EFFECTIVENESS OF STRUCTURED TEACHING PROGRAMME ON KNOWLEDGE REGARDING FATTY LIVER DISEASE AMONG 1ST SEMESTER B.Sc. NURSING STUDENTS AT SELECTED COLLEGE IN KANNUR.

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DECLARATION BY THE CANDIDATES

We hereby declare that this dissertation entitled "**Effectiveness of structured teaching programme on knowledge regarding fatty liver disease among 1st semester B.Sc. Nursing students at selected college in Kannur**" is a bona fide research work carried out by **research group 3 (2022 batch)** of College Of Nursing, Kannur Medical College, Anjarakandy.

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ENDORSEMENT BY THE HOD, PRINCIPAL/HEAD OF THE INSTITUTION

This is to certify that the dissertation entitled "**Effectiveness of structured teaching programme on knowledge regarding fatty liver disease among 1st Semester B.Sc. Nursing students at selected college in Kannur**" is a bonafide research work done r**esearch group 03 (2022 batch)**, in partial fulfilment of the requirements for **Degree of Bachelor of Science in Nursing.**

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We hereby declare that the College of Nursing, Kannur Medical College, Anjarakandy, Kerala shall have the right to preserve, use and disseminate this dissertation in the print or electronic format for academic/research.

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Date:

Place: Anjarakandy

ABSTRACT

The present study aimed to assess the effectiveness of a structured teaching programme on knowledge regarding fatty liver disease among 1st semester B.Sc. nursing students at selected college in Kannur. A quantitative research approach with a pre-experimental one-group pre-test post-test design was adopted. The study was conducted among 45 1st semester B.Sc. nursing students selected using non-probability convenience sampling technique. Data were collected using a structured knowledge questionnaire consisting of 30 multiple-choice items. Pre-test knowledge was assessed, followed by administration of the structured teaching programme, and post-test knowledge was evaluated on the fifth day. Data was analyzed using descriptive and inferential statistics. The findings revealed that in the pre-test, 57.77% of students had inadequate knowledge and 42.22% had moderately adequate knowledge, whereas none had adequate knowledge. After the intervention, 100% of the students achieved adequate knowledge. The mean pre-test score was 10.82 ± 3.29, which significantly increased to 28.31 ± 1.64 in the post-test, with a mean difference of 17.49. The calculated paired t-value (3.39) was statistically significant at $p < 0.05$, indicating that the structured teaching programme was highly effective. No significant association was found between knowledge scores and selected variables. The study concludes that the structured teaching programme was effective in significantly improving knowledge regarding fatty liver disease among 1st semester B.Sc. nursing students. Regular educational interventions are recommended to enhance awareness and promote preventive practices among nursing students.

Key words: Effectiveness, Fatty liver disease, Structured teaching programme, Knowledge, 1st semester BSc. Nursing students.

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ABBREVIATIONS

AFLD : Alcoholic Fatty Liver Disease
ALP :Alkaline Phosphatase
ALT : Alanine Aminotransferase
ANA : Antinuclear Antibody
AST : Aspartate Aminotransferase
BMI : Body Mass Index
CAD : Coronary Artery Disease
CAP : Controlled Attenuation Parameter
CK :Creatine Kinase
CT : Computed Tomography
GGT : Gamma-Glutamyl Transferase
HbA1c : Glycated Hemoglobin
HDL : High-Density Lipoprotein
HOMA-IR : Homeostatic Model Assessment of Insulin Resistance
HPM : Health Promotion Model
hsCRP : High-Sensitivity C-Reactive Protein
IR : Insulin Resistance
LDL : Low-Density Lipoprotein
LSM : Liver Stiffness Measurement
MAFLD : Metabolic-Associated Fatty Liver Disease
MASLD : Metabolic Dysfunction-Associated Steatotic Liver Disease
MRI : Magnetic Resonance Imaging
NAFLD : Non-Alcoholic Fatty Liver Disease
NASH : Non-Alcoholic Steatohepatitis
NOC : No Objection Certificate
OSA : Obstructive Sleep Apnea
QUICKI : Quantitative Insulin Sensitivity Check Index
ROL : Review of Literature
SMA : Smooth Muscle Antibody
T2DM : Type 2 Diabetes Mellitus
TSH : Thyroid-Stimulating Hormone
USG : Ultra sonography

CHAPTER 1
INTRODUCTION

Fatty liver disease is no longer a benign condition but a major public health problem.

- *Christopher P.Da*

1.1 INTRODUCTION

Fatty liver disease has emerged as a significant public health concern worldwide, with a rapidly increasing prevalence among young adults. Once considered a condition affecting middle-aged and older individuals, fatty liver disease—particularly non-alcoholic fatty liver disease (NAFLD)—is now commonly observed in younger populations due to sedentary lifestyles, unhealthy dietary habits, obesity, insulin resistance, and metabolic disorders. If left undetected or unmanaged, fatty liver disease can progress to serious complications such as non-alcoholic steatohepatitis, liver fibrosis, cirrhosis, and hepatocellular carcinoma, leading to long-term morbidity and reduced quality of life.

Young adulthood represents a critical period for the adoption of health-related behaviours that influence future well-being. However, lack of awareness and inadequate knowledge regarding the causes, risk factors, symptoms, prevention, and management of fatty liver disease often contribute to delayed diagnosis and poor health-seeking behaviour. Enhancing knowledge at this stage can promote early lifestyle modifications, encourage preventive practices, and reduce the burden of disease progression.

Structured teaching programmes are systematic, planned educational interventions designed to improve knowledge and understanding through organized content and learner-centered strategies. Such programmes have been shown to be effective in increasing awareness and fostering positive health behaviours among various population groups. Implementing a structured teaching programme focused on fatty liver disease may empower young adults with accurate information, enabling them to make informed decisions regarding diet, physical activity, and overall lifestyle.[3]

Therefore, this study aims to assess the effectiveness of a structured teaching programme on knowledge regarding fatty liver disease among 1st semester BSc. Nursing students at selected college in Kannur. The findings of this study may provide valuable insights into the role of health education in disease prevention and contribute to the development of targeted educational strategies for promoting liver health in the young adult population.

1.2 NEED FOR THE STUDY

Fatty liver disease has become an increasingly prevalent health problem among young adults due to rapid lifestyle changes, including unhealthy dietary patterns, physical inactivity, obesity, and increased stress levels. Despite its rising incidence, fatty liver disease often remains asymptomatic in the early stages, leading to under diagnosis and

delayed management. Young adults frequently underestimate the seriousness of the condition, resulting in poor awareness and limited adoption of preventive measures.

Adequate knowledge plays a crucial role in the prevention and control of fatty liver disease, as lifestyle modification remains the cornerstone of its management. However, several studies and clinical observations indicate that young adults have insufficient knowledge regarding the risk factors, early warning signs, complications, and preventive strategies related to fatty liver disease. This lack of awareness contributes to the progression of the disease to more severe forms, increasing the risk of long-term liver damage and associated metabolic disorders.

Structured teaching programmes offer a systematic and effective approach to health education by providing accurate, comprehensive, and age-appropriate information. By improving knowledge and awareness, such programmes can motivate young adults to adopt healthier lifestyles and engage in early preventive practices. Assessing the effectiveness of a structured teaching programme is essential to determine its impact on knowledge enhancement and to identify gaps that may require further educational interventions.[20]

Therefore, this study is needed to evaluate the effectiveness of a structured teaching programme on knowledge regarding fatty liver disease among 1st semester BSc. Nursing students at selected college in Kannur . The results of this study will help in planning and implementing effective educational strategies, support early prevention efforts, and ultimately contribute to reducing the growing burden of fatty liver disease in the young adult population.

