



ISSN: 2230-9926

Available online at <http://www.journalijdr.com>

IJDR

International Journal of Development Research
Vol. 15, Issue, 02, pp. 67664-67670, February, 2025
<https://doi.org/10.37118/ijdr.29108.02.2025>



RESEARCH ARTICLE

OPEN ACCESS

A STUDY TO ASSESS THE EFFECTIVENESS OF INFORMATION BOOKLET ON KNOWLEDGE REGARDING CHOLELITHIASIS DISEASE AND ITS SPYGLASS TREATMENT AMONG STAFF NURSES IN SELECTED HOSPITAL AT BANGALORE

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ARTICLE INFO

Article History:

Received 07th December, 2024

Received in revised form

20th December, 2024

Accepted 27th January, 2025

Published online 27th February, 2025

Key Words:

Cholelithiasis, Spyglass treatment, Information booklet, Knowledge assessment, Staff nurses, Educational intervention, Healthcare education, Gallstones, Bangalore.

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ABSTRACT

Cholelithiasis, commonly known as gallstones, is a prevalent condition that often requires treatment such as Spyglass cholangioscopy, a minimally invasive procedure. Nurses play a crucial role in educating patients and assisting in procedures, which highlights the need for adequate knowledge regarding the disease and its treatments. The purpose of this study was to assess the effectiveness of an information booklet in enhancing the knowledge of staff nurses regarding cholelithiasis and its Spyglass treatment.

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Citation: Archana, DK, Swetha, IV, Acsah Regulas and Nagamani, T. 2025. "A study to assess the effectiveness of information booklet on knowledge regarding cholelithiasis disease and its spyglass treatment among staff nurses in selected hospital at Bangalore". *International Journal of Development Research*, 15, (02), 67664-67670.

INTRODUCTION

A plant-based diet is more likely to produce good health and to reduce sharply the risk of heart problems, cancer, gallstones, and kidney disease. ~T. Colin Campbell

Gallstone formation, known as cholelithiasis, is a gradual process often without symptoms, primarily involving cholesterol or mixed stones. These hardened bile deposits can range from small grains to golf ball-sized, forming when there is an imbalance in bile's chemical constituents. Risk factors include obesity, pregnancy, fatty foods, Crohn's disease, and certain genetic conditions, with women being more likely to develop gallstones than men. Although most cases remain asymptomatic, gallstones can lead to serious health issues, especially with complications from conditions like obesity and type 2 diabetes. Treatment for cholelithiasis has advanced with the SpyGlass technique, which offers a minimally invasive alternative to surgery by using a small flexible tube with a camera to locate and shatter stones

through electrohydraulic lithotripsy or laser. This method, which allows direct visualization of the bile duct, replaces traditional surgery and reduces diagnostic testing. SpyGlass has revolutionized gallstone management by enabling quick, incision-free removal, improving patient outcomes and reducing medical costs.¹

Need for the Study: Gallstone disease is increasingly common, affecting 10-15% of the Western population, with higher rates among women and older adults. It is a costly condition, with over 700,000 cholecystectomies performed annually in the U.S., and its complications consuming around \$6.5 billion each year. Although gallstones are often asymptomatic, approximately 10-20% of individuals will experience symptoms over time.² Risk factors include obesity, age, gender (with women at a higher risk), and metabolic conditions such as insulin resistance. Gallstones can cause severe complications such as biliary colic, acute cholecystitis, and choledocholithiasis, particularly if they obstruct the bile ducts. The traditional treatment of gallstones involved invasive surgeries, but advancements like the SpyGlass procedure have significantly

