Knowledge and Practices Regarding Ganga Hospital Open Injury Severity Score among Newly Joined Staff Nurses at Ganga Hospital, Coimbatore: A Descriptive Cross-Sectional Study

Ajaykumar S[1], Grace Jebakani Sweety G[2], Vijayabharathi[3], Nirmala[4], Maheswari[5]
[1,3,4,5]*Ganga College of Nursing, Vattamalaipalayam, Coimbatore – 641 014, Tamil Nadu, India Affiliated to The Tamil Nadu Dr. M.G.R. Medical University, Chennai, India.*
[2]*Corresponding Author: Ganga College of Nursing, Vattamalaipalayam, Coimbatore – 641 014, Tamil Nadu, India Affiliated to The Tamil Nadu Dr. M.G.R. Medical University, Chennai, India.*

***Abstract*—Background: Trauma assessment is an essential component of emergency and orthopaedic nursing care. The Ganga Hospital Open Injury Severity Score (GHOISS) is a specialized scoring system developed to evaluate the severity of severe open limb injuries and assist in predicting limb salvage outcomes. Nurses involved in trauma care require adequate knowledge of the assessment components and appropriate clinical practices to support timely evaluation, documentation and communication.**

Objective: To assess the knowledge and practices regarding Ganga Hospital Open Injury Severity Score among newly joined staff nurses at Ganga Hospital, Coimbatore, and to determine the association of knowledge and practice scores with selected demographic variables.

Methods: A quantitative descriptive cross-sectional study was conducted among 30 newly joined staff nurses at Ganga Hospital, Coimbatore. Non-probability purposive sampling was used to select the participants. Data were collected using a structured knowledge questionnaire and a structured practice assessment checklist. Descriptive statistics, including frequency, percentage, mean and standard deviation, were used to summarize the findings. Chi-square tests were used to assess associations between selected variables.

Results: Among the 30 participants, 17 (56.7%) demonstrated moderately adequate knowledge, 8 (26.7%) had inadequate knowledge and 5 (16.7%) had adequate knowledge regarding GHOISS. The mean knowledge score was 18.23 ± 4.12. Regarding practice, 18 participants (60.0%) demonstrated average practice, while 6 (20.0%) demonstrated poor practice and 6 (20.0%) demonstrated good practice. The mean practice score was 13.57 ± 2.84. A statistically significant association was reported between age and knowledge scores ($\chi^2 = 6.12$, df = 2, p = 0.047). Previous trauma care experience was significantly associated with practice scores ($\chi^2 = 7.28$, df = 2, p = 0.026).

Conclusion: The findings indicated that the majority of newly joined staff nurses had moderately adequate knowledge and average practice regarding GHOISS. The findings emphasize the importance of structured orientation, continuing nursing education and competency-based training to strengthen nurses' involvement in trauma assessment and care.

***Index Terms*—Ganga Hospital Open Injury Severity Score, GHOISS, knowledge, practice, newly joined staff nurses, trauma assessment, nursing competency, Coimbatore.**

I. INTRODUCTION

Trauma is a major cause of morbidity, disability and mortality worldwide. Severe open limb injuries present considerable challenges in clinical management because of extensive damage to soft tissues, bones, muscles and associated structures. Early assessment, appropriate decision-making and timely multidisciplinary intervention are essential to improve patient outcomes and preserve limb function. The Ganga Hospital Open Injury Severity Score (GHOISS) was developed at Ganga Hospital, Coimbatore, to evaluate the severity of open injuries, particularly Gustilo-Anderson type IIIA and IIIB open

tibial fractures. The scoring system assesses three major tissue components, namely covering structures, skeletal structures and functional tissues, along with associated comorbid conditions. It provides valuable information for treatment planning, reconstruction and predicting the possibility of limb salvage or amputation. [1,2]

The GHOISS is particularly useful because it considers individual tissue damage rather than relying exclusively on the general classification of open fractures. Evidence from published studies has demonstrated its usefulness in predicting limb salvage outcomes and supporting clinical decision-making in patients with complex open lower-limb injuries. [2,3]

Nurses play an important supportive role in trauma management through initial patient assessment, monitoring, documentation, communication with the multidisciplinary team and implementation of prescribed treatment protocols. Newly joined staff nurses may have varying levels of clinical exposure and familiarity with specialized trauma assessment procedures. Inadequate understanding of assessment components and documentation requirements may affect the consistency of trauma care.

