−0.071	0.789	NS
4.	If needed suctioning	2 and 3	−0.105	0.695	NS
5.	Drug administration	2 and 3	0.423	0.113	NS
6.	Insert ET heal tube	2 and 3	−0.196	0.463	NS
7.	Connect AMBU bag start ventilator	2 and 3	−0.105	0.695	NS
8.	Confirm ET placement of 5 point auscultation	2 and 3	−0.071	0.789	NS
9.	Inflate the cuff	2 and 3	−0.130	0.619	NS
10.	Connect $ETCO_2$	2 and 3	0.377	0.151	NS
11.	Secure ET tube with tape	2 and 3	0.318	0.224	NS

*Statistically significant at 5% level, that is, $P<0.05$

Watch for post intubation complications, Document the procedure, and Any special information. For the construction of tool, CVI-I with less than 0.78 can be removed from the checklist.

Table 6: Comparison of inclusion of items based on experts opinion on post management in round two and three. (Kendall's tau-b) (*n*=15)

S. No.	Item/variables	Rounds	Kendall's tau-b	*P* value	Significance at 5% level
1.	Initiate mechanical	2 and 3	−0.154	0.565	NS
2.	Chest X-ray	2 and 3	0.294	0.271	NS
3.	Monitor vital	2 and 3	−0.250	0.350	NS
4.	Head end elevation	2 and 3	−0.105	0.695	NS
5.	Suction if required	2 and 3	−0.154	0.565	NS
6.	ABG	2 and 3	−0.134	0.617	NS
7.	Insert Oro pharyngeal airway	2 and 3	−0.196	0.463	NS
8.	Sedation and paralysis	2 and 3	0.294	0.271	NS
9.	Watch for post intubation complication	2 and 3	−0.154	0.565	NS
10.	Document the procedure	2 and 3	−0.154	0.565	NS
11.	Any special information	2 and 3	0.402	0.117	NS

*Statistically significant at 5% level, that is, $P<0.05$

Table 7: Level of agreement of Delphi experts in round three (*n*=15)

S. No.	Items	Round 3					
		Strongly Agree		Agree		Neutral	
		f	%	f	%	f	%
1.	The endotracheal intubation checklist is appropriate to use in ICUs	13	86.7	2	13.3	0	0.0
2.	It is useful to reduce the endotracheal intubation complications	14	93.3	1	6.7	0	0.0
3.	Convenient for the health care provider	15	100.0	0	0.0	0	0.0
4.	Content used to design this endotracheal intubation checklist is appropriate	13	86.7	2	13.3	0	0.0
5.	The endotracheal intubation checklist is better than protocol available ones	12	80.0	2	13.3	1	6.7

Table 8: Content validity index of experts or inclusion of items in round three (*n*=15)

Expert No.	Identification data		Pre intubation preparation		During procedure		Post management		Overall	
	Number of items agreed (9)	CVI-e	Number of items agreed (11)	CVI-e	Number of items agreed (11)	CVI-e	Number of items agreed (11)	CVI-e	Number of items agreed (42)	CVI-e
1	9	1.000	11	1.000	11	1.000	11	1.000	42	1.000
2	9	1.000	11	1.000	11	1.000	10	0.909	41	0.976
3	9	1.000	10	0.909	11	1.000	10	0.909	40	0.952
4	9	1.000	10	0.909	11	1.000	11	1.000	41	0.976
5	9	1.000	10	0.909	11	1.000	11	1.000	41	0.976
6	9	1.000	11	1.000	11	1.000	11	1.000	41	0.976
7	9	1.000	10	0.909	11	1.000	10	0.909	40	0.952
8	7	0.778	10	0.909	11	1.000	11	1.000	39	0.929
9	9	1.000	11	1.000	10	0.909	11	1.000	40	0.952
10	9	1.000	11	1.000	11	1.000	11	1.000	42	1.000
11	9	1.000	11	1.000	10	0.909	11	1.000	41	0.976
12	8	0.889	11	1.000	11	1.000	9	0.818	39	0.929
13	9	1.000	10	0.909	11	1.000	10	0.909	40	0.952
14	9	1.000	10	0.909	11	1.000	11	1.000	42	1.000
15	9	1.000	11	1.000	11	1.000	10	0.909	41	0.976
				Total sum of CVI-e						14.524

Section 6.3: Items with low CVI

Table 10 represents that the items which scored CVI-I less than 0.78. Hence considered to Role Assignments: Airway Assistant, Drug Assistant, Monitor Assistant eliminate from checklist.

Discussion

Using Delphi methodologies, a critical illness intubation checklist for critically sick patients was conceived, produced, and validated in the current study. This list was compiled after three rounds of Delphi surveying to arrive at the final list of elements to be included in the checklist. In this study, the agreement stability for inclusion of an item in round three was measured by frequency, and the results revealed that the vast majority of experts firmly agreed with the checklist that had been established. Kendall's tau-b correlation coefficient was used to construct the agreement ranking, which revealed that there is no statistically significant difference between rounds two and three. As a result, consensus on ranking was reached between rounds two and three.