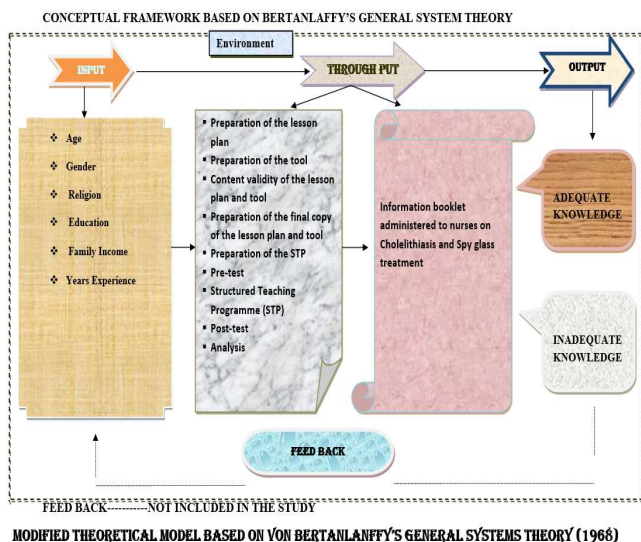
improved patient outcomes.³ The SpyGlass system, which allows direct visualization of gallstones and bile ducts, is a revolutionary treatment, offering a non-surgical alternative for patients who would otherwise require extensive surgeries like ERCP. With a 90% success rate, SpyGlass enables the fragmentation and removal of stones in a 30-90 minute procedure, allowing for a quicker recovery and shorter hospital stay compared to traditional methods. This technique reduces treatment costs by 30-40%, making it an attractive option for both patients and healthcare providers. SpyGlass also aids in early detection of bile duct cancers, offering earlier diagnoses that can improve treatment outcomes.⁴ This advancement in medical technology is set to become more widely adopted, benefiting patients with gallstone disease and promoting greater awareness of modern treatment methods in the medical and nursing fields.⁵

Objectives

1. To assess the pre-test knowledge regarding cholelithiasis disease and its spyglass treatment among staff nurses.
2. To evaluate the effectiveness of information booklet by comparing pre test and post test knowledge scores regarding cholelithiasis disease and spyglass treatment.
3. To find out the association between pre-test and post –test knowledge scores of staff nurses regard cholelithiasis disease and spyglass treatment with their selected socio demographic variables.

Hypothesis

- H1:** There is a significant difference between pre test and post test knowledge on cholelithiasis disease and spyglass treatment.
- H2:** There will be a significant association between pre-test knowledge score on Cholelithiasis disease and spyglass treatment with their demographic variables.
- H3:** There will be a significant association between post-test knowledge score on Cholelithiasis disease and spyglass treatment with their demographic variables.



REVIEW OF LITERATURE

The literature review of knowledge on a research problem and is a crucial step in the research process. It helps understand the research topic, justifies its selection, avoids duplication, explores feasibility, and guides new researchers. Researchers review existing knowledge before starting a study, interpreting results, and applying new insights to nursing practice.⁶ For this study, an extensive review of various journals, research reports, unpublished theses, texts, and online resources was conducted to gather information on the prevention and first aid management of common injuries in children among school

teachers. The review is presented under specific headings in this chapter.⁷

Reviews related to Incidence and Prevalence of Cholelithiasis /Gallstones: Several studies were conducted to assess the prevalence, risk factors, and outcomes of gallstone disease (GSD). One study in Karachi, Pakistan found a 10.2% prevalence of gallstones, with higher rates in females and those over 40 years old, and an inverse correlation with physical activity and diet.⁸ A study in Brazil showed a lower prevalence of cholelithiasis, with age and BMI linked to the disease in natural death cases, and suggested that lifestyle factors like diet and physical activity may contribute to the low prevalence. Another study on diabetic patients found a 17.5% prevalence of gallstones, particularly in those aged over 40 and with a BMI > 25 kg/m², with no significant impact from smoking or alcohol.⁹ A study on gallbladder cancer in cholelithiasis patients revealed a 10.86% cancer rate, with gallstones being the most significant risk factor. Additionally, research on gallstones in children highlighted various causes such as hemolysis and total parenteral nutrition, with spontaneous resolution in infants and cholecystectomy recommended for those with biliary symptoms or hemolytic disorders.¹⁰ A study on gastric banding patients showed that the incidence of symptomatic gallstones was similar to the general obese population, suggesting that a noninterventionist approach is suitable for these patients.¹¹

Reviews related to Causes and Risk factors of Cholelithiasis /Gallstones: A series of studies examined various factors related to gallstone disease (GSD). One study from Sweden identified familial risks for GSD, finding that 36% of cases were familial, with higher risks in those with a parental or sibling history. Another study revealed that 10.8% of patients with asymptomatic gallstones developed symptoms over an average follow-up of 4.02 years, with higher conversion rates in females. A study on pediatric GSD found obesity and Hispanic ethnicity were significant risk factors, with a shift away from hemolytic diseases being the primary cause. Additionally, a population-based study in Taiwan identified hepatitis C, cirrhosis, obesity, and hyperlipidemia as key risk factors for GSD.¹² Research on post-menopausal breast cancer patients taking tamoxifen found no significant association with gallstone formation in the South Indian population, in contrast to Western studies. Lastly, a study on ultrasonography and gallstones highlighted the importance of modifiable risk factors such as obesity, rapid weight loss, and a sedentary lifestyle.¹³

