IJNH Innovational Journal of Nursing and Healthcare (IJNH)

www.ijnursing.com

Research article

Develop and validate postoperative nursing handover checklist for patients undergone general surgery in a teaching hospital of Navi Mumbai

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Abstract

Objectives: To develop and to validate the content and construct of postoperative nursing handover checklist for patients undergone general surgery.
Methods: Descriptive evaluative approach with quantitative research design-by using Delphi technique. Data collection was done in three rounds. In round, one open-ended questionnaire and in round two and three analysis checklist was prepared
Result: Analysis of opinion for significant difference in inclusion by using Wilcoxon signed rank test showed there was no significant difference in the opinion of experts in round two and three. Agreement for ranking of items was done by Kendall's tau-b (τ_b) correlation coefficient, indicates high correlation among experts for ranking of items between rounds two and three. The tool was validated by using content validity index, the content validity of tool is 0.909 which depicted, that the overall tool is highly valid. Content validity was measured by calculating item content validity of all items. Only 16.3% I-CVI was less than 0.78 and it was removed from the checklist. The final draft of the postoperative nursing handover checklist was pilot tested and the reliability was estimated by inter-rater reliability approach and the reliability of the tool was 0.9917, which showed that the tool is highly reliable.
Major conclusion: Surgical complications are a major cause of morbidity and mortality, but these complications are avoidable by the implementation of valid and reliable postoperative nursing handover in clinical settings which would enhance the surgical outcome and patient safety.

Key words: Delphi technique; Postoperative nursing handover checklist.

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1. Introduction

Handovers are defined as "the transfer of professional responsibility and accountability for some or all aspects of care for a patient or group of patients to another person or professional group on a temporary or permanent basis" [1]. Though handover is often defined in terms of exchange of information and transfer of responsibility, it also performs a number of other functions. Information transferred between health care professionals should include all relevant data, be accurate, unambiguous, and occur in a timely manner [2].

Surgical services are one of the fundamental health care services of the health care system. Surgical complications are a major cause of morbidity and mortality.

Access this article online

Website: www.ijnursing.com | ISSN No: 2454-4906

How to cite this article: Lijo John, Ponchitra.R. Develop and validate postoperative nursing handover checklist for patients undergone general surgery in a teaching hospital of Navi Mumbai. Inno J Nur Health 2018; 4(1): 15-23.

The transfer of care after surgery to the post-anesthesia care unit or intensive care unit presents special challenges to providers on both delivering and receiving teams [3].

Lack of communication has been observed in surgical patients in the preoperative, intra-operative, and postoperative time periods [1]. NCBI published an article in 2015 entitled, Compliance with Surgical Safety Checklist completion in the operating room of University of Gondar Hospital, Northwest Ethiopia states that over 234 million surgical operations are performed annually worldwide and complications occurred in 3–16 % of surgical procedures. But it has been estimated that at least half of the complications that occur are avoidable and therefore the safety of the surgical care is a global concern [4]. Effective handovers in surgery ensure continuity in patient care, from the point of admission, through to the operating theatre, recovery room, and back to the wards up to discharge from hospital [3].

The surgical patient is more vulnerable to handover errors than patients in other clinical specialties because of the high number of transitions in care that occur throughout the preoperative, intra- and postoperative phases of care. It is only logical to assume that the greater the number of transitions, the greater the need for handovers during the transitions and thus the greater the likelihood of information being distorted or lost across phases of care [3].

Post-operative care, as a mechanism for monitoring patient progress and detecting potential complications, is a traditional component of clinical nursing. Phipps [5] et al., 1999 states that the post-operative phase of surgery is the final phase of surgical experience; therefore nurses play a critical role in returning the client to an optimal level of functioning. Mortality and complications are undesirable but occur occasionally following any surgical procedures, traditionally, many complications are considered unavoidable and result from uncontrolled factors related to nature of the disease and general health conditions. The first few hours after a patient has been returned to the general ward is important because it is in this period that changes in the condition of a patient most easily occur. [5] There is a relationship between handovers and patient outcomes. As recognition of the risks inherent to patient, handovers has grown; increasing attention has focused on this process of care. It is important to characterize current practices in postoperative hand over's and to identify evidence-based methods to improve them. There is a need for structured and systemic approach to postoperative handover. Checklists cannot simply be dropped like a piece of paper on the desk and be expected to improve outcomes; they must be actively implemented and thoughtfully used. Standardizing this process can improve patient care by ensuring information completeness and accuracy and increasing the efficiency of the patient transfer process. These recommendations highlight the need to standardize postoperative handover and this study was aimed to develop and validate a post-operative nursing hand over the checklist.