1.3 BACKGROUND OF THE PROBLEM

Fatty liver disease is a growing global health problem characterized by the excessive accumulation of fat in liver cells, affecting more than 5% of hepatocytes. It includes non-alcoholic fatty liver disease (NAFLD) and the recently redefined metabolic dysfunction–associated fatty liver disease (MAFLD). This condition is closely associated with lifestyle-related factors such as obesity, sedentary behaviour, unhealthy dietary habits, insulin resistance, and type 2 diabetes mellitus.

The prevalence of fatty liver disease has increased markedly in recent years, particularly among young adults, due to rapid urbanization, dietary changes, and reduced physical activity. In India, fatty liver disease is emerging as a major public health concern, with studies reporting a prevalence ranging from 20–30% in the general population. If left undetected and untreated, fatty liver disease can progress from simple steatosis to non-alcoholic steatohepatitis (NASH), liver fibrosis, cirrhosis, and hepatocellular carcinoma, leading to significant morbidity and mortality.

Despite its increasing burden, fatty liver disease often remains asymptomatic in the early stages, resulting in delayed diagnosis and poor disease awareness. Lack of knowledge regarding risk factors, preventive measures, lifestyle modification, and early symptoms contributes to disease progression. Nurses play a crucial role in health education, early identification, lifestyle counselling, and prevention of fatty liver

disease. However, evidence suggests that nursing students may have inadequate knowledge about fatty liver disease and its management.[21]

Therefore, providing structured teaching programme on fatty liver disease is essential to enhance knowledge, promote healthy lifestyle practices, and prepare future nurses to deliver effective patient education and preventive care. This highlights the need for research to assess the effectiveness of educational interventions related to fatty liver disease.

1.4 STATEMENT OF THE PROBLEM

A study to assess the effectiveness of structured teaching programme on knowledge regarding fatty liver disease among 1st semester BSc. nursing students at selected college in Kannur.

1.5 OBJECTIVES FOR THE STUDY

- To assess the pre-test and post-test level of knowledge on fatty liver disease among 1st semester BSc. nursing students at selected college in Kannur.
- To assess the effectiveness of structured teaching programme on fatty liver disease among 1st semester BSc. nursing students at selected college in Kannur.
- To assess the significant association between the knowledge scores and selected variables.(age, gender, history of fatty liver, diet, habit of alcohol, previous knowledge about fatty liver disease)

1.6 VARIABLES

DEPENDENT VARIABLE

Level of Knowledge regarding Fatty liver disease

This refers to the knowledge score obtained by the students based on a structured knowledge questionnaire.

INDEPENDENT VARIABLE

Structured teaching programme

This is the planned educational intervention provided to the students to improve their knowledge about Fatty liver disease.

1.7 HYPOTHESES

- H_1: There will be a significant difference between pre-test and post-test knowledge scores regarding the knowledge on fatty liver disease among 1st semester BSc. Nursing students at selected college in Kannur.
- H_2: There will be a significant association between knowledge scores and the selected variables.(age, gender, history of fatty liver, diet, habit of alcohol, previous knowledge about fatty liver disease)

1.8 ASSUMPTIONS

1. B.Sc. Nursing students possess basic prior knowledge related to liver function, nutrition, and lifestyle-related disorders through their curriculum, but may lack specific knowledge regarding fatty liver disease.

2. The structured teaching programme is designed appropriately and is capable of enhancing knowledge regarding fatty liver disease.

3. The selected variables (such as age, gender, history of fatty liver, diet, habit of alcohol, previous knowledge about fatty liver disease) may have an influence on the baseline knowledge level of the students.

1.9 DELIMITATIONS OF THE STUDY

1. The study was delimited to 1st semester BSc. Nursing students of a single nursing college.

2. The study was delimited to be conducted for only 5 days.

1.10 OPERATIONAL DEFINITIONS

EFFECTIVENESS

Effectiveness is defined as the extent to which an intervention or programme achieves its intended objectives or produces the desired outcome under actual conditions of use. In this study, effectiveness refers to the measurable improvement in the level of knowledge of participants regarding fatty liver disease, assessed by comparing the pre-test and post-test scores. A statistically significant increase in post-test scores will indicate the effectiveness of the structured teaching programme.

STRUCTURED TEACHING PROGRAMME

A structured teaching programme is a systematically planned and organized educational intervention designed to provide information in a logical sequence using predetermined objectives, content, teaching methods, and evaluation strategies. In this study, structured teaching programme refers to a systematically planned and organized educational intervention designed by the researcher to provide structured content related to Fatty liver disease using a PowerPoint presentation for 45 minutes about fatty liver disease.

KNOWLEDGE

Knowledge is defined as the awareness, understanding, and information gained through learning, education, or experience. In this study, knowledge refers to the information, understanding, and awareness the students have about fatty liver disease which is measured through structured knowledge questionnaire.

FATTY LIVER DISEASE

Fatty liver disease is defined as a condition characterized by abnormal accumulation of fat in the liver cells, exceeding normal limits, which may occur due to alcohol consumption or metabolic factors. In this study fatty liver disease is defined as accumulation of fat in more than 5% of hepatocytes(liver cells) by weight, or when fat constitutes more than 5-10% of the liver's weight, in the absence of significant alcohol intake or other secondary causes.

1.11 CONCEPTUAL/THEORETICAL FRAMEWORK

"A conceptual framework is a frame that works to put those concepts into practice."
– Paul Hughes

A model is a symbolic representation of a phenomenon that explains relationships among concepts. A conceptual/theoretical framework is a set of interrelated concepts that provide direction to research by explaining how variables are connected based on an existing theory. It serves as a foundation for the study and guides data collection, analysis, and interpretation.

The present study is concerned with assessing the effectiveness of a structured teaching programme on knowledge regarding fatty liver disease among 1st semester B.Sc. nursing students at selected college in Kannur, based on Pender's health Promotion Model (HPM). The Health Promotion Model focuses on individual characteristics, behaviour-specific cognitions, and behavioural outcomes that influence health-promoting behaviour. This model emphasizes health education as a key strategy to enhance knowledge, motivation, and adoption of healthy behaviours.

INDIVIDUAL CHARACTERISTICS AND EXPERIENCES

Each person has unique personal characteristics and experiences that affect subsequent actions. The importance of their effect depends on the target behaviour being considered. Individual characteristics and experiences include prior related behaviour and personal factors. This component includes the personal factors and prior related behaviour of the 1st semester B.Sc. nursing students who are the participants in the study. These factors influence baseline knowledge and readiness to learn.

-Personal factors:

- Age
- Gender
- Dietary pattern
- Habit of alcohol consumption

-Prior related behaviour:

- History of fatty liver disease
- Previous knowledge regarding fatty liver disease

These individual characteristics affect students' perceptions, learning ability, and interest in health-promoting behaviours.