Reviews related to signs and symptoms and Diagnosis of Cholelithiasis /Gallstones: A series of studies explored various aspects of gallstone disease (GSD). One study evaluated the role of endoscopy in diagnosing choledocholithiasis, emphasizing the need for further clinical studies and expert consensus to refine guidelines. Another study assessed 37 symptoms and signs of gallstones in 192 patients with upper abdominal pain, concluding that while classical symptoms were not highly diagnostic, their absence could help exclude GSD.¹⁴ A case-control study on gallbladder cancer found associations with factors such as late menarche, multiple pregnancies, and tobacco use. In pediatric populations, a study on obese children revealed that more severe obesity was linked to a higher prevalence of gallstones, while no prepubertal children were affected. A study on asymptomatic gallstones found that 7.6% of individuals developed symptoms requiring treatment within five years, with younger individuals more likely to experience complications. These studies provide insights into diagnostic methods, risk factors, and the progression of gallstone disease across different populations.¹⁵

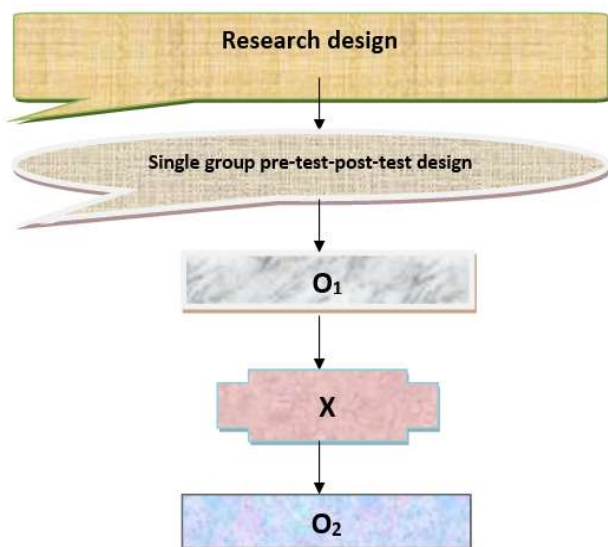
Reviews related to Different Management techniques of Cholelithiasis /Gallstones: Several studies have been conducted to assess various aspects of gallstone management. A study evaluating the quality of guidelines for gallstone treatment found that while five of fourteen guidelines were suitable for clinical practice, most were based on low-quality evidence, particularly regarding issues like the definition of symptomatic gallstones and indications for cholecystectomy. Another study reviewed updated guidelines for managing common bile duct stones (CBDS) and highlighted the role

of different imaging modalities, endoscopic retrograde cholangiopancreatography, and surgery in treatment, while emphasizing that these guidelines should complement clinical judgment. Research on open versus endoscopic surgery for gallstones suggested that laparoscopic cholecystectomy is as safe and effective as endoscopic techniques.¹⁶ Finally, a study on endoscopic laser lithotripsy (EHL) demonstrated a high success rate in fragmenting difficult stones, with minimal complications, thus proving to be a viable treatment option for large stones.¹⁷

Reviews related to Cholelithiasis disease and its spyglass treatment: Large calculi, stones in unusual locations, or anatomical abnormalities may require alternative approaches, including mechanical lithotripsy, electrohydraulic lithotripsy (EHL), or laser lithotripsy (LL) guided by cholangioscopy. The SpyGlass system, a direct cholangioscopy tool, has recently been introduced and offers increased diagnostic yield and therapeutic options for managing difficult biliary lithiasis and indeterminate biliary strictures.¹⁸ Endoscopic papillary dilation with large balloons has proven useful for large, multiple calculi, while a transhepatic approach is recommended for altered anatomy. For elderly patients with poor health, biliary stent placement may be used to improve the patient's condition for further therapy.¹⁹ A case study on a 34-year-old female with chronic cholecystitis demonstrated the effective use of the Spy Glass system for biliary stent placement and gallstone irrigation, successfully treating symptomatic cholecystitis and cholelithiasis without the need for cholecystectomy.²⁰

RESEARCH METHODOLOGY

The research design refers to the researcher's overall plan or blueprint obtaining answers to the research questions, testing hypothesis and how to handle some of the difficulties encountered during the research process. The research design spells out the strategies that the researcher adopts to develop information that is accurate, objective and interpretable.²¹



Schematic representation of research design.