Objectives of the study

- To develop post-operative nursing handover checklist for patients undergone general surgery
- To validate the content and construct of postoperative nursing handover checklist for patients undergone general surgery

2. Methodology

Research approach: Quantitative approach

Research design: Descriptive evaluative study - Delphi technique.

The Delphi method is a structured communication technique or method, originally developed as a systematic, interactive forecasting method which relies on a panel of experts. Delphi may be characterized as a method for structuring group communication process so that the process is effective in allowing a group of individuals, as a whole to deal with a complex problem [6].

Population

Target population: Nurses

Accessible population: Nurses working in surgical units

Sample: Nursing experts working with minimum 3years experience in surgical units and operation theatre

Sample size: Delphi experts – 60

Sampling technique: Non probability convenient sampling technique.

Sampling criteria

Inclusion criteria:

Nursing Experts;

- Having minimum 3 years experience in general surgical wards / Operation Theatre
- Willing to participate in all the Delphi rounds.
- Available during this study

Description of tool

Tool 1: Open-ended questionnaire

The researcher divided the questionnaire into two sections,

Section A - Demographic data with the following five items:

1. Age in years
2. Gender
3. Professional qualification
4. Working experience in years in current unit
5. Unit employed

Age, gender and work experience was given to fill whereas, in professional qualification and unit employed, options were given to be selected.

Section B: This contains four open-ended questions with blank spaces under each question which included

1. Identification data
2. Peri-operative information
3. Documentation
4. Any other items were framed.

The experts have to fill the blank space with their opinions under the respective questions by listing the items to be included in the postoperative hand over the checklist

Tool 2: Postoperative nursing handover checklist.

In Tool 2, the checklist was prepared based on the consolidated list of opinions discovered from Tool1in round one. The researcher organized the items in the checklist under three subheadings,

1. Identification data - 16 items
2. Peri-operative information - 23 items
3. Documentation - 16 items

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

Data collection process

In this study, data collection is divided into 3 phases.

Phase 1- Preliminary phase

Phase one started by preparation of open-ended questionnaire based on the researcher's self-experience and literature review on the postoperative nursing handover checklist. Researcher listed the hospitals and obtained permission from management for conducting the study and selected the Delphi experts by obtaining the informed consent.

Phase 2- Delphi survey

In this phase, the researcher conducted round one, two and three.

Round one

In this round one, researcher selected sixty experts with the consent and open-ended questionnaire was distributed among them. After two weeks, the initial feedback was received from the experts and based on it analysis was done. Based on the initial feedback, the given opinions for each question complied and a checklist was prepared.

Round two

The prepared checklist was distributed among the sixty experts explaining the tool and the results of round one. They were asked to fill Yes or No options and asked to rank the items orderly and priority wise. Fifty-one feedbacks were received back and analyzed for the agreement was performed.

Round three

Based on the round two feedback, cumulative frequencies of the given opinions for inclusion were calculated and the checklist was modified in terms of inclusion, exclusion, and rank. This checklist was distributed among the fifty-one experts and they again responded for inclusion/exclusion of items and ranked the items priority wise from which forty feedbacks were received.

Phase 3- Analytic Phase

When all experts have returned the responses feedbacks were analyzed for the agreement of inclusion of items and rank order. Based on the analysis, the final checklist was prepared by calculating consensus and agreement of the experts. Validation was done by calculation content validity index. Content validation should be built into scale both careful through efforts to conceptualize the construct, and through content validation procedures by a panel of experts- including the computing a content validity index at item level (I-CVI) , content validity index of each expert CVI-e and content validity index of the scale S-CVI [7]. The validated checklist was constructed to a newly developed postoperative nursing handover checklist.

