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A study to assess the effectiveness of a planned teaching programme on Glasgow coma scale pupil score (GCS-P) in terms of knowledge and practice among the staff nurses working in trauma centre of civil hospital, Ahmedabad city

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Abstract
Background: The GCS is an assessment of the level of consciousness measuring three indicators which include: eye opening, best verbal response, and best motor response. Other components and essential parameters; pupil reaction, vital signs, limb movements and strength define the basic general neurological condition of the patient and when monitored regularly, allow changes to be detected early. The pupillary response is the key indicator of the severity of traumatic brain damage. It is recorded as both pupil reacting to light, one pupil reacting to light or no reaction. The information is combined using a simple arithmetic score (GCS score [range3-15]) minus the number of non-reacting pupils [0, 1, or 2].
Aims and Objectives: To Assess the effectiveness of a Planned Teaching Programme on Glasgow Coma Scale Pupil Score (GCS-P) in terms of Knowledge and Practice among the Staff Nurses, moreover to find out the correlation between Knowledge and Practice and to find out the association between Knowledge and Practice with selected Demographic Data.
Materials and Methods: The study was conducted among 50 Staff Nurses working in Trauma Centre of Civil Hospital, Ahmedabad City using Simple Random Sampling technique. Data were obtained using Structured Knowledge Questionnaire to Assess Knowledge and Structured Observational Checklist to Assess the Practice. Descriptive and inferential statistics were used to analyze the Demographic Data, Structured Knowledge Questionnaire and Structured Observational Checklist. Karl Pearson's formula was used to find out correlation whereas the association was determined by using Chi Square formula.
Results and Conclusions: The study revealed that the Mean Post-test Knowledge score (20.16) was higher than Mean Pre-test Knowledge score (11.28) and calculated 't' value was 27.30 which was higher than tabulated 't' value 2.0096. The Mean Post-test Practice score (12.32) was higher than Mean Pre-test Practice score (7.22) and calculated 't' value was 27.80 which was higher than tabulated 't' value 2.0096. There exists a positive correlation (r=0.5) between Post-test Knowledge and Post-test Practice score. Study also revealed that there is no significant association between Pre-test Knowledge score and selected Demographic Data of the Samples. Whereas there was no significant association between Pre-test Practice score and selected Demographic Data except Gender of the Samples on Glasgow Coma Scale Pupil Score (GCS-P).

Keywords: Assess, effectiveness, planned teaching programme, knowledge, practice, Glasgow coma scale pupil score (GCS-P), staff nurse, trauma center, civil hospital

Introduction

Background of study

The GCS is an assessment of the level of consciousness measuring three indicators which include: eye opening, best verbal response, and best motor response. Other components and essential parameters; pupil reaction, vital signs, limb movements and strength define the basic general neurological condition of the patient and when monitored regularly, allow changes to be detected early (Chan Moon Fai, Mattar Ihsan, 2013) [20].

Need of the study

The Glasgow Coma Scale Pupils Score (GCS-P) was described by Paul Brennan, Gordon Murray, and Graham Teasdale in 2018 as a strategy to combine the two key indicators of the severity of traumatic brain injury into a single simple index.

Calculation of the GCS-P is by subtracting the Pupil Reactivity Score (PRS) from the Glasgow Coma Scale (GCS) total score:

GCS-P = GCS – PRS

The Pupil Reactivity Score is calculated as follows.

Pupils unreactive to light - Pupil Reactivity Score

- Both pupils - 2
- One pupil – 1
- Neither pupil - 0

The GCS-P score can range from 1 and 15 and extends the range over which early severity can be shown to relate to outcomes of either mortality or independent recovery.

Adoption of the Pupil Reactivity Score (GCS-P)

Prof. Teasdale was not finished however. The ability to prognosticate based on initial presentation is important for both downstream management of the injured patient as well as to help guide goals of care discussions. As a result, this year a new paper was published calling for the adoption of the GCS-P score. The GCS-P is scored from 1 to 15 and is calculated by subtracting a pupil reactivity score (PRS) from the calculated GCS.