Key words:

- O₁ – Pre test on Knowledge of Staff Nurses regarding Cholelithiasis and Spyglass treatment.
- X – Information Booklet regarding Cholelithiasis and Spyglass treatment.
- O₂ – Post test on Knowledge of Staff Nurses regarding Cholelithiasis and Spyglass treatment.

Sample and Sample Size

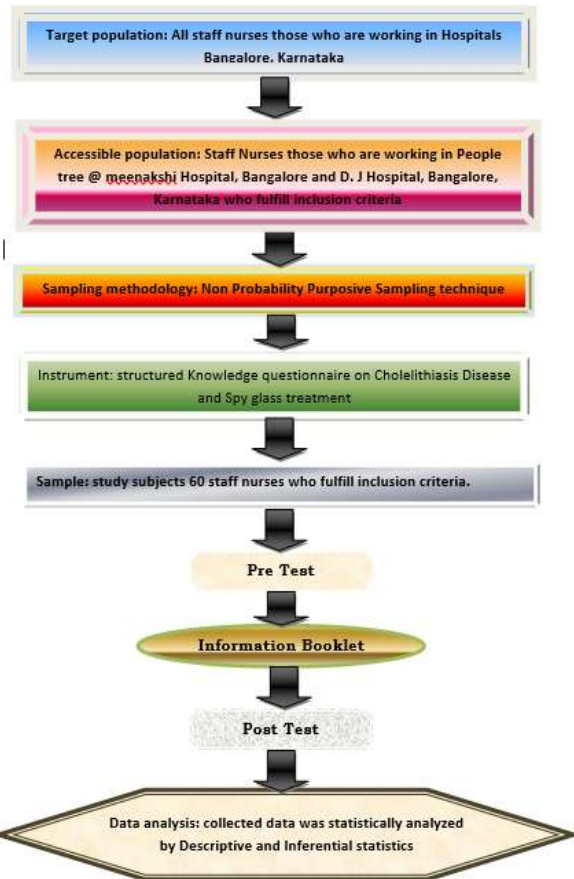


FIGURE: 2- SCHEMATIC REPRESENTATION OF RESEARCH STUDY

RESULTS AND ANALYSIS

The Findings of data has been finalized and organized in accordance with the plan for data analysis. These are presented under the following sections.²²

- Section-I:** Demographic characteristics of staff nurses.
- Section-II:** Knowledge level of staff nurses regarding cholelithiasis disease and its spyglass treatment through pre and post test.
- Section-III:** Comparison of pre test and post test knowledge regarding cholelithiasis disease and its spyglass treatment.
- Section-IV:** Association of the post test knowledge scores with the demographic variables of staff nurses.

Section – I

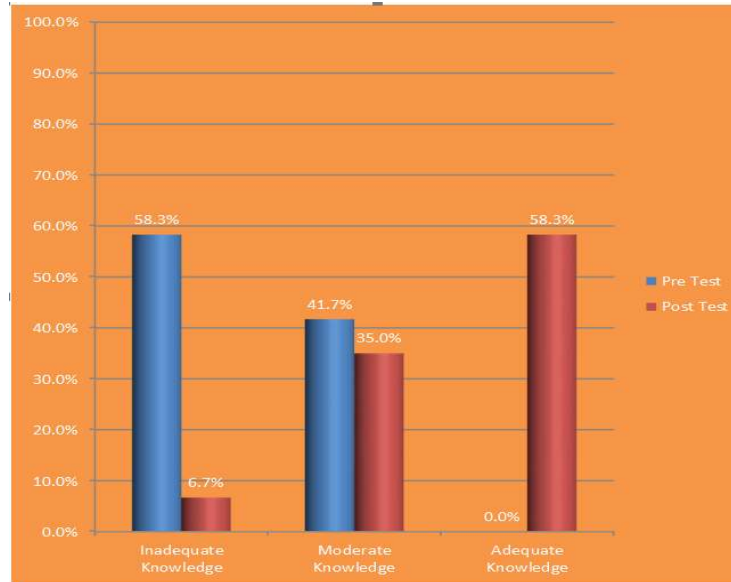
Demographic Characteristics of staff nurses