3. Statistics and result

Table No 1: Significance of difference for the inclusion of items based on experts opinion on identification data in round two and three.

n = 40

Item No.	Items	Round 2		Round 3		Wilcoxon signed rank Test	P-value	Significance at 5% Difference
		Yes	%	Yes	%			
1.	Patient Identity Band	40	100	40	100	0.000	1.000	N.D
2.	Patient name	40	100	40	100	0.000	1.000	N.D
3.	Age	40	100	40	100	0.000	1.000	N.D
4.	IPD/OPD no.	40	100	40	100	0.000	1.000	N.D
5.	Sex	40	100	40	100	0.000	1.000	N.D
6.	Height	36	90	32	80	1.414	0.157	N.D
7	Weight	36	90	38	95	0.816	0.414	N.D
8	Allergy status	39	97.5	40	100	1.000	0.317	N.D
9	Diagnosis	40	100	40	100	0.000	1.000	N.D
10	Name of surgery	40	100	40	100	0.000	1.000	N.D
11	Date of surgery	40	100	37	92.5	0.000	1.000	N.D
12	Surgery unit	37	92.5	36	90	0.577	0.564	N.D
13	Elective/ Emergency Surgery	40	100	40	100	0.000	1.000	N.D
14	Name of the surgeon	40	100	39	97.5	1.000	0.317	N.D
15	MLC/ NON MLC	32	80	28	70	1.155	0.248	N.D
16	Paying /Charity	37	92.5	21	52.5	4.000*	<0.001	D

*statistically significant at 5% level i.e., P<0.05. (*Difference = D & No Difference = ND)

Table 1 shows that 100% of experts in both the round agreed had no difference of opinion in significant value for inclusion of patient identity band, patient name, age, IPD/OPD no., sex, and diagnosis, name of the surgery, date of surgery, elective/emergency surgery and name of the surgeon. There was a significant difference in opinion for the item paying/charity between both the rounds.

Table 2: Significance of difference for the inclusion of items based on experts opinion from round two and three on peri-operative information.

n = 40

Item .No.	Items	Round 2		Round 3		Wilcoxon signed rank Test	P-value	Significance at 5% Difference
		Yes	%	Yes	%			
1	Vital signs	40	100	40	100	0.000	1.000	ND
1.1	Temperature	40	100	40	100	0.000	1.000	ND
1.2	Pulse	40	100	40	100	0.000	1.000	ND
1.3	Respiration	40	100	40	100	0.000	1.000	ND
1.4	Blood pressure	40	100	40	100	0.000	1.000	ND
1.5	SpO_2	39	97.5	40	100	1.000	0.317	ND
2	Glasgow coma score	33	82.5	22	55	2.400*	0.016	D
3	RBS	40	100	35	87.5	2.236	0.025	D
4	Position of the patient	37	92.5	38	95	0.000	1.000	ND
5	Patient on oxygen/ room air	39	97.5	38	95	0.577	0.564	ND
5.1	If yes, then administered through	39	97.5	38	95	0.577	0.564	ND
6	NBM till	39	97.5	40	100	1.000	0.317	ND
7	Abdominal girth	37	92.5	22	55	3.638*	<0.001	D
8	Site of surgery	40	100	18	45	4.690*	<0.001	D
9	Suture site is intact	39	97.5	40	100	1.000	0.317	ND
10	Number of sutures	32	80	37	92.5	1.508	0.132	ND
11	Oozing from dressing	39	97.5	40	100	1.000	0.317	ND
12	Intravenous line	40	100	40	100	0.000	1.000	ND
12.1	Site	40	100	38	95	1.414	0.157	ND