Pupil Reactivity Score

Pupils Unreactive to Light	Pupil Reactivity Score
Both Pupils	2
One Pupil	1
Neither Pupil	0

Note: the higher score is assigned to non-reactive pupils[5]

The combined GCS-P is not intended to replace the role of separate assessment of reporting of each component of the Glasgow Coma Scale and pupil response in the care of individual patients. The GCS-P is simple to implement and at the same time expands the information about the severity of the patient's clinical condition and prognosis.

Objectives of the study

1. To Assess the Knowledge of Staff Nurses Before and After Administration of a Planned Teaching Programme on Glasgow Coma Scale Pupil Score (GCS-P) in Trauma Centre of Civil Hospital, Ahmedabad City.
2. To Assess the Practice of Staff Nurses Before and After Administration of a Planned Teaching Programme on Glasgow Coma Scale Pupil Score (GCS-P) in Trauma Centre of Civil Hospital, Ahmedabad City.
3. To find out the Correlation between the Post-test Knowledge Score and Post-test Practice Scores on Glasgow Coma Scale Pupil Score (GCS-P) among the Staff Nurses Working in Trauma Centre of Civil Hospital, Ahmedabad City.
4. To find out the Association of Pre Test Knowledge Score With Selected Demographic Data among the Staff Nurses Working in Trauma Centre of Civil Hospital, Ahmedabad City.
5. To find out the Association of Pre Test Practice Score with Selected Demographic Data among the Staff Nurses Working in Trauma Centre of Civil Hospital, Ahmedabad City.

Literature review

Paul M. Brennan, 2018 [11]. United Kingdom .Glasgow Coma Scale (GCS) scores and pupil responses are key indicators of the severity of traumatic brain damage. The aim of this study was to determine what information would be gained by combining these indicators into a single index and to explore the merits of different ways of achieving this. Methods of combining the Glasgow Coma Scale and pupil response data varied in complexity from using a simple arithmetic score (GCS score [range 3–15] minus the number of non-reacting pupils [0, 1, or 2]), which we call the GCS-Pupils score (GCS-P; range 1–15), to treating each factor as a separate categorical variable The GCS-P may be a useful platform onto which information about other key prognostic features can be added in a simple format likely to be useful in clinical practice.

Methodology

- **Research Approach**: Quantitative Research Design
- **Research Design:** Pre - Experimental Research Design
- **Target Population:** In this study, the target population is the Staff Nurses working in Trauma Centre of Civil Hospital, Ahmedabad City.
- **Sample Size:** 50 Staff nurses who are working in Trauma Centre of Civil Hospital, Ahmedabad City
- **Sampling Technique:** Simple Random sampling technique.

A Structured Knowledge Questionnaire and Observational Checklist was developed for assessing the effect of Planned Teaching on Glasgow Coma Scale Pupil Score (GCS-P) in terms of Knowledge and Practice among the Staff nurses working in Trauma Centre of Civil Hospital, Ahmedabad City.

Validity

The content validity of the tool was tested by the opinion of 09 experts in nursing profession and other related field.

Reliability

The reliability of Structured Knowledge Questionnaire was determined by Test-Retest Method using Karl Pearson's formula. Reliability of Structured Knowledge Questionnaire was 0.7 which is more than 0.5; hence the Questionnaire was found to be reliable. The reliability of the Structured Observational Checklist was 0.8 which is more than 0.5;

hence the Structured Observational Checklist was found to be reliable.

Pilot study result

Knowledge

The Mean Post-test Knowledge score (20) was higher than the Mean Pre-test Knowledge score (10) with the mean difference of 10.

Practice

The Mean Post- test Practice score (26.4) was higher than the Mean Pre-test Practice score (16.6) with the mean difference analysis and interpretation of demographic data of the samples.

Data analysis and interpretation

Table 1: Frequency and Percentage wise distribution of the Demographic Data.