Assessing the knowledge and practices of newly joined staff nurses regarding GHOISS can help identify educational needs and opportunities for professional development. Regular orientation, continuing nursing education and simulation-based learning may strengthen their competency in trauma-related nursing responsibilities.

Therefore, the present study was undertaken to assess the knowledge and practices regarding GHOISS among newly joined staff nurses at Ganga Hospital, Coimbatore.

II. OBJECTIVES

1. To assess the level of knowledge regarding Ganga Hospital Open Injury Severity Score among newly joined staff nurses.
2. To assess the level of practice regarding GHOISS among newly joined staff nurses.
3. To determine the association between knowledge scores and selected demographic variables.
4. To determine the association between practice scores and selected demographic variables.
5. To identify the relationship between knowledge and practice scores regarding GHOISS.

III. METHODS

A quantitative research approach with a descriptive cross-sectional research design was adopted for the study. The study was conducted at Ganga Hospital, Coimbatore, Tamil Nadu.

The study population comprised newly joined staff nurses working at Ganga Hospital. A total of 30 newly joined staff nurses were selected using a non-probability purposive sampling technique. Nurses who had joined the hospital within the previous six months, were available during data collection and were willing to participate were included.

Data were collected using a structured questionnaire consisting of three sections.

Section A: Demographic Variables

This section included age, gender, educational qualification, area of work, total clinical experience, previous trauma care experience, duration of employment, previous training on trauma scoring systems, source of information regarding GHOISS and previous use of GHOISS in clinical practice.

Section B: Structured Knowledge Questionnaire

The knowledge questionnaire assessed understanding of the purpose, components, scoring principles, interpretation and clinical application of GHOISS. Each correct response was awarded one mark, and incorrect responses were awarded zero marks. The dissertation methodology reports a maximum score of 30.

Knowledge was categorized as inadequate, moderately adequate and adequate according to the scoring criteria specified in the research protocol.

Section C: Structured Practice Assessment Checklist

The practice checklist assessed nursing activities related to trauma assessment, identification of tissue injury, documentation, communication, use of trauma scoring systems, reassessment and adherence to hospital trauma care guidelines.

The dissertation methodology reports a maximum practice score of 20, with practice classified as poor, average and good.

The tool was submitted to seven experts for content validation, including specialists in Medical Surgical Nursing, Orthopaedic Nursing, trauma care and statistics. Reliability was assessed using the split-half

method for the knowledge questionnaire and Cronbach's alpha for the practice checklist. The reported reliability coefficients were 0.82 and 0.86, respectively.

A pilot study was conducted among five newly joined staff nurses at a selected hospital in Coimbatore to assess the feasibility of the research procedure.

Permission was obtained from the concerned hospital authority, and ethical clearance was obtained from the Institutional Ethics Committee. Written informed consent was obtained from all participants. Confidentiality and anonymity were maintained throughout the study.

Data were analysed using descriptive statistics, including frequency, percentage, mean and standard deviation. Chi-square tests were used to determine associations between selected demographic variables and knowledge and practice levels. The level of statistical significance was set at $p < 0.05$.

IV. RESULTS

The study included 30 newly joined staff nurses working at Ganga Hospital, Coimbatore. The findings are presented under demographic characteristics, knowledge, practice and associations with selected demographic variables.

Table 1. Selected Demographic Characteristics of Staff Nurses (n = 30)

Characteristics	Category	n	%
Age	21-25 years	16	53.3
	26-30 years	10	33.3
	31-35 years	4	13.3
Gender	Male	8	26.7
	Female	22	73.3

Table 1 presents the demographic characteristics of the participating staff nurses. More than half of the participants (16; 53.3%) belonged to the age group of 21–25 years, followed by 10 (33.3%) in the 26–30 years age group and 4 (13.3%) in the 31–35 years age group. Regarding gender, the majority were female nurses (22; 73.3%), while 8 (26.7%) were male nurses. These findings indicate that most participants were young adult nurses.

Table 2. Distribution of Staff Nurses According to Level of Knowledge Regarding GHOISS (n = 30)

Level of knowledge	n	%
Inadequate	8	26.7
Moderately adequate	17	56.7
Adequate	5	16.7
Total	30	100.0

Table 2 illustrates the level of knowledge regarding GHOISS among newly joined staff nurses. The majority of participants (17; 56.7%) demonstrated moderately adequate knowledge, while 8 (26.7%) had inadequate knowledge. Only 5 participants (16.7%) demonstrated adequate knowledge. These findings indicate that most newly joined staff nurses possessed a moderate understanding of the scoring system, highlighting the need for further educational support.