Age	Frequency	Percentage
a. 20-25 years	15	25.0
b. 26-30 years	20	33.3
c. 31-35 years	15	25.0
d. More than 36 years	10	16.7
Total	60	100.0
Gender	Frequency	Percentage
a. Male	15	25.0
b. Female	45	75.0
Total	60	100.0
Religion	Frequency	Percentage
a. Hindu	31	51.7
b. Muslim	6	10.0
c. Christian	23	38.3
Total	60	100.0
Education	Frequency	Percentage
a. Diploma general nursing	36	60.0
b. PC B.Sc Nursing	12	20.0
c. B.Sc Nursing	12	20.0

Pretest and post test knowledge level of the staff nurses.

N = 60

Knowledge level	Pre test		Post test	
	Frequency	%	Frequency	%
a. Inadequate knowledge	35	58.3	4	6.7
b. Moderate knowledge	25	41.7	21	35.0
c. Adequate knowledge	0	0	35	58.3

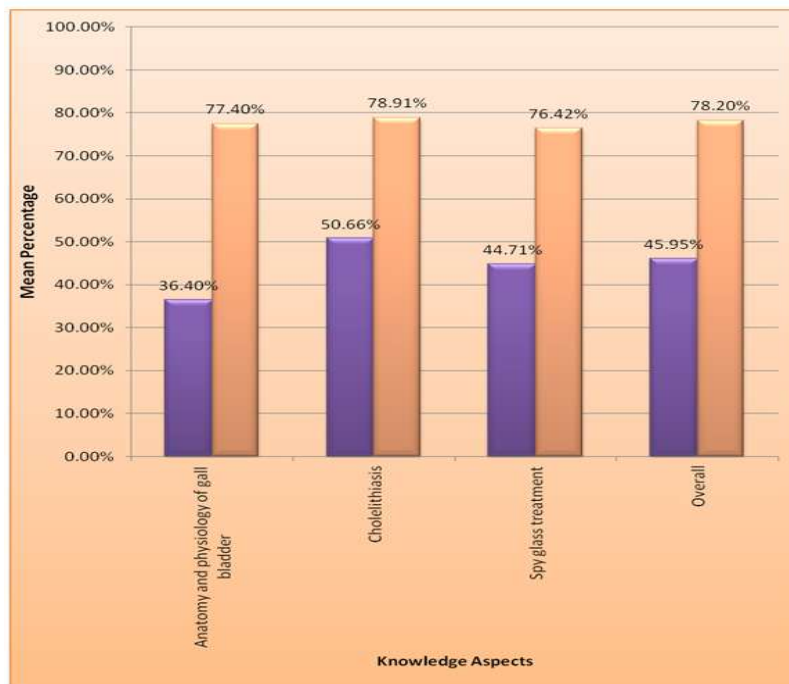


Cylindrical diagram showing the Pre test and post test knowledge level of staff nurses

Overall analysis of pre test and post test knowledge scores of staff nurses

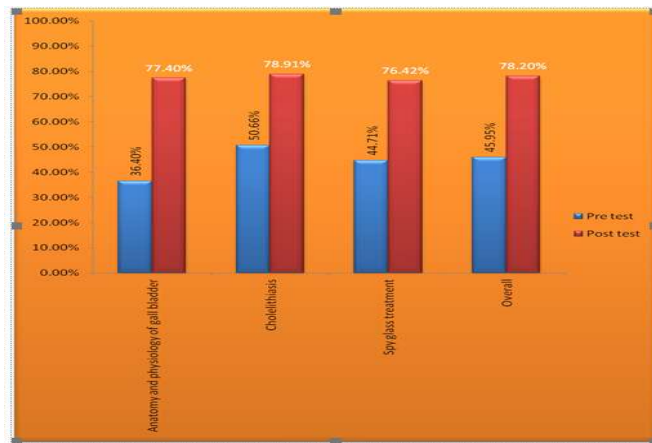
N = 60

Knowledge aspects	No. of Items	Max Score	Pre test			Post test		
			Mean	Mean %	SD	Mean	Mean %	SD
Anatomy and physiology of gall bladder	5	5	1.82	36.4	1.097	3.87	77.4	0.911
Cholelithiasis	12	12	6.08	50.66	2.573	9.47	78.91	2.182
Spy glass treatment	7	7	3.13	44.71	1.371	5.35	76.42	1.764
Overall	24	24	11.03	45.95	4.063	18.77	78.20	4.311