Item .No.	Items	Round 2		Round 3		Wilcoxon signed rank Test	P-value	Significance at 5%
		Yes	%	Yes	%			Difference
12.2	Size	40	100	38	95	1.414	0.157	ND
12.3	Patency	39	97.5	40	100	1.000	0.317	ND
12.4	Onflow IV fluid	40	100	40	100	0.000	1.000	ND
12.5	Onflow IV medications	39	97.5	40	100	1.000	0.317	ND
13	Central line	39	97.5	25	62.5	3.742*	<0.001	D
13.1	Site	39	97.5	25	62.5	3.742*	<0.001	D
13.2	Size	39	97.5	25	62.5	3.742*	<0.001	D
13.3	Lumen	38	95	25	62.5	3.606*	<0.001	D
13.4	Last CVP of patient	36	90	22	55	3.500*	<0.001	D
14	Epidural line	39	97.5	39	97.5	0.000	1.000	ND
14.1	Insitu	39	97.5	39	97.5	0.000	1.000	ND
14.2	Intact	39	97.5	39	97.5	0.000	1.000	ND
15	Nasogastric tube	40	100	37	92..5	1.732	0.083	ND
15.1	Size	40	100	37	92..5	1.732	0.083	ND
15.2	Insitu	39	97.5	37	92..5	1.000	0.317	ND
15.3	Patient on continuous or hourly aspiration	39	97.5	37	92..5	1.000	0.317	ND
16	Name of the drains	40	100	39	97.5	1.000	0.317	ND
16.1	Site	40	100	39	97.5	1.000	0.317	ND
16.2	Located safely	40	100	39	97.5	1.000	0.317	ND
16.3	Any precautions to be taken care	39	97.5	39	97.5	0.000	1.000	ND
17	Foley's catheter	39	97.5	40	100	0.000	1.000	ND
17.1	Size of the Foleys catheter	40	100	40	100	0.000	1.000	ND
17.2	Consistency of urine	40	100	39	97.5	1.000	0.317	ND
17.3	Last urine output	40	100	40	100	1.000	0.317	ND
17.4	Located appropriately	38		39	97.5	1.000	0.317	ND
18	Colostomy bag	40	100	24	60	4.000*	<0.001	D
18.1	Colour of the content	40	100	24	60	4.000*	<0.001	D
18.2	Consistency of the content	40	100	23	57.5	4.123*	<0.001	D
19	Post operative medications to be given	40	100	38	95	1.414	0.157	ND
20	Name of the IV fluid	40	100	40	100	0.000	1.000	ND
20.1	Drop rate	40	100	40	100	0.000	1.000	ND
21	Blood product	40	100	39	97.5	1.000	0.317	ND
21.1	Drop rate	40	100	39	97.5	1.000	0.317	ND
21.2	Blood group	40	100	39	97.5	1.000	0.317	ND
22	Record of any complications during surgery	40	100	40	100	0.000	1.000	ND
23	Any use of implant	39	97.5	39	97.5	0.000	1.000	ND

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

Table 2 shows that there was no difference in opinion for the inclusion of items like vital signs, position of patient, patient n oxygen, NBM, site of surgery, suture site intact, No. of suture, oozing from dressing, Intravenous line, Epidural line, Nasogastric tube, Name of IV fluid, Blood product, Record of complications and any use of implant with the p-value <0.05. And there was a significant difference of opinion for the items like Glasgow coma scale, RBS, Central Line and Colostomy bag were with the p-value of less than 0.05.

Table 3: Significance of difference for the inclusion of items based on expert opinion items in round two and three on documentation data.

n = 40

Item. No.	Items	Round 2		Round 3		Wilcoxon signed rank Test	the	Significance at 5% Difference
		Yes	%	Yes	%			
1	Surgical notes completed by surgeon	40	100	40	100	0.000	1.000	ND
2	Anaesthesia notes completed by anaesthetist	40	100	40	100	0.000	1.000	ND
3	Patient transfer out notes completed by anaesthetist	40	100	40	100	0.000	1.000	ND
4	Nursing documentation updated in post operative recovery room.	40	100	40	100	0.000	1.000	ND
5	Surgical safety checklist	40	100	40	100	0.000	1.000	ND
6	Cautry / ES4 checklist	28	70	19	47.5	1.877	0.061	ND
7	Surgical site infection tracking form	39	97.5	40	100	1.000	0.317	ND
8	BMW Disposal form	28	70	23	57.5	1.213	0.225	ND
9	Recovery room chart	39	97.5	38	95	0.577	0.564	ND
10	Material record sheet	38	95	38	95	0.000	1.000	ND
11	Name of the X ray	40	100	40	100	0.000	1.000	ND
11.1	No. of the x ray film with report	40	100	40	100	0.000	1.000	ND
12	Name of the lab investigation	39	97.5	40	100	1.000	0.317	ND
12.1	i No. of lab investigation report	39	97.5	40	100	1.000	0.317	ND
13	Name of the CT Scan/ MRI	40	100	40	100	0.000	1.000	ND
13.1	i No. of the CT Scan/ MRI plates with a report	40	100	40	100	0.000	1.000	ND
14	Any other investigation report	40	100	40	100	0.000	1.000	ND
15	Recommendation for any investigation to be done	39	97.5	39	97.5	0.000	1.000	ND
16	Any special recommendation	37	92.5	36	90	0.447	0.655	ND