Table 9: Item wise content validity index from round 3 (*n*=15)

Item No.	Items	f	CVI-I
I)	IDENTIFICATION DATA		
1	Patient name	15	1.0
2	Age	15	1.0
3	Sex	15	1.0
4	OP/IP No	15	1.0
5	Admission diagnosis	15	1.0
6	Indication for Intubation	15	1.0
7	Name of the Intubator/Designation	15	1.0
8	Name of the supervisor/Designation	13	0.9
9	Type of intubation	12	0.8
II)	PRE-PREPARATION		
2.1	Patient Preparation		
10	Assessment of the patient	14	0.9
11	Monitor Vitals	15	1.0
12	Secure IV line or check the patent of IV line, Start rescue Fluid	14	0.9
2.2	Preparation of Equipment's		
13	Check the functioning of Laryngoscope with blade (± 1 size)	15	1.0
14	Check the O_2 supply suction battle	15	1.0
15	Keep ready of yank auer suction $ETCO_2$ device approximate size ET Tube (± 2 sizes). oropharyngeal airway stylet and bougie	15	1.0
16	Check the ET tube cuff for any leakage	15	1.0
17	All rapid sequence intubation medications ready to administer	15	1.0
2.3	Team Preparation		
18	Availability of crash cart	15	1.0
19	Role assignments: airway assistant, drug assistant, monitor assistant	9	0.6
20	Obtain consent	15	1.0
III)	DURING PROCEDURE		
21	Sniffing position (if cervical trauma not suspected)	14	0.9
22	3 min pre-oxygenation	15	1.0
23	Monitor vitals	14	0.9
24	If needed suctioning	15	1.0
25	Drug administration	15	1.0
26	Insert endotracheal tube with direct visualization of the vocal cords with the help of laryngoscope	15	1.0
27	Connect AMBU bag and start ventilation	15	1.0
28	Confirm ET placement with help of 5-point auscultation	15	1.0
29	Inflate the cuff	15	1.0
30	Connect $ETCO_2$	15	1.0
31	Secure ET Tube with tape	15	1.0
IV)	POST MANAGEMENT		
32	Initiate mechanical ventilation	15	1.0
33	Chest X-ray	15	1.0
34	Monitor the vitals	15	1.0
35	Head-end elevation (30–45°)	15	1.0
36	Suction if required	15	1.0
37	ABG	14	0.9
38	Insert oropharyngeal airway if required	12	0.8
39	Sedation and paralysis infusion started	15	1.0
40	Watch for post intubation complications	15	1.0
41	Document the procedure	15	1.0
42	Any special information	15	1.0

Table 10: Items with low content validity index from round 3

Item No.	Items	f	CVI-I
1	PRE-INTUBATION PREPARATION Role Assignments: Airway Assistant, Drug Assistant, Monitor Assistant	9	0.6

It was decided to use the Delphi method to determine the feasibility, validity, and reliability of a post-operative handover evaluation instrument, and it was done so by employing the Delphi methodology. Overall, the instrument was easy to use and inter-rater reliability was outstanding (r-0.96, $P < 0.01$), according to the findings.[9]

The content validity of the tool was determined by computing its CVI, which was 0.909, indicating that it is a highly valid instrument. The final checklist was created on the basis of the CVI-I guidelines.

Patients' DVT risk assessment tool, consisting of 27 questions with CVI of 0.986 and internal consistency (Cronbach's Alpha = 0.745), was the subject of this study, which was done to create and verify the validity and reliability of the instrument. The value of the interclass correlation coefficient is 0.98, the value of Cohen's Kapa is 0.898, and the percentage agreement is 96%.[10]

It was conducted to develop and validate the post-operative nursing handover checklist, which consists of 54 items with a CVI of 0.909, a correlation coefficient (Kendall's tau-b) of 0.92, and a reliability index of 0.91. The draught final checklist has a CVI of 0.90, a correlation coefficient (Kendall's tau-b) of 0.92, and a reliability index of 0.91.[11]

An intubation checklist was assessed in this study and found to have a reliability of 0.94 when measured by rater inter-rater reliability, indicating that the tool is quite trustworthy, according to the findings.

Conclusion

The current study aims to create and verify an intubation checklist for critically sick patients who were in the intensive care unit. An expert's recommendations included a total of 42 things in the form of numerals. It was discovered that the experts' consensus reached in rounds two and three was accepted, and that there was no statistically significant difference in opinion about the inclusion of the majority of items in either round. The items with a statistically significant difference in opinions, as well as the items with a low item-CVI (below 0.78), were eliminated. The final checklist was drafted with 41 items that received unanimous approval from all experts and a high CVI-I in terms of order of ranking agreement from all experts. The inter-rater reliability of the final draught of the intubation checklist was 0.94, indicating that the tool was highly valid and reliable when completed.

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