Simple bar diagram showing Over-all and area wise pre test and post test knowledge scores of staff nurses

Comparison of the Knowledge level of Staff Nurses



Simple bar diagram the Comparison of mean percentage of pre-test and post-test scores

Section IV: Association between knowledge of staff nurses and the selected demographic variables

N = 60

Variables	Below Median	Median and above	Chi square	Df	P value (0.05)	Inference
1. Age in years						
a. 20-25 years	7	8	0.133	3	0.988	NS
b. 26-30 years	10	10				
c. 31-35 years	8	7				
d. more than 36 years	5	5				
2. Gender						
a. Male	7	8	0.089	1	0.766	NS
b. Female	23	22				
3. Religion						
a. Hindu	16	15	1.090	2	0.580	NS
b. Muslim	4	2				
c. Christian	10	13				
4. Education						
a. Diploma general nursing	18	18	0.000	2	1.000	NS
b. PC BSc Nursing	6	6				
c. BSc Nursing	6	6				
5. Family Income						
a. Less than Rs. 15000	3	6	3.702	2	0.157	NS
b. Rs. 15001-25000	12	16				
c. More than Rs. 25001	15	8				
6. Years of Experience						
a. Less than 2 years	13	11	8.350	3	0.045	S
b. 2-6 years	12	7				
c. 7-10 years	4	6				
d. More than 10 years	1	6				

Association between post-test knowledge of staff nurses and the selected demographic variables

N = 60

Variables	Below Median	Median and above	Chi square	Df	P value (0.05)	Inference
1. Age in years						
a. 20-25 years	5	10	3.086	3	0.379	S
b. 26-30 years	8	12				
c. 31-35 years	9	6				
d. more than 36 years	3	7				
2. Gender						
a. Male	6	9	0.023	1	0.880	NS
b. Female	19	26				
3. Religion						
a. Hindu	15	16	1.941	2	0.379	NS
b. Muslim	3	3				
c. Christian	7	16				
4. Education						
a. Diploma general nursing	15	21	0.000	2	1.000	S
b. PC BSc Nursing	5	7				
c. BSc Nursing	5	7				
5. Family Income						
a. Less than Rs. 15000	3	6	1.710	2	0.425	NS
b. Rs. 15001-25000	10	18				
c. More than Rs. 25001	12	11				
6. Experience						
a. Less than 2 years	11	13	1.442	3	0.655	NS
b. 2-6 years	8	11				
c. 7-10 years	4	6				
d. More than 10 years	2	5				

DISCUSSION

Objective 1: To assess the pre-test knowledge regarding cholelithiasis disease and its spyglass treatment among staff nurses.

Based on the objective of the study, the findings of the Pre-Test knowledge score of the Staff Nurses regarding Cholelithiasis and Spyglass treatment shows that they were able to answer the questions to some extent. The level of pre test knowledge depicts that majority 58.3% of the staff nurses had inadequate knowledge and 41.7% had moderate knowledge in the pretest. Overall mean pre test knowledge scores of respondents were found to be 11.03 (45.95%) with standard deviation 4.063 indicates inadequate knowledge of staff nurses regarding cholelithiasis disease and its spyglass treatment.²³

Objective 2: To evaluate the effectiveness of information booklet by comparing pre test and post test knowledge scores regarding cholelithiasis disease and spyglass treatment.

Based on the above objective of the study the findings of the post-test Knowledge score of the Staff Nurses regarding Cholelithiasis and Spyglass treatment after the administration of information booklet shows that 58.3% of the subjects had adequate knowledge, 35% had moderate knowledge regarding cholelithiasis disease and its spyglass treatment in the post test. After administration of information booklet overall knowledge scores of respondents were found to be 18.77 (78.20%) with standard deviation 4.311 shows improvement in the knowledge of staff nurses regarding the cholelithiasis disease and its spyglass treatment. The mean enhancement of the knowledge score was 7.733 and the "t" value 14.161 is greater than the table value both at 0.01 level of significance. Therefore, "t" value is found to be significant.²⁴

Hypothesis Testing

H1: There is a significant difference between pre test and post test knowledge on cholelithiasis disease and spyglass treatment.