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

Table 3 depicts that experts had no significant difference of opinion for agreement on inclusion of all items under the category of Surgical notes completed by surgeon, Anaesthesia notes completed by anaesthetist, Patient transfer out notes completed by anaesthetist, Nursing documentation updated in postoperative recovery room, Surgical safety checklist, Name of the X-ray, Name of the CT Scan/ MRI and Any other investigation report.

Table 4: Kendall's tau-b (τ_b) correlation coefficient value for ranking of items in round two and three

n = 40

Categories	Correlation Coefficient T_b (Kendall's tau_b) Round 2 Vs Round 3	P-value	Significance at 0.01% level	Agreement
Identification data	0.845**	<0.001	Yes	Accepted
Perioperative information	0.927**	<0.001	Yes	Accepted
Documentation data	0.929**	<0.001	Yes	Accepted

**Statistically highly Significant at 0.01% level i.e., P<0.001.

Table 4 indicates that correlation ranks of items between round two and round three are 0.845 for identification data, 0.927 for peri-operative information and 0.929 for documentation data which showed significant correlation between the ranks of all items by experts in round two and round three. Hence agreement of the rank of items is accepted.

Fig 1: Content Validity Index of experts from round three.

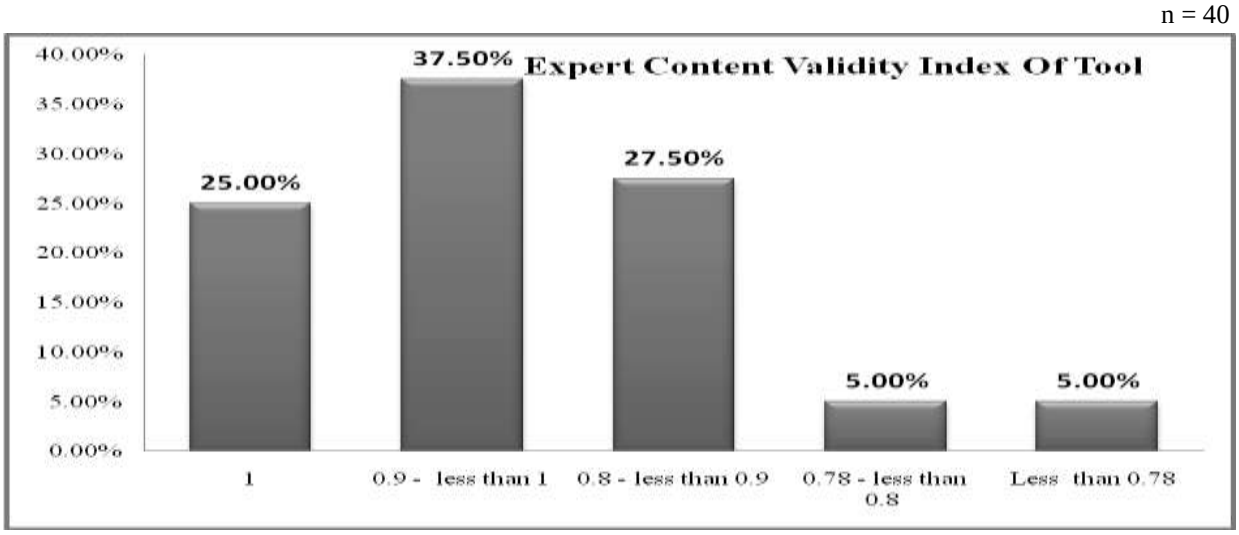

Fig 1indicates that 25% of CVI- e is 1, 37.5% of CVI-e is above 0.9, 27.5% of CVI-e is above 0.8, 5% of CVI-e is more than 0.78 and 5% of CVI-e is less than 0.78 which shows high content validity index. The CVI of the tool is 0.909 which shows, it is a highly valid tool.