BEHAVIOR-SPECIFIC COGNITIONS AND AFFECT

Behaviour-specific variables are considered to have major motivational significance. These variables constitute a critical "core" because they can be modified through interventions. They include perceived benefits, perceived barriers, perceived self-efficacy, activity-related affect, interpersonal influences, and situational influences. Measuring these variables is essential to assess whether change actually results from the intervention. This component represents the cognitive and emotional factors that influence students' motivation to learn and adopt health-promoting behaviours.

a)Perceived benefits of action
Students gain knowledge about fatty liver disease, understand importance of healthy diet and have awareness about regular exercise.

b) Perceived barriers to action
lack of time for exercise, hostel or canteen food habits, preference for fast food, academic stress.

c) Perceived self-efficacy
Confidence of students in their ability to understand health information and apply preventive measures related to fatty liver disease.

d) Activity-related affect
Positive feelings towards structured teaching sessions enhance attention, interest, and participation.

INTERPERSONAL INFLUENCES

Interpersonal influences are cognitions involving the behaviours, beliefs, or attitudes of others. These cognitions may or may not correspond with reality. Interpersonal influences include interaction between the investigator (nursing educator) and the students. Through effective communication, motivation, and guidance, the educator facilitates learning.

- Teaching–learning interaction
- Clarification of doubts
- Motivation to adopt healthy lifestyle behaviours

This interaction plays a vital role in strengthening students' commitment to learning.

SITUATIONAL INFLUENCES

Personal perceptions and cognitions of any situation or context facilitate or impede behaviour. Situational influences on health-promoting behaviour include perceptions of options available, demand characteristics, and characteristics of the environment in which a given behaviour is proposed to take place. Situational influences include the selected nursing college and learning environment where the teaching programme is conducted.

- Educational setting
- Curriculum support
- Institutional policies

- Availability of learning resources

These factors facilitate or hinder the effectiveness of the structured teaching programme.

COMMITMENT TO A PLAN OF ACTION

Commitment to a plan of action initiates a behavioural event. Commitment propels the individual into action unless there is a competing demand that cannot be avoided or a competing preference that is not resisted. Following the structured teaching programme, students develop a commitment to improve their knowledge and adopt preventive practices related to fatty liver disease. This commitment is reflected in their willingness to participate actively and apply learned concepts.

IMMEDIATE COMPETING DEMANDS AND PREFERENCES

Immediate competing demands or preferences refer to alternative behaviours that intrude into consciousness immediately prior to the intended occurrence of a planned health-promoting behaviour. Competing demands are alternative behaviours over which individuals have a relatively low level of control because of environmental contingencies such as work or family care responsibilities. Failure to respond to a competing demand may have untoward effects for the self or for significant others. Academic stress, personal habits, and lifestyle choices may compete with students' intention to adopt healthy behaviours. Competing preferences have powerful reinforcing properties over which individuals exert a relatively high level of control. However, improved knowledge helps students prioritize health-promoting actions.

HEALTH-PROMOTING BEHAVIOUR (OUTCOME)

Health-promoting behaviour is the end point or action out-come in the HPM. However, health-promoting behaviour is ultimately directed toward attaining positive health outcomes for the client. The outcome of the teaching-learning process is assessed through a post-test, which reflects the effectiveness of the structured teaching programme.

- Adopting a balanced and nutritious diet
- Performing regular exercise
- Increase awareness about fatty liver prevention

An adequate gain indicates successful health promotion and achievement of study objectives.[1]

1.12 SUMMARY

By applying Pender's health promotion model, the study highlights how individual characteristics, cognitive perceptions, interpersonal and situational influences contribute to improved knowledge regarding fatty liver disease. The structured teaching programme acts as a health-promoting intervention that enhances awareness and encourages preventive health behaviours among nursing students.

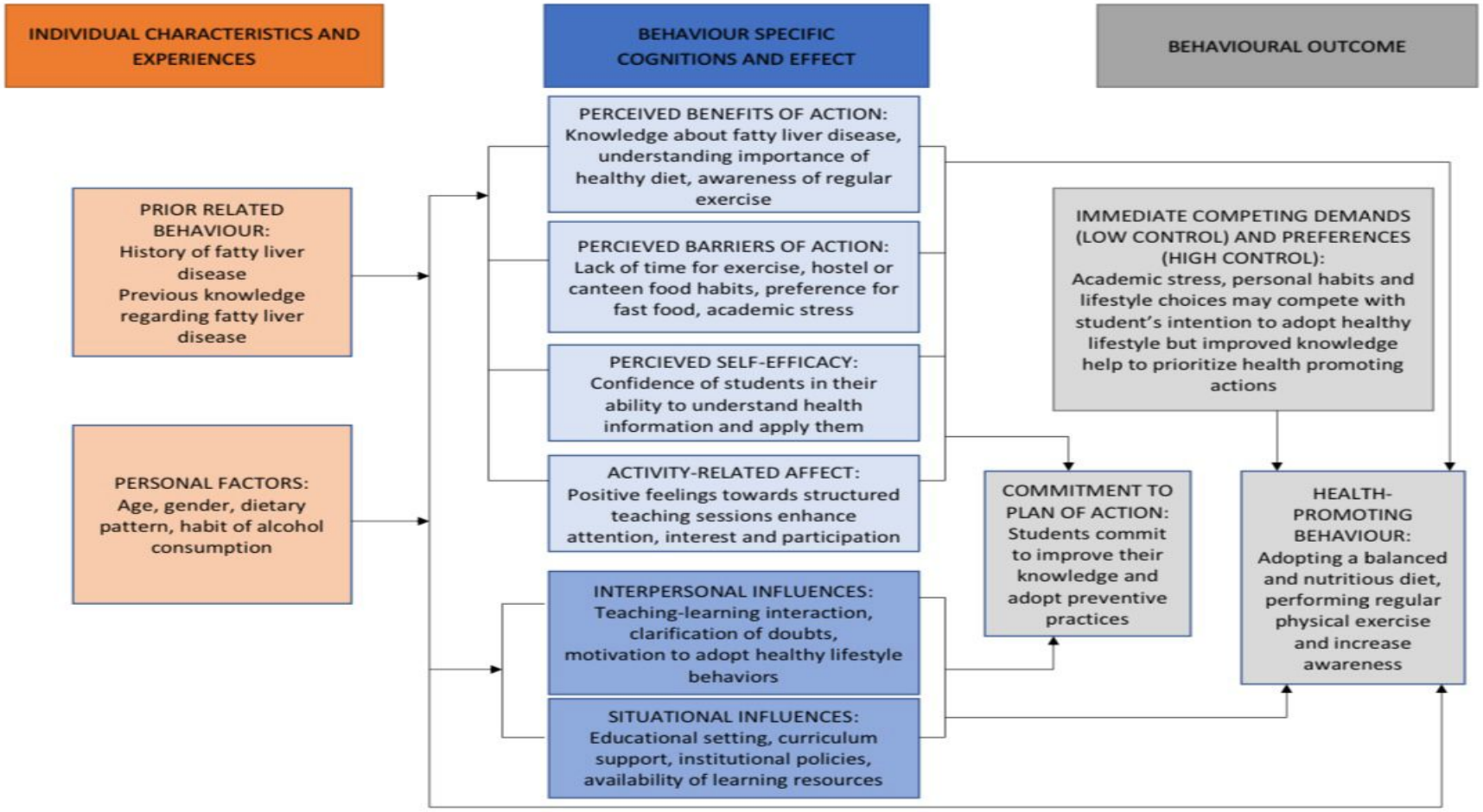

FIG 1.1 CONCEPTUAL/THEORITICAL FRAME WORK- PENDER'S HEALTH PROMOTION MODEL

CHAPTER 2

REVIEW OF LITERATURE

—A literature review is a journey through the landscape of the existing knowledge which each source provides a new perspective or insight.