The mean enhancement of the knowledge score was 7.733 and the "t" value 14.161 is greater than the table value both at 0.01 level of significance. Therefore, "t" value is found to be significant. Hence it is inferred that there is significant difference between the pre test and post test knowledge level of staff nurses regarding the cholelithiasis disease and its spyglass treatment. Hence the hypothesis H₁ has been accepted.²⁵ There is a significant difference between pre test and post test knowledge on cholelithiasis disease and spyglass treatment is accepted.

Objective 3: To find out the association between pre-test and post –test knowledge scores of staff nurses regard cholelithiasis disease and spyglass treatment with their selected socio demographic variables.

Based on the above objective of the study the findings of the association between the pre test knowledge scores of staff nurses and selected demographic variables depicts that variables such as age ($X^2 = 0.133$), gender ($X^2 = 0.089$), religion ($X^2 = 1.09$), educational qualification ($X^2 = 0.000$) and family income ($X^2 = 3.702$) were not significant at 0.05 level of significance. Thus it is inferred that the knowledge of staff nurses regarding cholelithiasis disease and its spyglass treatment does not have any association with demographic variables. Based on the above objective of the study the findings of the association between the post test knowledge scores of staff nurses and selected demographic variables depicts that variables such as age ($X^2 = 3.086$), gender ($X^2 = 0.023$), religion ($X^2 = 1.941$), educational qualification ($X^2 = 0.000$), family income ($X^2 = 1.710$) and years of experience ($X^2 = 1.442$) were not significant at 0.05 level of significance. Thus it is inferred that the knowledge of staff nurses regarding cholelithiasis disease and its spyglass treatment does not have any association with selected demographic variables.²⁶

Hypothesis Testing

H2: There will be a significant association between pre-test knowledge score on Cholelithiasis disease and spyglass treatment with their demographic variables.

The findings of the association between the pre test knowledge scores of staff nurses and selected demographic variables depicts that variables such as age ($X^2 = 0.133$), gender ($X^2 = 0.089$), religion ($X^2 = 1.09$), educational qualification ($X^2 = 0.000$) and family income ($X^2 = 3.702$) were not significant at 0.05 level of significance. Thus it is inferred that the knowledge of staff nurses regarding cholelithiasis disease and its spyglass treatment does not have any association with demographic variables. Hence the hypothesis H₂: There will be a significant association between pre-test knowledge score on Cholelithiasis disease and spyglass treatment with their demographic variables is rejected.²⁷

H3: There will be a significant association between post-test knowledge score on Cholelithiasis disease and spyglass treatment with their demographic variables.

The findings of the association between the post test knowledge scores of staff nurses and selected demographic variables depicts that variables such as age ($X^2 = 3.086$), gender ($X^2 = 0.023$), religion ($X^2 = 1.941$), educational qualification ($X^2 = 0.000$), family income ($X^2 = 1.710$) and years of experience ($X^2 = 1.442$) were not significant at 0.05 level of significance. Thus it is inferred that the knowledge of staff nurses regarding cholelithiasis disease and its spyglass treatment does not have any association with selected demographic variables. Hence the hypothesis H₃ There will be a significant association between post-test knowledge score on Cholelithiasis disease and spyglass treatment with their demographic variables is rejected.²⁸ The study concludes that the SpyGlass device, which is used to destroy stones in the bile duct that cannot be removed by other methods, provides direct visualization, unlike traditional ERCP, which relies on X-rays. The findings show that the knowledge level of staff nurses regarding Cholelithiasis and SpyGlass treatment was moderate during the pre-test but improved significantly after the administration of an information booklet. The post-test results indicated that 58.3% of nurses had adequate knowledge, with an overall mean improvement in knowledge scores of 78.20%. The knowledge enhancement was statistically significant, with a "t" value of 14.161, which was greater than the table value. There was no significant association between the pre-test and post-test knowledge scores and demographic variables. The study highlights the implications for nursing practice, education, administration, and research, emphasizing the importance of ongoing education and training to improve nurses' knowledge and skills in managing Cholelithiasis and utilizing SpyGlass treatment. Recommendations include replicating the study with larger sample sizes, using video-assisted teaching programs, and conducting comparative studies between different nursing groups.²⁹ The study suggests that nurses should regularly update their knowledge and participate in educational programs to enhance their competence in managing Cholelithiasis and its treatment.³⁰

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