Fig 2: Item wise content validity index from round 3

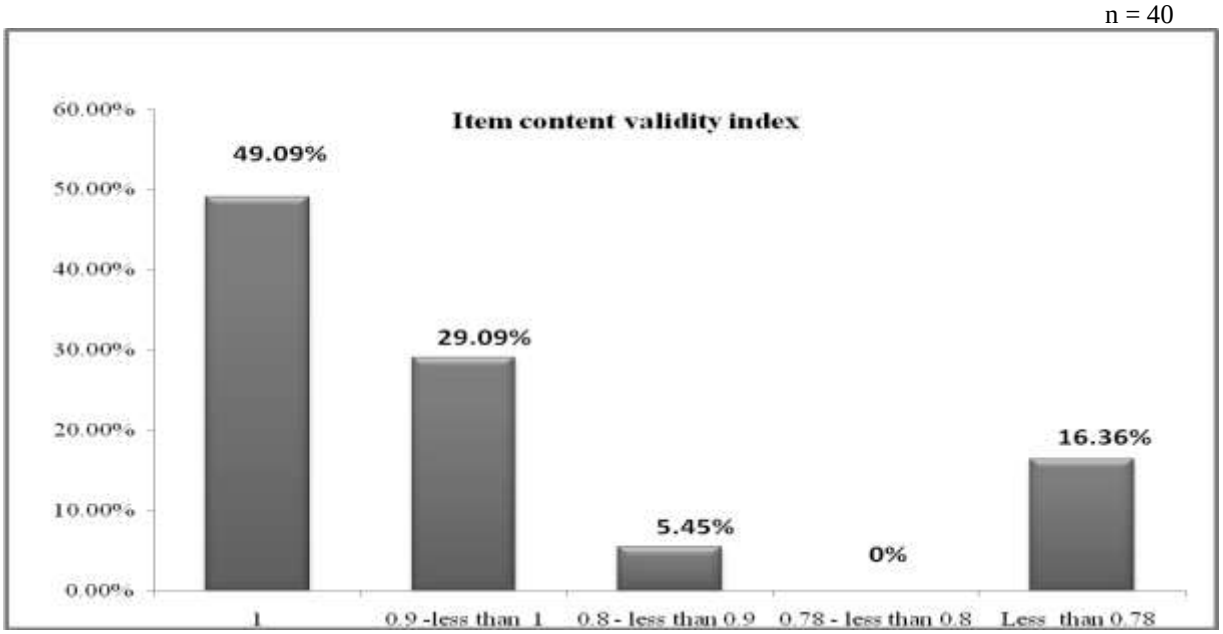

Fig 2 represents that 49.09% of CVI- i is 1, 29.09% of CVI-i is between 0.9 to less than 1, 5.45% of CVI-i is between 0.8 to less than 0.9 and 16.36% of CVI-i is less than 0.78. For the construction of tool, CVI-i with less than 0.78 is removed from the checklist

4. Discussion

In the present study, a post-operative nursing handover checklist for patient undergone general surgery was developed, constructed and validated by using Delphi technique. After three rounds of Delphi survey, the final list of items for inclusion in the checklist was obtained. In this study, the agreement stability for the inclusion of items between round two and round three was calculated by Wilcoxon signed rank test which showed no significant difference in the majority of items with the p-value of 1.000.

Agreement ranking was calculated by Kendall's tau-b (τ_b) correlation coefficient which showed that co-relation coefficient for identification data was 0.845, peri-operative information was 0.927 and documentation data was 0.929 which indicates statistically highly significant at 0.01% as p-value is less than 0.001. Hence ranking

agreement was accepted between round two and round three.