-Elizabeth K Kostova

2.1 INTRODUCTION

Review of literature is one of the most important steps in the research process. According to ANA (2000), "A literature review is a body of text that aims to review the critical points of knowledge on a particular topic of research." It provides an account of what is already known about a particular phenomenon and reflects previous efforts and achievements of scholars and researchers.

The review in this study is divided into following sections:

1. Literature review related to prevalence of fatty liver disease among young adults.

2. Literature review related to assessment of knowledge regarding fatty liver among young adults.

3. Literature review related to fatty liver associated with lifestyle conditions among young adults.

4. Literature review related to effectiveness of structured teaching programme on fatty liver disease among young adults.

LITERATURE REVIEW RELATED TO PREVALANCE OF FATTY LIVER DISEASE AMONG YOUNG ADULTS.

A retrospective study was conducted to determine the prevalence of non-alcoholic fatty liver disease (NAFLD) among 254 healthy young men undergoing annual medical check-ups. Using demographic data, liver enzyme measurements, and ultrasonography, the study found that 10.6% of participants had NAFLD. The presence of NAFLD was significantly associated with age, body mass index (BMI), and liver enzyme levels including AST, ALT, GGT, and ALP (p-values: 0.014, 0.022, 0.003, ≤0.001, respectively). When comparing higher (grade 2) versus lower (grade 1) NAFLD, participants with grade 2 tended to have higher ALT, fasting blood glucose, GGT, triglycerides, total cholesterol, and age, although differences between NAFLD grades were not statistically significant. The study concluded that even in otherwise healthy young men with normal BMI and laboratory results, NAFLD was not rare, and liver enzyme levels showed a slight upward trend consistent with the presence and severity of the disease.[6]

A national health and nutrition examination survey conducted to estimate the prevalence of non-alcoholic fatty liver disease (NAFLD) among 4,654 adolescents and young adults in the united States aged 12–29 years. Using the U.S. Fatty Liver Index and excluding secondary causes of liver disease, the overall prevalence of NAFLD was 18.5%, increasing with age from 13.2% in early and middle adolescents (12–17 years) to 18.7% in late adolescents (18–24 years) and 24.0% in older young adults (25–30 years). The prevalence was higher in males than females across all age groups and was highest among hispanics compared to whites and blacks. While NAFLD prevalence remained stable among most age groups, it increased significantly among 18–24-year-olds, primarily driven by white and hispanic males. Furthermore, obesity-related complications such as insulin resistance and hyperlipidemia paralleled these trends, highlighting a growing public health concern and the need for targeted preventive strategies in U.S. youth.[7]

A systemic review and meta-analysis conducted to estimate the prevalence of non-alcoholic fatty liver disease (NAFLD) among children and adolescents aged 1–19 years to assess variations according to body mass index, gender, age, diagnostic method, geographical region, and study characteristics. The authors reviewed all available studies reporting NAFLD prevalence using any diagnostic method, regardless of the original study objective. The pooled mean prevalence of NAFLD was found to be 7.6% (95% CI: 5.5%–10.3%) in general population studies and markedly higher at 34.2% (95% CI: 27.8%–41.2%) in studies conducted in obesity clinic populations, with substantial heterogeneity observed across studies (I^2 = 98%). The prevalence was consistently higher in males compared to females and increased progressively with higher BMI categories. Regional differences were noted in clinical populations, with the highest prevalence reported in Asian countries. There was no evidence of a temporal change in NAFLD prevalence over time. Additionally, studies that used elevated alanine aminotransferase (ALT) levels as the diagnostic criterion reported lower prevalence estimates compared to studies using more sensitive methods such as liver biopsy, ultrasound, or magnetic resonance imaging. Overall, the findings indicate that NAFLD is highly prevalent in the paediatric population, particularly among obese children and adolescents and in males, underscoring the importance of early detection and appropriate diagnostic approaches.[8]

A retrospective study examined the prevalence of non-alcoholic fatty liver disease (NAFLD) and its associated metabolic risk factors among Asian Indian adolescents and young adults in Chennai, south India. A total of 389 participants aged 10–30 years were included, comprising 188 adolescents (<20 years) and 201 young adults (≥20 years). NAFLD was diagnosed using abdominal ultrasonography, and participants underwent detailed anthropometric, biochemical, and metabolic assessments. The study found that 18% of participants had NAFLD, with most cases being grade I (mild), followed by grade II and one case of grade III. NAFLD was more prevalent among young adults (80%) compared to adolescents and was significantly higher in males (70%) than females. A striking 90% of individuals with NAFLD were obese, and 70% had abdominal obesity. Metabolic abnormalities were common among those with NAFLD. Participants with NAFLD had significantly higher BMI, fasting plasma glucose, and triglyceride levels, along with lower HDL cholesterol, compared to those without NAFLD. Logistic regression analysis showed that obesity and hyperglycemia were the strongest independent predictors of NAFLD, even after adjusting for age and gender. Additionally, a strong association was observed between higher fasting insulin levels and increasing prevalence of NAFLD, indicating underlying insulin resistance. The study concludes that NAFLD is highly prevalent among Asian Indian youth, particularly in those with obesity and impaired glucose metabolism.[9]

A hospital-based cross-sectional study conducted to assess the prevalence of non-alcoholic fatty liver disease (NAFLD) among patients with Type 2 diabetes mellitus and to evaluate its correlation with coronary artery disease (CAD). The study included 114 patients with Type 2 diabetes mellitus, and NAFLD was diagnosed using ultrasonography along with clinical and biochemical assessment. The prevalence of NAFLD was found to be 41.2%, with a higher prevalence among females and in younger age groups. NAFLD showed significant associations with elevated liver enzymes, poor glycaemic control indicated by increased HbA1c, longer duration of diabetes, obesity, acanthosis nigricans, and metabolic syndrome ($p < 0.05$). The prevalence of CAD was significantly higher among patients with NAFLD (72.46%) compared to those without NAFLD (52.63%), and this association was statistically significant ($p = 0.001$). Binary logistic regression analysis revealed that NAFLD was an independent predictor of CAD ($p = 0.002$). Although a statistically significant association was demonstrated, the correlation coefficient (r value) was not explicitly reported in the study. The authors concluded that NAFLD is highly prevalent among individuals with Type 2 diabetes mellitus and is independently associated with an increased risk of coronary artery disease, highlighting the importance of early identification and preventive strategies.[10]

LITERATURE REVIEW RELATED TO ASSESSMENT OF KNOWLEDGE REGARDING FATTY LIVER AMONG YOUNG ADULTS.

