



“A COMPARATIVE STUDY TO EVALUATE THE EFFECTIVENESS OF FACE TO SCREEN LEARNING VERSUS FACE-TO-FACE LEARNING ON KNOWLEDGE REGARDING CONSTRICTION BAND SYNDROME AMONG STAFF NURSES IN SELECTED HOSPITALS”

¹Ms. Diksha Jais, ² Dr. Anita Soni, ³ Mrs. Sandhya Ragit

¹ M.Sc. Nursing Student, Department of Obstetrics and Gynecological Nursing, College of Nursing, GMC, Nagpur, India,

² Associate Professor and HOD Department of Obstetrics and Gynecological Nursing, College of Nursing, GMC, Nagpur, India,

³ M.Sc. Nursing Student, Department of Obstetrics and Gynecological Nursing, College of Nursing, GMC, Nagpur, India

Corresponding Author: ¹Ms. Diksha Jaswant Jais Email: dikshajais2000@gmail.com
Department of Obstetrics and Gynecological Nursing, College of Nursing, GMC, Nagpur, India

Abstract:

Introduction: Constriction Band Syndrome (CBS) is a rare congenital anomaly characterized by constriction rings that may result in limb deformities, functional impairment, and psychosocial challenges. Early identification and appropriate management are essential to prevent complications and improve outcomes. Staff nurses play an important role in early recognition, parental counselling, and timely referral of affected newborns. However, limited clinical exposure to rare congenital anomalies may contribute to inadequate knowledge among nurses. Different educational modalities may help improve their knowledge and preparedness regarding CBS.

Objectives: 1) To assess the pre-existing knowledge regarding Constriction Band Syndrome among Staff Nurses in Selected Hospitals. 2) To evaluate the effectiveness of Face to Screen Learning on knowledge regarding Constriction Band Syndrome among Staff Nurses in Selected Hospitals. 3) To evaluate the effectiveness Face-to-Face Learning on knowledge regarding Constriction Band Syndrome among Staff Nurses in Selected Hospitals. 4) To compare the knowledge score of Face to Screen Learning Group versus Face-to-Face Learning Group on Constriction Band Syndrome. 5) To find association of study findings with selected demographic variables.

Methodology: A quantitative, two-parallel-arm comparative research design was adopted. A total of 96 staff nurses were selected from selected hospitals using simple random sampling and allocated into two groups: Face-to-Face Learning group (n=48) and Face-to-Screen Learning group (n=48). Data were collected using a structured knowledge questionnaire on Constriction Band Syndrome. A pre-test was conducted in both groups, followed by the respective educational intervention. Post-test knowledge was assessed after the intervention. Descriptive and inferential statistics were used for data analysis, including frequency, percentage, mean, standard deviation, Chi-square test, and comparison of pre-test and post-test knowledge scores between the groups.

Results: At baseline, both groups had comparable knowledge scores. After the intervention, both groups showed a highly significant improvement in knowledge. The Face-to-Screen group showed a mean improvement of 9.70 ± 2.88 , while the Face-to-Face group demonstrated a higher mean improvement of 14.77 ± 3.00 . The findings confirmed that both methods were effective, with Face-to-Face Learning showing greater improvement in knowledge. **Conclusion:** The study concludes that both Face-to-Screen and Face-to-Face Learning are effective methods for improving staff nurses' knowledge regarding Constriction Band Syndrome. However, Face-to-Face Learning was more effective than Face-to-Screen Learning.

Keywords: Constriction Band Syndrome, Knowledge, Face-to-Face Learning, Face-to-Screen Learning, Congenital Anomalies

I. INTRODUCTION

Constriction Band Syndrome (CBS), also referred to as Amniotic Band Syndrome (ABS), Streeter's Dysplasia, or ADAM complex, is a rare congenital anomaly characterized by fibrous bands that encircle and constrict fetal body parts during intrauterine development. These bands can lead to a spectrum of deformities ranging from superficial indentations to severe limb amputations, craniofacial abnormalities, and visceral defects. The condition was first described by Montgomery in the 1960s and has since been the subject of ongoing debate regarding its etiology and classification.¹

Constriction band syndrome (CBS) is a condition of unknown origin, when detected early and treated promptly, the prognosis is often very positive; however, without such intervention, outcomes can range from minor cosmetic issues to potentially fatal outcomes.²