N=50

Sr. No.	Demographic data	Frequency (f)	Percentage (%)
	Age:		
	21-30 years	43	86
	31-40 years	07	14
	41-50 years	0	0
	>50 years	0	0
	Gender:		
	Male	09	18
	Female	41	82
	Third Gender	0	0
	Professional Qualifications:		
	GNM	37	74
	Basis B. Sc Nursing	09	18
	Post Basic B. Sc Nursing	04	08
	M. Sc Nursing	0	0
	Any other Profession	0	0
	Total Clinical Experience:		
	< 5 year	38	76
	5-10 years	09	18
	11-15 years	03	06
	> 15 years	0	0
	Attended any Training/ Conference/ Workshop or In-service Education on Glasgow Coma Scale Pupil Score (GCS-P).		
	Yes	0	0
	No	50	100

Analysis and interpretation of the data related to pre-test and post-test knowledge score of the samples

Table 2: Area wise Max. Score, Obtained Score, Mean Score, Mean Percentage, Mean Percentage gain and Mean Difference of Pre-test and Post-test Knowledge Scores of Samples on Glasgow Coma Scale Pupil Score (GCS-P).

N=50

Area	Max Score	Pre-test Knowledge Score of samples		Post-test Knowledge Score of Samples				Mean difference	Mean Percentage Gain (%)
		Obtained score	Mean Score	Mean Percentage (%)	Obtained score	Mean Score	Mean Percentage (%)		
Introduction	02	53	1.06	53	70	1.4	70	0.34	17
Purposes for adoption of GCS-P	01	44	0.88	88	49	0.98	98	0.1	10
Stages of GCS assessment	02	49	0.98	49	69	1.38	69	0.4	20
Physiological Parameters	13	253	5.06	38.9	496	9.92	76.3	4.86	37.4
Interpretation of GCS-P	05	104	2.08	41.6	238	4.76	95.2	2.68	53.6
Traumatic Brain Injury	01	17	0.34	34	36	0.72	72	0.38	38
Advantages	01	44	0.88	88	50	1.0	100	0.12	12
Total	25	564	11.28		1008	20.16		8.88	1008

Table 3: Max. Score, Obtained score, Mean Score, Mean Percentage, Mean Difference and Mean Percentage gain of Pre-test and Post-test Knowledge Score of the Samples on Glasgow Coma Scale Pupil Score (GCS-P).

N=50

Knowledge Score	Max Score	Obtained Score	Mean Score	Mean Percentage (%)	Mean Difference	Mean Percentage gain (%)
Pre-test	25	564	11.28	45.12	8.88	35.52
Post-test	25	1008	20.16	80.64		

Table 4: Frequency and Percentage wise Distribution of the Samples based on Knowledge score on Glasgow Coma Scale Pupil Score (GCS-P).

N=50

Knowledge Score	Level	Pre-test		Post-test	
		Frequency(f)	Percentage (%)	Frequency (f)	Percentage (%)
0-8	Poor	18	36	0	0
9-17	Average	31	62	11	22
18-25	Good	01	02	39	78
Total		50	100	50	100

Table 5: Mean, Mean Difference, Standard Deviation, Standard Error and 't' Value of Per- test and Post-test Knowledge Score of the Samples.

N=50

Knowledge Score	Mean	Mean Difference	SD	SE	Calculated 't' value	Tabulated 't' value
Pre-test	11.28	8.88	3.38	0.59	27.30	2.0096
Post-test	20.16		2.46			

*Note: t=p≤0.05,df=49

Analysis and interpretation of the data related to pre-test and post-test practice scores of the samples on glasgow coma scale pupil score (GCS-P).

Table 5: Max. Score, Obtained score, Mean Score, Mean Percentage, Mean Difference and Mean Percentage gain of Pre-test and Post-test Practice Score of the Samples on Glasgow Coma Scale Pupil Score (GCS-P).

N=50

Practice Score	Max Score	Obtained Score	Mean Score	Mean Percentage (%)	Mean Difference	Mean Percentage gain (%)
Pre-test	15	361	7.22	48.13	5.1	34
Post-test	15	616	12.32	82.13		

Table 6: Frequency and Percentage wise Distribution of the Samples based on Practice Score on Glasgow Coma Scale Pupil Score (GCS-P).

N=50

Practice Score	Level	Pre-test		Post-test	
		Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)
0-6	Poor	20	40	0	0
7-11	Average	30	60	10	20
12-15	Good	0	0	40	80
Total		50	100	50	100

Table 7: Mean, Mean Difference, Standard Deviation, Standard Error and 't' Value of Per- test and Post-test Practice Score of the Samples.