A cross-sectional study titled "factors associated with awareness and knowledge of non-alcoholic fatty liver disease, a liver cancer etiological factor, among chinese young adults" published in J cancer education journals assessing awareness and knowledge of NAFLD among 1,373 chinese university students aged 18–25 years using a web-based, self-administered questionnaire. The study found that awareness was low, with only 26.2% having heard of NAFLD and 7.7% aware of lean NAFLD. Knowledge scores were also limited, with only 11.1% scoring ≥20 points (mean score 9.35 ± 7.67; median 9, range 0–27). Factors positively associated with higher awareness and knowledge

included a medical background, higher medical knowledge, and a family history of NAFLD. The study did not report specific R or p values but highlighted a significant knowledge gap among young adults, indicating a strong need for educational interventions to improve NAFLD awareness and understanding.[16]

A cross-sectional study was conducted to assess the knowledge, attitudes, and factors influencing non-alcoholic fatty liver disease (NAFLD) among 264 adults, using a validated structured questionnaire and logistic regression analysis. Despite NAFLD being a leading global liver disease with high prevalence, only 15.2% of participants had good knowledge and 12.9% demonstrated a positive attitude toward NAFLD. After adjustment for covariates, female participants showed a significantly more negative attitude compared to males (AOR = 0.22, $P < 0.001$), and participants earning 10,000–20,000 SR also had significantly negative attitudes (AOR = 0.17, $P = 0.044$). Although poor knowledge scores were observed across all sociodemographic groups, none of these associations reached statistical significance. The findings highlight gender and income as important determinants of attitudes and knowledge regarding NAFLD, emphasizing the need for targeted educational and awareness interventions, particularly among females and lower-income groups in the community.[17]

A multi sector survey conducted to assess knowledge and awareness of non-alcoholic fatty liver disease (NAFLD) among 138 doctors (80 medical officers and 58 postgraduate trainees/consultants) from three state sector hospitals. The majority of participants (79.7%) recognized NAFLD as a major public health problem, and 70.3% estimated its prevalence to be between 10–40%. Awareness of key risk factors was high, with obesity (97.8%), dyslipidemia (95.7%), diabetes mellitus (92.7%), and polycystic ovary syndrome (63%) correctly identified by most respondents. Ultrasonography was widely acknowledged as a diagnostic tool (95.7%); however, awareness of non-invasive diagnostic methods was comparatively low (38.4%), and referral practices to lifestyle and supportive services such as dieticians and weight-loss clinics were suboptimal. Postgraduate trainees demonstrated significantly better awareness than non-trainees regarding non-invasive diagnostic methods ($p = 0.01$) and NAFLD management guidelines ($p = 0.02$). Overall, despite good theoretical knowledge of NAFLD risk factors, notable gaps existed in guideline awareness, diagnostic strategies, and management practices, and no correlation coefficients were reported in the study.[18]

A Survey of non-alcoholic fatty liver disease knowledge, nutrition, and physical activity patterns among the general public, published in digestive diseases and sciences, assessed NAFLD knowledge, dietary habits, and physical activity among 1,790 adults attending a university ultrasound clinic and office workplaces in Beijing using a structured survey. The study reported low overall knowledge of NAFLD, with median knowledge scores of 15/25 in clinic participants and 16/25 in office participants, and 44.9% of respondents reported minimal physical activity. Multivariate analysis showed that college education or higher was significantly associated with better NAFLD knowledge (OR = 1.7, $p = 0.01$), as was a family history of hyperlipidemia (OR = 1.96, $p < 0.001$), while higher consumption of sugary drinks was negatively associated with knowledge (OR = 0.74, $p = 0.006$). No significant factors were associated with physical activity levels. Correlation I values were not reported in this study. The authors concluded that public awareness and understanding of NAFLD in Beijing are

inadequate, emphasizing the need for population-based education and lifestyle intervention programmes.[19]

LITERATURE REVIEW RELATED TO FATTY LIVER ASSOCIATED WITH LIFESTYLE CONDITIONS AMONG YOUNG ADULTS.

A descriptive cross sectional study was conducted using data from the dortmund nutritional and anthropometric longitudinally designed (DONALD) study to examine the association between adolescent lifestyle and non-alcoholic fatty liver disease (NAFLD) risk in early adulthood. A total of 240 participants had repeated measurements of a lifestyle score—including diet, physical activity, sedentary behaviour, sleep duration, and BMI—during adolescence (females: 8.5–15.5 years; males: 9.5–16.5 years). Multivariable linear regression analyses showed that higher adolescent lifestyle scores were inversely associated with fatty liver indices in early adulthood, with the hepatic steatosis index decreasing by 5.8% (95% CI −8.3 to −3.1, $P < 0.0001$) and the fatty liver index decreasing by 32.4% (95% CI −42.9 to −20.0, $P < 0.0001$). Sex-stratified analyses indicated that these associations were significant in men, while inverse but non-significant trends were observed in women. The study concluded that adherence to a healthy lifestyle during adolescence, particularly in males, may help prevent NAFLD in early adulthood.[11]

An epidemiological study, investigated the impact of a sedentary lifestyle and obesity-related risk factors among urban adult academic professionals conducted between september 2017 and september 2018 across three campuses of the University of Calcutta, the study included 650 adults aged 20–65 years (456 males, 194 females). Data collection involved socio-demographic interviews, anthropometric measurements using bioelectrical impedance analysis, and blood biochemical analyses. Participants were classified into age- and BMI-based groups to examine obesity and associated risk factors, including visceral fat percentage (VF%), subcutaneous fat, and skeletal muscle percentage. Results showed that both BMI and VF% were strongly associated with other anthropometric parameters, indicating that VF% acts as an independent risk factor for obesity-related conditions when BMI alone is insufficient. The study also found a high prevalence of obesity-associated comorbidities such as type 2 diabetes, hypertension, and hypothyroidism, particularly in individuals with a parental history of obesity. Poor dietary habits, sedentary behaviour, and low physical activity were linked to impaired liver function, vitamin D deficiency, and systemic inflammation, highlighting the cumulative effect of lifestyle and genetic factors on obesity and metabolic risk in this population.[24]

A cross sectional study titled “prevalence and association of risk factors according to liver steatosis and fibrosis stages among non-alcoholic fatty liver disease patients with Type 2 diabetes mellitus in India: A cross-sectional study” conducted a cross-sectional analysis of 1,521 T2DM patients at a specialty centre to evaluate the prevalence and risk factors of NAFLD stages using fibroScan (VCTE). The study found a high prevalence of liver steatosis (75.1%) with stages S1 (15.1%, $p = 0.012$) and S3 (36%, $p = 0.001$) showing significant gender differences. Liver fibrosis was observed in 28% of patients, with stages F1 (19%, $p = 0.001$) and F2 (5%, $p = 0.001$) also demonstrating significant gender associations. Waist circumference was significantly associated with both steatosis and fibrosis severity ($p = 0.001$), while BMI correlated only with steatosis ($p = 0.001$). No significant associations were observed with age (steatosis: $p = 0.149$;

fibrosis: p = 0.078). The study concluded that NAFLD is highly prevalent in Indian T2DM patients, with waist circumference and BMI being key risk factors, highlighting the need for targeted screening and early intervention.[12]

A cross-sectional study , conducted in a tertiary care hospital , assessed the proportion of non-alcoholic fatty liver disease (NAFLD) and associated risk factors among 211 sedentary hospital employees (83.4% male; mean age 34.5 ± 7.11 years). Liver stiffness measurement (LSM) was used to evaluate fibrosis, and the controlled attenuation parameter (CAP) was used to assess steatosis. The results showed that 10.4% of participants had advanced fibrosis (F3–F4) and 26.5% had severe steatosis (S3). Steatosis grade was significantly associated with age ($p < 0.001$) and gender ($p = 0.020$), while fibrosis stage showed no significant association with age, gender, diet, alcohol, or tobacco use. CAP-based steatosis grades were significantly correlated with LSM-based fibrosis stages ($p = 0.006$). The study concluded that NAFLD and related fibrosis and steatosis are highly prevalent among sedentary workers, highlighting the need for workplace-based screening and lifestyle interventions.[13]