The origin of this disease has been explored through two different theories. The first theory proposes that the bands share a common source, resulting from a disruption in the developing germinal disc of the embryo, thereby linking the disorder to intrinsic factors within the fetus [intrinsic model]. In contrast, the second theory posits that the abnormalities arise due to the influence of fibrous amniotic bands which lead to the rupture of the amnion, and subsequently cause all parts of the fetus to be forced into the chorion. This approach attributes the deformities to external factors acting on the fetus [extrinsic model]³

Management of CBS is multidisciplinary, involving neonatologists, pediatric surgeons, orthopedic specialists, and nursing staff. Surgical release of constriction bands, reconstructive procedures, and prosthetic rehabilitation are common interventions. Early diagnosis and timely surgical correction are crucial for preserving function and preventing complications such as compartment syndrome or autoamputation.¹

In the modern era of healthcare education, the method of instructional delivery significantly influences how nursing professionals acquire and apply clinical knowledge. With the rapid expansion of digital technologies, face-to-screen (online) learning has become a prominent alternative to traditional face-to-face instruction. The study highlights that online learning offers flexibility, accessibility, and autonomy, which are especially beneficial for adult learners in demanding professions like nursing. However, the study also emphasizes that face-to-face learning continues to hold value due to its interpersonal engagement, structured feedback, and collaborative atmosphere, which can enhance learner satisfaction and retention. These insights are particularly relevant in clinical education, where the effectiveness of teaching methods directly impacts the preparedness of nurses in delivering safe and competent care.⁴

II. OBJECTIVES

- 1) To assess the pre-existing knowledge regarding Constriction Band Syndrome among Staff Nurses in Selected Hospitals.
- 2) To evaluate the effectiveness of Face to Screen Learning on knowledge regarding Constriction Band Syndrome among Staff Nurses in Selected Hospitals.
- 3) To evaluate the effectiveness Face-to-Face Learning on knowledge regarding Constriction Band Syndrome among Staff Nurses in Selected Hospitals.
- 4) To compare the knowledge score of Face to Screen Learning Group versus Face-to-Face Learning Group on Constriction Band Syndrome.
- 5) To find association of study findings with selected demographic variables.

III. HYPOTHESIS

- 1) **H₀ (Null Hypothesis):** There is no significant difference in pre-test and post-test score knowledge regarding Constriction Band Syndrome in Face to Screen Learning and Face-to-Face Learning.
- 2) **H₁ (Research Hypothesis):** There is significant difference in the pre-test and post-test score knowledge regarding Constriction Band Syndrome in Face to Screen Learning and Face-to-Face Learning.

IV. ASSUMPTION

Both Face to Screen Learning Group and Face-to-Face Learning Group may be equally effective on Knowledge Regarding Constriction Band Syndrome among Staff Nurses in Selected Hospitals.

V. RESEARCH MATERIAL AND METHODS

5.1 Research Approach

A Quantitative research approach to evaluate study, the Effectiveness of Face to Screen Learning Versus Face-to-Face Learning on Knowledge Regarding Constriction Band Syndrome among Staff Nurses in Selected Hospitals.

5.2 Research Design

Two parallel arm comparative study design to evaluate the knowledge among Staff Nurses before and after the giving Face to Screen Learning Intervention and Face-to-Face learning Intervention.

5.3 Population and Sample

Sample was Staff Nurses in Selected Hospitals.'

5.4 Sample size

Total 96 Staff Nurses were selected from selected hospital i.e. 48 Staff Nurses in each group with 10% dropout factor.

- Group-I Face-to-Screen Learning: 48 Staff Nurses
- Group-II Face-to-Face Learning: 48 Staff Nurses

Sample size calculated by statistician using sample size formula

$$N = \frac{2 (Z_{\alpha} + Z_{\beta})^2 \bar{p} (1 - \bar{p})}{d^2}$$

$$Z_{\alpha} = 1.96 \text{ for } \alpha = 0.05$$

$$Z_{\beta} = 0.84 \text{ for } \beta = 0.2 \text{ i.e. } 80\% \text{ power}$$

$$\bar{p} = \frac{p_1 + p_2}{2}$$

$$p_1 = \text{Proportion of knowledge before the intervention} = 31.7$$

$$p_2 = \text{Proportion of knowledge after the intervention} = 61.2$$

$$d = p_1 - p_2$$

Sample size was calculated to be 44 per group

Sample size of 48 per group will be taken to compensate for 10% loss to follow-up.