N=50

Practice Score	Mean Score	Mean Difference	SD	SE	Calculated 't' value	Tabulated 't' value
Pre-test	7.22	5.1	1.46	0.25	27.80	2.0096
Post-test	12.32		1.019			

*Note: t=p≤0.05,df=49

Analysis and interpretation of data related to correlation between post-test knowledge score and post-test practice score on glasgow coma scale pupil score (GCS-P).

Table 8: Correlation between Post-test Knowledge Score and Post-test Practice Score of the Samples.

N=50

Post-test Knowledge Mean Score (x)	Post-test Practice Mean Score (y)	Number of Sample	Correlation Coefficient (r)	Inference
20.16	12.32	50	0.5	Significant Positive correlation at 0.05 level of significance.

Analysis and interpretation of data related to association of pre-test knowledge score with selected demographic data of samples on glasgow coma scale pupil score (GCS-P).

Table 9: Association between Age Group and Pre-test Knowledge Score of the Samples.

N=50

Age Group	Pre-test Knowledge Score			Total	Calculated value of $\chi 2$	Tabulated value of $\chi 2$*
	Poor	Average	Good			
21-30 years	15	27	01	43	0.1661	3.84
31-40 years	03	04	0	07		
Total	18	31	01	50		

*level of significance at 0.05, df= 02

* for the application of Chi square, pooling of data has been done. (df=01)

Table 10: Association between Gender and Pre-test Knowledge Score of the Samples.

N=50

Gender	Pre-test Knowledge Score			Total	Calculated value of χ^2	Tabulated value of χ^{2*}
	Poor	Average	Good			
Male	05	04	0	09	1.822	3.84
Female	13	27	01	41		
Total	18	31	01	50		

*level of significance at 0.05, df= 02
* for the application of Chi square, pooling of data has been done (df=01).

Table 10: Association between Professional Qualification and Pre-test Knowledge Score of the Samples.

N=50

Professional Qualification	Pre-test Knowledge Score			Total	Calculated value of χ^2	Tabulated value of χ^{2*}
	Poor	Average	Good			
GNM	14	23	0	37	1.136	5.99
B. Sc Nursing	02	06	01	09		
Post Basic B.Sc Nursing	02	02	0	04		
Total	18	31	01	50		

*level of significance at 0.05, df= 04
* for the application of Chi square, pooling of data has been done (df=02).

Table 11: Association between Total Clinical Experience and Pre-test Knowledge Score of the Samples.

N=50

Total Clinical Experience	Pre-test Knowledge Score			Total	Calculated value of $\chi 2$	Tabulated value of $\chi 2^*$
	Poor	Average	Good			
< 5 year	13	24	01	38	0.2201	3.84
5-10 years	05	04	0	09		
11-15 years	0	03	0	03		
Total	18	31	01	50		

*level of significance at 0.05, df= 04
* for the application of Chi square, pooling of data has been done (df=01).

Analysis and interpretation of data related to association of pre-test practice score with demographic data of the samples on glasgow coma scale pupil score (GCS-P).

Table 12: Association between Age Group and Pre-test Practice Score of the Samples.

N=50

Age Group	Pre-test Practice Score		Total	Calculated value of $\chi 2$	Tabulated value of $\chi 2^*$
	Poor	Average			
21-30 years	16	27	43	0.99	3.84
31-40 years	04	03	07		
Total	20	30	50		

*level of significance at 0.05, df= 01

Table 13: Association between Gender and Pre-test Practice Score of the Samples

N=50

Gender	Pre-test Practice Score		Total	Calculated value of χ^2	Tabulated value of χ^{2*}
	Poor	Average			
Male	07	02	09	6.52	3.84
Female	13	28	41		
Total	20	30	50		

*level of significance at 0.05, df= 0

Table 14: Association between Professional Qualification and Pre-test Practice Score of the Samples.

N=50

Professional Qualification	Pre-test Practice Score		Total	Calculated value of χ^2	Tabulated value of χ^{2*}
	Poor	Average			
GNM	15	22	37	0.45	5.99
B. Sc Nursing	04	05	09		
Post Basic B.Sc Nursing	01	03	04		
Total	20	30	50		

*level of significance at 0.05, df= 02

Table 15: Association between Total Clinical Experience and Pre-test Practice Score of the Samples.