Table 3. Mean and Standard Deviation of Knowledge Scores Regarding GHOISS (n = 30)

Variable	mean	Standard deviation
Knowledge score	18.23	4.12

Table 3 presents the mean and standard deviation of knowledge scores. The mean knowledge score was 18.23, with a standard deviation of 4.12. This finding indicates variation in knowledge levels among the participants and reflects the need to strengthen their understanding of the components and clinical application of GHOISS.

Table 4. Distribution of Staff Nurses According to Level of Practice Regarding GHOISS (n = 30)

Level of practice	n	%
Poor	6	20.0
Average	18	60.0
Good	6	20.0
Total	30	100.0

Table 4 presents the distribution of staff nurses according to their practice levels. The majority of participants (18; 60.0%) demonstrated average practice, while 6 (20.0%) demonstrated poor practice and 6 (20.0%) demonstrated good practice. These findings suggest that although most participants demonstrated an average level of practice,

opportunities remain to improve their clinical competency and application of trauma assessment procedures.

Table 5. Mean and Standard Deviation of Practice Scores Regarding GHOISS (n = 30)

Variable	Mean	Standard deviation
Practice score	13.57	2.84

Table 5 shows the mean and standard deviation of practice scores among the participating staff nurses. The mean practice score was 13.57, with a standard deviation of 2.84. This indicates moderate variation in the practice scores and suggests that staff nurses demonstrated differing levels of competency in trauma assessment-related activities.

Table 6. Association Between Knowledge Scores and Age (n = 30)

Variable	Chi-square value	df	p value	Inference
Age and knowledge level	6.12	2	0.047	significant

Significant at $p < 0.05$.

Table 6 presents the association between age and knowledge regarding GHOISS. The calculated Chi-square value was 6.12, with 2 degrees of freedom and a p-value of 0.047. Since the p-value was less than 0.05, the association was statistically significant. Therefore, the null hypothesis was rejected, indicating a significant association between age and knowledge levels among the participating staff nurses.

Table 7. Association Between Practice Scores and Previous Trauma Care Experience (n = 30)

Variable	chi-square value	df	p value	Inference
Previous trauma care experience and practice level	7.28	2	0.026	Significant

Significant at $p < 0.05$.

Table 7 shows the association between previous trauma care experience and practice regarding GHOISS. The calculated Chi-square value was 7.28, with 2 degrees of freedom and a p-value of 0.026. Since the p-value was less than 0.05, the association was statistically significant. Hence, the null hypothesis was rejected, suggesting that previous trauma care experience was significantly associated with the practice levels of newly joined staff nurses.

V. DISCUSSION

The present study assessed knowledge and practices regarding GHOISS among 30 newly joined staff nurses at Ganga Hospital, Coimbatore.

The demographic findings revealed that more than half of the participants belonged to the age group of 21–25 years, and the majority were female nurses. The findings indicate that the study population primarily consisted of young nurses who may require structured institutional orientation to strengthen their competency in specialized trauma care.

Regarding knowledge, the majority of participants (56.7%) demonstrated moderately adequate knowledge, while 26.7% had inadequate knowledge and only 16.7% had adequate knowledge. The mean knowledge score was 18.23 ± 4.12. These findings suggest that although most participants possessed a basic understanding of GHOISS, further educational support may be necessary to improve their knowledge of its components, scoring criteria and clinical relevance.

GHOISS evaluates the severity of injuries involving covering tissues, skeletal structures and functional tissues, along with associated comorbid factors. Rajasekaran and colleagues highlighted the importance of this scoring system in predicting limb salvage outcomes and guiding the management of severe open injuries. [1,2] A systematic review and meta-analysis by Al-Hourani and colleagues also demonstrated the diagnostic value of GHOISS in predicting limb salvage and amputation outcomes. [3] These findings emphasize the importance of appropriate professional understanding of the scoring system among healthcare personnel involved in trauma care.

Regarding practice, 60.0% of the participants demonstrated average practice, while 20.0% demonstrated poor practice and 20.0% demonstrated

good practice. The mean practice score was 13.57 ± 2.84. These findings suggest that practical competency in trauma assessment-related activities may require further strengthening through structured orientation and supervised clinical learning.