For two groups it will be 48+48 = 96.

Technique of The

Sampling technique the participants.

5.5 Sampling Study

A Simple Random was employed to select

5.6 Sampling Criteria

- **Inclusion criteria:** Registered staff nurses with more than 6 months of experience
- **Exclusion criteria:** Nurses who have previously received formal training on Constriction Band Syndrome
- **Withdrawal Criteria:** Subjects can withdraw from the study at any time if they wish to do so.

5.7 Variables

- **Demographic variables:** The demographic variables in this study are Age, Gender, Education, Clinical experience and Area of working.
- **Independent variables:** The independent variable in this study was Face to Screen Learning and Face-to-Face Learning on Constriction band syndrome.
- **Dependent variable:** The dependent variable in this study was the Knowledge regarding Constriction Band Syndrome.

5.8 Research Question

Which learning method, Face to Screen Learning or Face-to-Face Learning is effective in improving knowledge regarding Constriction Band Syndrome among Staff Nurses in Selected Hospitals?

PICO COMPONENTS:

Components	Description
P: Population	Staff nurses working in selected hospitals.
I: Intervention	Face to Screen Learning method and Face-to-Face Learning method
C: Comparison	Comparing Post-test knowledge score between two groups
O: Outcome	Improvement in knowledge regarding Constriction Band Syndrome in both groups

VI. TOOL AND TECHNIQUE FOR THE STUDY

In this study the tool consists of 2 sections.

Section A: Demographic data. This section consists of 5 items include age, gender, educational status. Clinical experience and area of working.

Section B: Questionnaire on knowledge regarding Constriction Band syndrome, knowledge was assessed by self- structured questionnaire on the basis of introduction of CBS, causes, types, investigation, management of constriction band syndrome.

Table 6.1: Grading for knowledge score

Rating	Score	Description
Poor	1-5	Inadequate knowledge with minimal understanding of the Constriction Band Syndrome.
Average	6-10	Basic knowledge with limited understanding of Constriction Band Syndrome
Good	11-15	Moderate knowledge with Fair understanding of Constriction Band Syndrome
Very Good	16-20	Strong Knowledge with confident and consistent understanding of Constriction Band Syndrome
Excellent	21-25	Comprehensive and In-depth knowledge with accurate understanding of Constriction Band Syndrome

6.1 Validity and Reliability of Tool

Validity: The content and construct validity of the tool was determined by 15 experts including Obstetrics and Gynecological Nursing experts-12, Child health Nursing experts-2, Statistician-1. Valuable suggestion was given by experts. Necessary correction was made before Data collection. Validity of tool calculated by SCVI was 0.8.

Reliability: The reliability of the structured knowledge questionnaire on Constriction Band Syndrome was assessed using the Parallel Form method. In the Face-to-Screen Learning Group, the Pearson's correlation coefficient was 0.932 (reliability = 0.9648), and in the Face-to-Face Learning Group, it was 0.913 (reliability = 0.9539). These high coefficients indicate that the tool is reliable and consistent for measuring nurses' knowledge in both groups.

6.2 Description of Interventions

Face-to-Screen Learning: In this method, staff nurses received a 45-minute live online teaching session conducted by the investigator using validated content by experts on Constriction Band Syndrome, including its definition, causes, types, clinical manifestations, prevention, and management etc. Multimedia teaching aids such as PowerPoint slides, pictures, and brief explanatory visuals were used. Interactive discussion and question-answer sessions were incorporated to promote active participation and clarify doubts. This method provided flexible and engaging real-time virtual learning.

Face-to-Face Learning: In this method, staff nurses attended a 45-minute in-person teaching session conducted by the investigator using the same content on Constriction Band Syndrome. The session was delivered through lecture-cum-discussion using identical teaching aids as the online session, allowing direct interaction, immediate feedback, and clarification of doubts. The

learning environment was supportive and conducive to effective understanding.