N=50

Total Clinical Experience	Pre-test Practice Score		Total	Calculated value of $\chi 2$	Tabulated value of $\chi 2$*
	Poor	Average			
< 5 year	16	22	38	0.29	5.99
5-10 years	03	06	09		
11-15years	01	02	03		
Total	20	30	50		

*level of significance at 0.05, df= 02

Implication and utilization of the study

Nursing Practice

The study emphasizes the significance of the short-term courses or in-service education for nurses in advancing knowledge on Glasgow Coma Scale Pupil Score (GCS-P) and in making use of facilities available in the management of patients in day to day care activities.

Nursing Education

Nurses should take initiative for practicing GCS-P in the trauma centre, based on their felt needs. The nurse should develop proper skills in GCS-P assessment to know the severity and conscious level of patient by expanding Knowledge and continue to impart care without any errors.

Major findings of the study

The data were analyzed and interpreted in terms of objectives of the study. Descriptive and Inferential statistics were used for the data analysis. After analysis the major findings of the study are as follows:

Findings related to Demographic Data of Samples on Glasgow Coma

Scale Pupil Score (GCS-P)

Findings related to Demographic Data of Samples on Glasgow Coma Scale Pupil Score (GCS-P) shows that out of 50 samples under study, majority of 43(86%) samples belongs to 21-30 years of age group, 41 (82%) samples were Female, 37 (74%) samples were GNM, 09 (18%) samples were B. Sc Nursing, 04 (8%) samples were Post Basic B.Sc Nursing in their Professional Qualification, 38 (76%) samples had < 5 years of Total Clinical Experience, and no one had attended any Training/ Conference/ Workshop or In-service Education on Glasgow Coma Scale Pupil Score (GCS-P).

Findings related to Knowledge of Samples on Glasgow Coma Scale

Pupil Score (GCS-P)

The Mean Pre-test Knowledge score of Samples on Glasgow Coma Scale Pupil Score (GCS-P) was 11.28, while Mean Post-test Knowledge score was 20.16, with the mean difference of 8.88. The calculated 't' value ('t'=27.30) was greater than the tabulated 't' value ('t'=2.0096) which was statistically proved at 0.05 level of significance. Hence, it was revealed that the Planned Teaching Programme was effective in improving knowledge among the Staff Nurses working in Trauma Centre of Civil Hospital, Ahmedabad City**.**

The data of the study revealed that among the 50 Samples, in Pre-test, 18 (36%) samples had Poor Knowledge, 31 (62%) samples had Average Knowledge and 01(2%) samples had Good Knowledge whereas in Post-test, 11 (22%) samples had average Knowledge and 39 (78%) samples had Good Knowledge on Glasgow Coma Scale Pupil Score (GCS-P).

Findings related to Practice of Samples on Glasgow Coma Scale Pupil

Score (GCS-P)

The Mean Pre-test Practice score of Samples on Glasgow Coma Scale Pupil Score (GCS-P) was 7.22, while Mean Post-test Practice score was 12.32, with the mean difference of 5.1 . The calculated 't' value ('t'=27.80) was greater than the tabulated 't' value ('t'=2.0096) which was statistically proved at 0.05 level of significance. Hence, it revealed that the Planned Teaching Programme was effective in improving practice among the Staff Nurses working in Trauma Centre of Civil Hospital, Ahmedabad City.

The data of the study revealed that among the 50 Samples, in Pre-test, 20 (40%) samples had Poor Practice, 30(60%) samples had Average Practice whereas in Post-test, 10 (20%) samples had Average Practice and 40 (80%) samples had Good Practice on Glasgow Coma Scale Pupil Score (GCS-P).

Findings related to Correlation between Post-test Knowledge and Post-test Practice of Samples after administering Planned Teaching Programme on Glasgow Coma Scale Pupil Score (GCS-P).

To find out the Correlation between Post-test Knowledge and Post-test Practice Scores of Staff Nurses, the investigator used Karl Pearson's Correlation Coefficient formula. The Correlation Coefficient obtained using Karl Pearson's formula was r= 0.5. This was suggested a Positive Correlation between Post-test Knowledge and Post-test Practice Scores of Samples.

Thus, the investigator concluded that there was a significant positive Correlation between the Post-test Knowledge and Post-test Practice Scores of Staff Nurses working in Trauma Centre of Civil Hospital, Ahmedabad City.