A cross-sectional study titled "Inflammatory markers in relation to non-alcoholic fatty liver disease in urban South Indians" assessed the association of inflammatory markers with NAFLD among urban South Indian adults, as part of the Chennai urban rural epidemiology study (CURES). The study included 200 participants (100 with NAFLD and 100 without NAFLD) diagnosed by ultrasonography. The results showed that mean high-sensitivity C-reactive protein (hsCRP) levels were significantly higher in subjects with NAFLD compared to those without NAFLD (4.2 ± 1.2 mg/L vs 2.2 ± 0.4 mg/L, $p < 0.001$). Similarly, total leukocyte count was significantly elevated in NAFLD subjects ($7.8 \pm 1.4 \times 10^3/\mu L$) compared to controls ($6.9 \pm 0.9 \times 10^3/\mu L$, $p < 0.001$). Both hsCRP and leukocyte count increased with increasing severity of NAFLD ($p < 0.001$). Multiple logistic regression analysis demonstrated that hsCRP (OR = 1.293; 95% CI: 1.13–1.47; $p < 0.001$) and leukocyte count (OR = 1.293; 95% CI: 1.069–1.564; $p = 0.008$) were independently associated with NAFLD even after adjusting for waist circumference, insulin resistance, serum triglycerides, and type 2 diabetes, highlighting the significant role of systemic inflammation in the pathogenesis of NAFLD.[14]

A case control study titled "association of prediabetes with non-alcoholic fatty liver disease (NAFLD): A case control study", examined the relationship between prediabetes and NAFLD in South Kerala, India. This retrospective case-control study included 33 NAFLD cases and 31 age- and sex-matched controls diagnosed by ultrasonography. The findings revealed that NAFLD was more common among males (66.6%), particularly in the 30–40-year age group. The mean fasting blood sugar levels were significantly higher in NAFLD cases (118.09 ± 24.8 mg/dL) compared to controls (76.39 ± 26.04 mg/dL). Prediabetes was present in 80.6% of NAFLD cases, whereas only 45% of controls had prediabetes, and this difference was highly statistically significant ($p = 0.0001$). The study concluded that prediabetes is strongly associated with NAFLD, emphasizing the importance of early detection and metabolic screening in at-risk populations.[15]

LITERATURE REVIEW RELATED TO EFFECTIVENESS OF STRUCTURED TEACHING PROGRAMME ON FATTY LIVER DISEASE AMONG YOUNG ADULTS.

A single-blind, parallel randomized controlled trial on 'The effect of nutrition education programme on overweight/obese patients with non-alcoholic fatty liver disease' to evaluate the effectiveness of a structured nutrition education programme on overweight and obese patients with non-alcoholic fatty liver disease. The study was carried out among 82 patients with a mean age of 48.89 ± 9.85 years. The participants were randomly assigned to an intervention group, which received a structured nutrition education programme along with usual care, and a control group, which received usual care alone for a period of two months. Metabolic parameters such as lipid profile and fasting blood glucose, along with dietary intake, were assessed at baseline and after the intervention. The results revealed a significant reduction in serum total cholesterol and triglyceride levels in the intervention group compared to the control group, while no significant changes were observed in fasting blood glucose, LDL-cholesterol, and HDL-cholesterol levels. Additionally, a significant reduction in total energy and sugar intake was noted following the nutrition education programme. The study concluded that a structured nutrition education programme is effective in improving lipid profile and dietary habits among patients with non-alcoholic fatty liver disease, emphasizing the importance of structured teaching programmes in the management of fatty liver disease.[22]

A quasi-experimental study conducted to assess the knowledge and awareness regarding non-alcoholic fatty liver disease (NAFLD) among degree college students. A pre-test and post-test design using focus group discussions (FGD) was conducted among 111 first-year degree students from september 2022 to march 2023. Prior to the intervention, only 9% of students had heard of NAFLD, which increased to 57% after the FGD. Awareness regarding foods contributing to NAFLD showed significant improvement post-intervention. The mean awareness score increased from 5.5 (pre-test) to 8.6 (post-test), with statistical significance determined by a t-test ($p < 0.05$). The study concluded that focus group discussions were effective in improving knowledge and awareness regarding NAFLD among students.[4]

A quasi-experimental study conducted to assess the effectiveness of a structured teaching programme on knowledge regarding diet and exercise among patients with non-alcoholic fatty liver disease. A sample of 50 patients was selected using convenience sampling. The findings revealed a significant improvement in post-test knowledge scores following the intervention, indicating the effectiveness of the structured teaching programme. The mean knowledge score increased from 34.40% (pre-test) to 71.46% (post-test), showing a 37.06% improvement. Statistical analysis using a paired t-test demonstrated a significant difference ($t = 11.03$, $p < 0.05$), confirming the effectiveness of the intervention.[23]

A quantitative study conducted to assess the effectiveness of a multicomponent instructional module on knowledge and lifestyle practices among adult patients with non-alcoholic fatty liver disease (NAFLD) at a tertiary care centre. A quantitative one-group pre-test and post-test research design was adopted among 50 adult patients attending the gastroenterology outpatient department. Pre-test knowledge and lifestyle practices were assessed using a structured questionnaire, followed by the intervention.

After four weeks, post-test assessment was conducted using the same tool. Data were analysed using descriptive and inferential statistics. The results showed that the mean knowledge score increased from 45.9% (pre-test) to 66.12% (post-test), with a statistically significant difference ($t = 6.71$, $p < 0.001$). The study concluded that the structured teaching programme with a multicomponent instructional module was effective in improving patients' knowledge regarding NAFLD.[5]

2.2 SUMMARY

This chapter deals with the review of different literature related to this study. Generally purpose of the reviews to analyse critically a segment of published studies. It helps the readers to understand the nature of other studies before proceeding to the methodological chapter.

CHAPTER 3
RESEARCH METHODOLOGY

"As for the future, your task is not to foresee it, but to enable it."

-Eleanor Roosevelt

3.1 INTRODUCTION

Research methodology is the technique used to structure a study and to gather and analyse information in a systematic fashion. In it, the researcher examines numerous approaches that are typically taken by researchers when analysing research problems, as well as the reasoning behind them. The chapter deals with the methodology of study and it includes research approach, research design, variables under the study, schematic representation, description of setting population, sample, sampling technique, the choice of data collection technique, tool used, content validity, reliability of tools, pilot study and procedure of data collection and plan for data analysis.[2]

3.2 RESEARCH APPROACH

Research approaches are the plans and procedures for research that span the steps from broad assumptions to detailed methods of data collection, analysis, and interpretation. A quantitative evaluative approach was adopted for this study.

3.3 RESEARCH DESIGN

Research design can be defined as a blueprint to conduct a research study, which involves the description of research approach, study setting, sampling size, sampling technique, tools and method of data collection and analysis to answer specific research questions or for testing research hypotheses.

Pre-experimental one group pre-test post-test design was adopted in this study to assess the effectiveness of structured teaching programme on knowledge regarding fatty liver disease among 1st semester Bsc. nursing students at selected college in Kannur.

It can be adopted by as following:

$E \rightarrow O_1 \rightarrow X \rightarrow O_2$

E: Experimental group

O_1: Pre-test knowledge assessment

X: Intervention (structured teaching programme)

O_2: Post-test knowledge assessment

3.4 VARIABLES

Variables are qualities, properties or characteristics of a person, things or situation that change or vary. Chin and kramer states that variables are concept at different level of abstraction that concisely defined to promote their measurement or manipulation within the study.