VII. DATA ANALYSIS

Data were analyzed using descriptive and inferential statistics. Frequency, percentage, mean, and standard deviation were used for descriptive analysis, while paired t-test, Chi-square test, and Pearson's correlation were used to assess intervention effectiveness and associations with selected variables.

VIII. RESULT

➤ Distribution of Staff Nurses with Regards to Demographic Variables.

Table 8.1: Percentage wise distribution of Staff Nurses according to their demographic characteristics.

n=96

Demographic Variables	Face to Screen Learning Group(n=48)	Face-to-Face Learning Group(n=48)
Age (years)		
21-30 years	7(14.6%)	9(18.8%)
31-40 years	13(27.1%)	7(14.6%)
41-50 years	12(25%)	19(39.6%)
≥51 years	16(33.3%)	13(27.1%)
Gender		
Male	1(2.1%)	0(0%)
Female	47(97.9%)	48(100%)
Other	0(0%)	0(0%)
Educational Qualification		
ANM	1(2.1%)	0(0%)
GNM	36(75%)	37(77.1%)
B.Sc. Nursing	8(16.7%)	8(16.7%)
P.B.B.Sc. Nursing	3(6.3%)	2(4.2%)
M.Sc. Nursing	0(0%)	1(2.1%)
Clinical Experience (years)		
6 months-5 years	6(12.5%)	8(16.7%)
6-10 years	6(12.5%)	5(10.4%)
11-15 years	15(31.3%)	8(16.7%)
≥16 years	21(43.8%)	27(56.3%)
Area of working		
ANC Ward	11(22.9%)	9(18.8%)
Casualty	4(8.3%)	3(6.3%)
Gynaec OPD	7(14.6%)	10(20.8%)
Immunization	5(10.4%)	5(10.4%)
Labor Room	7(14.6%)	8(16.7%)
NICU	9(18.8%)	7(14.6%)
PNC Ward	5(10.4%)	6(12.5%)

The majority of nurses in the Face-to-Screen group were aged ≥51 years (33.3%), whereas in the Face-to-Face group most were aged 41–50 years (39.6%). Almost all participants were female (97.9% and 100%, respectively). The majority had GNM qualification (75% and 77.1%) and ≥16 years of clinical experience (43.8% and 56.3%). Most nurses were working in the ANC ward (22.9%) in the Face-to-Screen group and Gynaecology OPD (20.8%) in the Face-to-Face group.

➤ Evaluation Of Effectiveness of Face-To-Screen Learning Group and Face-To-Face Learning Group.

Table 8.2: Significance of difference between Knowledge Score in pre and post-test of Staff Nurses in Face to Screen Learning Group

n=48

Overall	Mean	SD	Mean Difference	t-value	p-value
Pre Test	6.66	2.03	9.70±2.88	23.35	0.0001 S,p<0.05
Post Test	16.37	1.78			

The mean knowledge score increased from 6.66 ± 2.03 in the pre-test to 16.37 ± 1.78 in the post-test, with a mean difference of 9.70 ± 2.88 . The improvement was statistically highly significant ($t = 23.35$, $p = 0.0001$), indicating that the Face-to-Screen learning method was effective in improving staff nurses' knowledge regarding Constriction Band Syndrome.

Table 8.3 : Significance of difference between Knowledge Score in pre and post-test of Staff Nurses in Face-to-Face Learning Group

n=48

Overall	Mean	SD	Mean Difference	t-value	p-value
Pre Test	6.64	2.26	14.77±3	34.05	0.0001 S,p<0.05
Post Test	21.41	2.17			

The mean knowledge score increased from 6.64 ± 2.26 in the pre-test to 21.41 ± 2.17 in the post-test, with a mean difference of 14.77 ± 3.00 . The improvement was statistically highly significant ($t = 34.05$, $p = 0.0001$), indicating that the Face-to-Face learning method was effective in improving staff nurses' knowledge regarding Constriction Band Syndrome.