It is significant that if the Knowledge of the Samples increases then the Practice of Samples also tends to increase. Here, the Null Hypothesis was rejected and the Research Hypothesis was accepted.

Findings related to significant Association between Pre-test Knowledge

With selected Demographic Data of Samples

Chi square was used by the investigator to find out the Association between Pre- test Knowledge score with selected Demographic Data of the Samples. The findings revealed that there was no significant association between Pre-test Knowledge score with the selected Demographic Data such as Age, Gender, Professional Qualification, Total Clinical Experience of the Samples on Glasgow Coma Scale Pupil Score (GCS-P).

Findings related to significant Association between Pre-test Practice with selected Demographic Data of Samples.

Chi square was used by the investigator to find out the Association between Pre- test Practice score with selected Demographic Data of the Samples. The findings revealed that there was no significant association between Pre-test Practice score and selected Demographic Data except Gender of the Samples on Glasgow Coma Scale Pupil Score (GCS-P).

Discussion of the study

The aim of this study was to determine what information would be gained by combining these indicators into a single index and to explore the merits of different ways of achieving this. Information about early GCS scores, pupil responses, late outcomes on the Glasgow Outcome Scale, and mortality were obtained at the individual patient level by reviewing data from the CRASH (Corticosteroid Randomization After Significant Head Injury; n = 9,045) study and the IMPACT (International Mission for Prognosis and Clinical Trials in TBI; n = 6855) database. A simple arithmetic combination of the GCS score and pupillary response, the GCS-P, extends the information provided about patient outcome to an extent comparable to that obtained using more complex methods. The GCS-P may be a useful platform onto which information about other key prognostic features can be added in a simple format likely to be useful in clinical practice.

The present study is addressed to Assess the Effectiveness of a Planned Teaching Programme on Glasgow Coma Scale Pupil Score (GCS-P) in terms of Knowledge and Practice among the Staff Nurses working in Trauma Centre of Civil Hospital, Ahmedabad City. 50 Samples participated in the study, where the findings of the study revealed that majority of Samples had Good Knowledge and Practice after the administration of Planned Teaching Programme on Glasgow Coma Scale Pupil Score (GCS-P). The mean Post-test Knowledge score (20.16) was higher than mean Pre-test Knowledge score (11.28) with the mean difference of 8.88 and mean Percentage gain was 35.52%. The mean Post-test Practice score (12.32) was higher than mean Pre-test Practice score (7.22) with the mean difference of 5.1 and mean Percentage gain was 34%. Association of selected Demographic Data with Pre-test Knowledge and Pre-test Practice was computed using Chi Square test and it showed that there was no significant association between Pre-test Practice score and Demographic Data except Gender of the Samples on Glasgow Coma Scale Pupil Score (GCS-P).

Hence, it was proved that the Planned Teaching Programme on Glasgow Coma Scale Pupil Score (GCS-P) was effective in increasing Knowledge and Practice among the Staff Nurses working in Trauma Centre of Civil Hospital, Ahmedabad City.

Conclusion of the study

The study showed that Knowledge and Practice on Glasgow Coma Scale Pupil Score (GCS-P) was not so significant among Staff Nurses working in Trauma Centre of Civil Hospital, Ahmedabad City. The findings indicated that Planned Teaching Programme developed by the investigator was effective in improving Knowledge and Practice of Samples on Glasgow Coma Scale Pupil Score (GCS-P). Thus, the Planned Teaching Programme can be used for large population in different setting.

Recommendations for further study

The following recommendations are made on the bases of the findings of the present study;

1. A similar study can be conducted on a large scale which may help to draw more definite conclusion and make generalizations.
2. A similar study can be conducted on Staff Nurses of Private Hospitals.
3. A Comparative study can be conducted in order to compare the Knowledge and Practice on Glasgow Coma Scale Pupil Score (GCS-P) among the Staff Nurses working in Government and Private Hospitals.
4. An Observational study can be conducted to assess the practice of staff nurses on Glasgow Coma Scale Pupil Score (GCS-P).
5. A similar study can be conducted by using other Self-Instructional Module to assess Practice of Staff Nurses.

Conflict of Interest

Not available

Financial Support

Not available

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