The study also revealed a statistically significant association between age and knowledge scores (χ^2 = 6.12, p = 0.047). This finding suggests that knowledge levels differed across age categories. However, the cross-sectional design does not establish age as a causal factor.

Similarly, previous trauma care experience demonstrated a statistically significant association with practice scores (χ^2 = 7.28, p = 0.026). This finding highlights the importance of clinical exposure and practical experience in developing competency in trauma assessment.

The findings support the need for structured orientation programmes, continuing nursing education, simulation-based training and periodic competency assessment for newly joined staff nurses. Such initiatives may improve familiarity with trauma assessment procedures and promote consistency in clinical documentation and communication.

However, the present study did not provide the statistical findings for the relationship between knowledge and practice scores. Therefore, the relationship between these two variables cannot be established from the reported results.

The study provides useful preliminary information regarding the educational needs of newly joined staff nurses in a specialized trauma care setting. Nevertheless, the small sample size and single-centre design limit the generalizability of the findings.

VI. CONCLUSION

The present study revealed that the majority of newly joined staff nurses had moderately adequate knowledge and average practice regarding Ganga Hospital Open Injury Severity Score. A considerable proportion of participants demonstrated inadequate knowledge and poor practice, indicating the need for continued professional development.

Statistically significant associations were identified between age and knowledge scores and between previous trauma care experience and practice scores.

The findings emphasize the importance of structured orientation programmes, continuing nursing education, simulation-based learning and periodic competency assessment to strengthen the knowledge and practices of newly joined staff nurses involved in trauma care.

The study provides preliminary evidence regarding the educational needs of newly recruited nurses in a specialized trauma care institution. Further multicentre studies involving larger samples and validated assessment tools are recommended.

VII. LIMITATIONS

The study had certain limitations:

1. The sample size was limited to 30 newly joined staff nurses.
2. The study was conducted at a single institution, limiting generalizability.
3. Non-probability purposive sampling may have introduced selection bias.
4. Knowledge and practice were assessed at a single point in time.
5. The study did not evaluate the effectiveness of any structured educational intervention.
6. The relationship between knowledge and practice was not reported with correlation statistics.
7. The available results did not include complete demographic distributions and detailed cross-tabulations for all association tests.

VIII. RECOMMENDATIONS

1. Similar studies may be conducted with larger samples in multiple trauma care institutions.
2. Structured orientation programmes on GHOISS may be introduced for newly recruited nurses.
3. Simulation-based educational programmes may be conducted to improve trauma assessment competency.
4. Comparative studies may be conducted among newly joined and experienced staff nurses.
5. Further studies may evaluate the effectiveness of structured teaching programmes on knowledge and practice regarding GHOISS.
6. Periodic competency assessments may be implemented to monitor nurses' understanding of trauma assessment procedures.
7. Future studies may examine the relationship between knowledge, clinical practice and patient care outcomes.

REFERENCES

[1]. Rajasekaran S, Raja Sabapathy S. A philosophy of care of open injuries based on the Ganga hospital score. Injury. 2007;38(2):137-46. doi: 10.1016/j.injury.2006.04.135.

[2]. Rajasekaran S, Sabapathy SR, Dheenadhayalan J, Sundararajan SR, Venkatramani H, Devendra A, et al. Ganga hospital open injury score in management of open injuries. Eur J Trauma Emerg Surg. 2015;41(1):3-15. doi:10.1007/s00068-014-0465-9.

[3]. Al-Hourani K, et al. Clinical effectiveness of the Ganga Hospital Open Injury Severity Score for limb salvage versus amputation in patients with complex limb injuries: a systematic review and meta-analysis. Bone Joint J. 2023;105-B (1):21-28.

[4]. Kumar KN, Shivanna HYS, Santhosh Kumar TN, Pratheeksh. Assessment of Ganga Hospital Open Injury Severity Score of limbs. J Emerg Trauma Shock. 2020;13(4):317-318. doi: 10.4103/JETS.JETS_68_20.

[5]. Gustilo RB, Anderson JT. Prevention of infection in the treatment of one thousand and twenty-five open fractures of long bones: retrospective and prospective analyses. J Bone Joint Surg Am. 1976;58(4):453-458.

[6]. Rajasekaran S, Dheenadhayalan J, Sundararajan SR, et al. Predictability of salvage and outcome of Gustilo and Anderson type-IIIA and type-IIIB open tibial fractures using Ganga Hospital Scoring system. Injury. 2015;46(2):282-287. doi: 10.1016/j.injury.2014.11.003.