DEPENDENT VARIABLE

It is presumed effect/outcome or response due to effect of the independent variable, which researcher wants to predict or explain.

In this study, dependent variable is level of knowledge regarding fatty liver disease. This refers to the knowledge score obtained by the students based on a structured knowledge questionnaire

INDEPENDENT VARIABLE

It is presumed cause/stimulus or activity that is manipulated or varied by the researcher to create the effect on the dependent variable.

In this study, independent variable is structured teaching programme. This is the planned educational intervention provided to the students to improve their knowledge about fatty liver disease.

3.5 SCHEMATIC REPRESENTATION OF THE STUDY

FIG 3.1: SCHEMATIC REPRESENTATION OF THE STUDY

3.6 SETTING OF THE STUDY

Setting is a location for conducting research; can be natural, partially controlled or highly controlled. The main study was conducted at college of nursing, Kannur medical college, anjarakandy.

3.7 POPULATION

Population is the aggregation of all the units in which a researcher is interested.

TARGET POPULATION

A target population consists of the total number of students which meet the inclusion criteria. In this study, target population consists of 1st semester BSc. nursing students at selected college in Kannur.

ACCESSIBLE POPULATION

It is the aggregate of students that conform to designated criteria and are also accessible as subjects for study. In this study, the accessible population includes the 1st semester B.Sc. nursing students at college of nursing, Kannur medical college, anjarakandy.

3.8 SAMPLE

It refers to a smaller, manageable version of a larger group. In this study, the sample consisted of 1st semester B.Sc. nursing students at college of nursing, Kannur medical college, anjarakandy.

3.9 SAMPLE SIZE

Sample size refers to number of subjects, events, behaviours or situations that are examined in a study. In this study, the total number of sample is 45.

3.10 SAMPLING TECHNIQUE

Sampling is the process of selecting a representative part of the population. It is defined as the process of selecting a group of people, events, behaviour or other elements which are needed to conduct a study.

In this study, sampling technique used is non-probability convenience sampling technique.

3.11 SAMPLING CRITERIA

INCLUSION CRITERIA

1st semester B.Sc. nursing students who are studying in college of nursing, Kannur medical college, anjarakandy.

EXCLUSION CRITERIA

Students who are absent during the period of data collection.

3.12 DESCRIPTION OF THE TOOL

TOOL 1: The tool consists of two sections:-

Section A: Baseline data for selected variables among 1st semester B.Sc. nursing students.

It consist of items to collect baseline data for selected variables such as age, gender, history of fatty liver, diet, habit of alcohol, previous knowledge about fatty liver disease among 1st semester B.Sc. nursing students.

Section B: Structured questionnaire on knowledge regarding fatty liver disease among 1st semester B.Sc. nursing students.

It consist of 30 items to assess the knowledge regarding fatty liver disease among 1st semester B.Sc. nursing students. Each question carriers 1 mark and the total score is 30.

TOOL 2: Administration of structured teaching programme on fatty liver disease.

SCORE INTERPRETATION:

SCORE RANGE	INTERPRETATION
0-10	Inadequate knowledge
11-20	Moderately adequate knowledge
21-30	Adequate knowledge

TABLE 3.1: SCORE INTERPRETATION

3.13 VALIDITY

Validity refers to the extent to which a measure represents. Content validity is concerned with the scope or range of items used to measures the variable. It evaluates the trustworthiness, credibility and dependability of research results. For examining the content and face validity of questionnaire, it was given to 8 experts in the field of nursing, physiology, pathology, statistics. The validators have suggested some modifications in the content. The modifications and suggestions of experts were included in the final preparation of the questionnaire by the investigators.

3.14 RELIABILITY

The reliability of the structured knowledge questionnaire was established by using the split- half method, and the reliability coefficient was calculated by applying the spearman-brown prophecy Formula. The reliability coefficient obtained was **r = 0.75**,

which indicates that the tool is reliable for measuring knowledge regarding fatty liver disease among 1st semester B.Sc. nursing students.

3.15 PILOT STUDY

Pilot study is a trial study carried out before a research design is finalized to assist in defining the research question or to test the feasibility, reliability and validity of the proposed study design. Pilot study were conducted at co-operative college of nursing, Thaliparamba after obtaining written permission from the principal of the college; the tool is administered to 10 students to check the feasibility and reliability of the study. The purpose of the study were explained to the nursing students and assumed confidentiality of their identity and responses is maintained. Results from the pre-test revealed that they have inadequate awareness about fatty liver disease among 1st semester B.Sc. nursing students. Following the structured teaching programme, post-test scores showed a significant improvement. Statistical analysis using a paired t-test ($t = 13.35$, $df = 5$, critical value = 2.57, $P < 0.05$) confirmed the effectiveness of the intervention. No significant associations (using chi square test) founded between pre-test knowledge score and selected variables such as age, gender, history of fatty liver, diet, habit of alcohol, previous knowledge about fatty liver disease . These findings support the feasibility of the tool and the relevance of the intervention for the main study.

3.16 DATA COLLECTION PROCEDURE

Before data collection a formal written permission were obtained from the principal of the college of nursing, Kannur medical college, anjarakandy for conducting the research study. The purpose of the study were explained to the nursing students to ensure their cooperation and prompt response.

Data were collected from 20/01/2026 to 24/01/2026. The pre-test was done on 20/01/2026 and the post-test was done on 24/01/2026. The pre-test were conducted by administering structured questionnaire for about 10 minutes. Followed by a PPT assisted teaching were given through LED display for about 45 minutes. Then the post-test knowledge assessment were conducted with the same tool on 5th day of pre-test.