➤ **Comparison of Effectiveness of Face to Screen Learning Group and Face-to-Face Learning Group.**

Table 8.4: Comparison of difference between Knowledge Score in pre and post-test of Staff Nurses in Face to Screen Learning Group and Face-to-Face Learning Group.

n=96

Group	Mean	SD	Mean Difference	t-value	p-value
Face to Screen Learning Group	0.02	2.80	5.06±0.57	8.83	0.0001 S,p<0.05
Face-to-Face Learning Group	5.04	2.81			

The Face-to-Face Learning Group showed greater improvement in knowledge than the Face-to-Screen Learning Group, with mean gain scores of 5.04 ± 2.81 and 0.02 ± 2.80 , respectively. The mean difference between the groups was 5.06 ± 0.57 , which was statistically highly significant ($t = 8.83$, $p = 0.0001$), indicating that Face-to-Face learning was more effective than Face-to-Screen learning in improving staff nurses' knowledge regarding Constriction Band Syndrome.

➤ **Association Of Pre-Test Knowledge with their Selected Demographic Variables.**

Face to Screen Learning group: Among the selected demographic variables, age ($\chi^2 = 31.41$, $p = 0.0001$) and educational qualification ($\chi^2 = 22.40$, $p = 0.001$) showed a statistically significant association with pre-test knowledge scores ($p < 0.05$). However, gender ($\chi^2 = 0.23$, $p = 0.88$), clinical experience ($\chi^2 = 3.63$, $p = 0.72$), and area of working ($\chi^2 = 8.65$, $p = 0.73$) did not show a statistically significant association ($p > 0.05$).

Face-to-Face Learning group: Among the selected demographic variables, age ($\chi^2 = 29.15$, $p = 0.0001$) and educational qualification ($\chi^2 = 31.82$, $p = 0.0001$) showed a statistically significant association with pre-test knowledge scores ($p < 0.05$). However, clinical experience ($\chi^2 = 6.19$, $p = 0.40$) and area of working ($\chi^2 = 15.20$, $p = 0.23$) did not show a statistically significant association ($p > 0.05$).

IX. DISCUSSION

The present study found a significant improvement in staff nurses' knowledge regarding Constriction Band Syndrome after the intervention, with the Face-to-Screen group's mean score increasing from 6.66 ± 2.03 to 16.37 ± 1.78 ($t=23.35$, $p=0.0001$). Similarly, Hunter et al. (2018) reported that educational training significantly improved healthcare professionals' knowledge

regarding Amniotic Band Sequence.⁵ Thus, the findings of the present study are consistent with Hunter et al. (2018), confirming the effectiveness of educational interventions in improving knowledge; however, Face-to-Face learning was significantly more effective than Face-to-Screen learning.

McCutcheon et al. (2015) conducted a systematic review comparing e-learning with traditional classroom teaching in nursing education and found that both methods significantly improved learners' knowledge and skills, with no consistent superiority of e-learning.⁶ Similarly, the present study compared Face-to-Screen and Face-to-Face learning among 96 staff nurses and found that both methods significantly improved knowledge regarding Constriction Band Syndrome; however, Face-to-Face learning produced significantly higher post-test knowledge scores. Thus, the present study findings are partially consistent with McCutcheon et al. (2015).

X. CONCLUSION

The study highlights that targeted educational interventions improve nurses' knowledge and preparedness to manage rare congenital anomalies such as Constriction Band Syndrome. The greater effectiveness of Face-to-Face learning emphasizes the importance of direct interaction, immediate feedback, and active participation in improving understanding and retention. The findings support the inclusion of structured and interactive training in routine nursing education and continuing professional development. Such training can improve nurses' ability in early identification, counselling, timely referral, and provision of quality, family-centered care. Future studies may focus on long-term knowledge retention and application of learning in clinical practice.

XI. RECOMMENDATIONS

- Future studies should include larger, multi-hospital samples to improve generalizability.
- Longitudinal studies should evaluate long-term knowledge retention and clinical application for early CBS identification and referral.
- Future research should assess nurses' attitudes and clinical practices regarding CBS.
- Structured CBS teaching modules should be included in continuing nursing education programs.
- Standardized CBS clinical guidelines, checklists, and referral protocols should be implemented in maternity and neonatal units.

XII. ETHICAL CONSIDERATIONS

1. Obtained approval from Institutional Ethical Committee
2. Prior permission will be obtained from concerned authorities.
3. Informed written consent will be obtained from study subjects.
4. Participants will be protected from all type of harms.
5. Confidentiality and anonymity of the subject will be maintained.
6. Freedom to withdraw from study at any point in time will be assured to study subjects.

XIII. REFERENCES

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