Kamal Nagpal [4] conducted a study by using Delphi method to assess the feasibility, validity, and reliability of a postoperative Handover Assessment Tool (PoHAT) by Delphi technique. The result showed that tool was feasible to use and inter-rater reliability was excellent ($r = 0.96$, $P < 0.001$).

Content validity was done by calculating content validity index of the tool which was 0.909 that indicates, it is a highly valid tool. On the basis of CVI-i, the final checklist was prepared.

Jaspreet Kaur Sodhi [8] conducted a study to develop and test the validity and reliability of the Patient's DVT Risk Assessment Tool, which consists of 27 items with the content validity index 0.986, Internal consistency (Cronbach's Alpha = 0.745). Interclass correlation coefficient value is 0.98, Cohen's kappa value is 0.898, and percentage agreement is 96%. In this study, the final draft of postoperative nursing handover checklist was pilot tested and the reliability of 0.9917 was estimated by inter-rater reliability, which depicted the tool is highly reliable.

There are similar other studies which have done by using Delphi technique for development, construction and validating the tool:

Development and validation of the Efficacy Safety Score (ESS), a novel tool for postoperative patient management to validate the score for the revised tool of ESS by Delphi process was studied by Skraastad [8], et al. With the help of international experts consensus was created on the final score contents for the revised tool of the ESS. A prospective observational study with the ESS throughout the first 24 h postoperatively in 207 surgical in-patients and compared with ESS with Modified Early Warning Systems (MEWS), and postoperative journal information and subsequently validated ESS by the measurement of health status questionnaires.

Expert Facilitated Development of an Objective Assessment Tool for Point-of-Care Ultrasound Performance in Undergraduate Medical Education was done by Black H [9], et al using a modified Delphi technique. Three exam-specific checklists were created by a thorough review of existing literature and input from experts in PoCUS, a prototype global rating scale (GRS) by18 panelists, which was selected to evaluate the GRS and three checklists The items were rated on a 5-point Likert scale with comments and suggestions for further items to be added to the GRS or checklists. Items were modified according to their comments. Hence by using a modified Delphi technique, they developed a single GRS and three checklists.

Development and validation of preoperative interventions checklist aimed to the safety of surgical patients by using a Delphi technique were done by Pires MP [10] , et , al in which, the checklist was validated through the Delphi panelist and established a consensus level of 80%.

Construct and Content Validation Using a Modified Delphi Method was done to assess the construct and content validity of the Diabetes Evaluation Framework for Innovative National Evaluations (DEFINE) by Paquette – Warren J et al [11]. A tool was developed to guide the evaluation, design, and implementation with built-in knowledge translation principles, by a modified Delphi method with 3 individual rounds using questionnaire with 7-point agreement/importance Likert scales and/or open-ended questions on 12 experts. Participants reached consensus on the content and construct validity of DEFINE, including its title, overall goal, 5-step evaluation approach, medical and nonmedical determinants of health schematics, full list of indicators and associated measurement tools, priority multi-level indicator set and next steps in DEFINE's development.

Conclusion

The present study aimed to develop and validate postoperative nursing handover checklist for patient undergone general surgery. There was total of fifty-five numbers of items suggested by experts. It was found that agreement made by the experts in round two and round three was accepted and there was no significant difference in opinion for the inclusions of the majority of the items in both the rounds. The items which had a significant difference of opinions and the items which had Item-Content validity index low (below 0.78) were removed. The final checklist was drafted with forty-four numbers of items which had 100% consensus of all experts and high CVI-I in the order of ranking agreement by all experts and the inter-rater reliability of the final draft of the postoperative Nursing hand over checklist is 0.9917 which depicted the prepared tool is highly valid and reliable.

Acknowledgement

I express my heartfelt thanks to my research guide Mrs. R. Ponchitra, Associate Professor, MGM Institute University Department of Nursing, for her motivation, encouragement, guidance, personal interest, inspiration towards completion of this study. I would also express my sincere gratitude towards my institution for their support, encouragement and valuable suggestions, throughout this study. I especially thank all my Delphi experts of this study for their kind co-operation till the last round, without their cooperation it would be impossible to complete this research project. I am grateful to Mr. Abhiram Behera (Bio-Statistician) for his valuable help and support in statistical analysis for the research study.

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