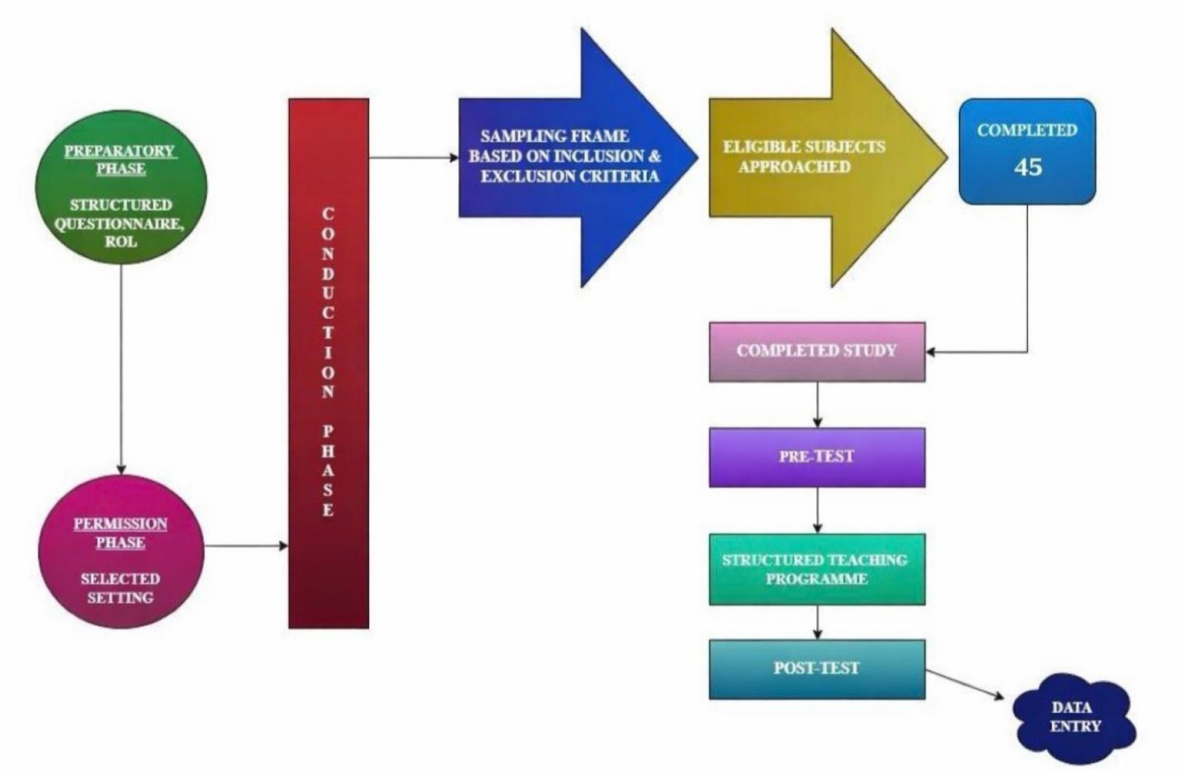

FIG 3.2: SCHEMATIC DIAGRAM OF DATA COLLECTION PROCEDURE

a)Preparatory Phase:

The research were discussed with a number of experts in including research guide, scientific committee and statistician.

Valuable inputs given by them were incorporated and changes were made accordingly. The investigators took ROL related to the study and prepared structured questionnaire and lesson plan for the structured teaching programme. Procedure validation required were done.

b) Permission Phase:

Permission were taken from the college research committee for conduction of research. Then the ethical clearance were taken from the institutional review board. At last NOC was obtained from college of nursing, Kannur medical college, anjarakandy for conducting the research.

c) Conduction Phase:

The investigator checked the available nursing students based on the inclusion and exclusion criteria. After introduction, the investigator explained about the study and provided the students with the information. All the doubts were clarified and their confidentiality and anonymity in the study was assured. The investigator obtained informed written consent after establishing the subject's willingness to participate. Pre-assessment of all the available students was done by administering a structured knowledge questionnaire for 10 minutes. The investigator collected data for all the available samples. Intervention was given to the selected students as a structured

teaching programme about fatty liver disease was given using the assistance of PPT for 45 minutes. Post-test was done on the 5th day after intervention by administering the same structured knowledge questionnaire for 10 minutes. The findings of the data was recorded. The investigators assured not to interfere with the regular academic activities of the participants and thanked the participants and college management for their co-operation. Data collection process was concluded by thanking each nursing students for his/her participation and co-operation. The data collected was then complied for data analysis.

3.17 PLAN FOR DATA ANALYSIS

Analysis is defined as the process of organizing and synthesizing data in such a way that research questions can be answered and hypothesis tested. The data analysis for this study involved both descriptive and inferential statistical methods. Descriptive analysis were used to summarize baseline characteristics of participants. For the outcome measures, descriptive statistics were present mean, median, standard deviation, and frequency distributions. Inferential analysis were conducted to assess the impact of evidence-based communication practices on clinical outcomes. Statistical tests, such as paired t-tests were used to compare outcome variables before and after the intervention. Correlation analysis were used to explore relationships between variables. Statistical significance were set at a predetermined alpha level (usually 0.05), and confidence intervals were used to help interpret the precision of the results. Software like SPSS were used for analysis.

3.18 SUMMARY

The research methodology employed in this study provided a systematic and rigorous framework for investigating the research questions. The chosen approach, data collection methods, and analysis techniques were carefully selected to ensure the reliability and validity of the findings. By adhering to established research practices and addressing potential limitations, this methodology had contributed to the robustness of the study's outcomes and had laid a foundation for future research in this area.

CHAPTER 4
ANALYSIS AND INTERPRETATION

Research findings become meaningful only when they are properly analysed and interpreted. – Kerlinger

4.1 INTRODUCTION

"Data analysis is the process of organizing and synthesizing the data so as to answer research questions and test hypotheses." Data analysis and interpretation play a crucial role in transforming collected data into credible evidence that supports the development and evaluation of the intervention and its outcomes. This phase follows data collection and involves systematically analysing and interpreting the information in alignment with the study objectives. It further facilitates effective processes such as coding, categorization, tabulation, and presentation of data, thereby ensuring that the results are meaningful.

4.2 STATEMENT OF THE PROBLEM

A study to assess the effectiveness of structured teaching programme on knowledge regarding fatty liver disease among 1st semester BSc. nursing students at selected college in Kannur.

4.3 OBJECTIVES OF THE STUDY

- To assess the pre-test and post-test level of knowledge on fatty liver disease among 1st semester BSc. nursing students at selected college in Kannur.
- To assess the effectiveness of structured teaching programme on fatty liver disease among 1st semester BSc. nursing students at selected college in Kannur.
- To assess the significant association between the knowledge scores and selected variables.(age, gender, history of fatty liver, diet, habit of alcohol, previous knowledge about fatty liver disease)

4.4 HYPOTHESES

- H_1: There will be a significant difference between pre-test and post-test knowledge scores regarding the knowledge on fatty liver disease among 1st semester BSc. nursing students at selected college in Kannur.
- H_2: There will be a significant association between knowledge scores and the selected variables.(age, gender, history of fatty liver, diet, habit of alcohol, previous knowledge about fatty liver disease)

4.5 ANALYSIS AND INTERPRETATION

This chapter deals with statistical analysis. The data collected from the 1st semester B.Sc. nursing students in selected nursing college regarding effectiveness of structured teaching programme on fatty liver disease is tabulated, analysed, and interpreted. The data obtained is mainly classified into three sections:

SECTION 1:

This section deals with the distribution of selected variables such as (age, gender, history of fatty liver, diet, habit of alcohol, previous knowledge about fatty liver disease) among the 1st semester B.Sc. nursing students who are studying in college of nursing, Kannur medical college, anjarakandy.

SECTION 2:

This section consists of the effect of structured teaching programme on knowledge regarding fatty liver disease among 1st semester B.Sc. nursing students who are studying in college of nursing, Kannur medical college, anjarakandy.

SECTION 3:

This section deals with the association between level of knowledge and selected variables of 1st semester B.Sc. nursing students who are studying in college of nursing, Kannur medical college, anjarakandy.

SECTION A

This section deals with the distribution of selected variables such as (age, gender, history of fatty liver, diet, habit of alcohol, previous knowledge about fatty liver disease) among 1st semester BSc. nursing students who are studying in college of nursing, Kannur medical college, anjarakandy. This is analysed in frequency and percentage method.

(N=45)

SELECTED VARIABLES	FREQUENCY	PERCENTAGE
AGE		
18-19	40	88.88%
20-21	4	8.9%
22& above	1	2.22%
GENDER		
Male	9	20%
Female	36	80%
HISTORY OF FATTY LIVER		
Yes	0	0%
No	45	100%
PREVIOUS KNOWLEDGE ABOUT FATTY LIVER DISEASE		
Yes	1	2.23%
No	44	97.77%
DIET		
Vegetarian	3	6.67%
Non-vegetarian	42	93.33%
HABIT OF ALCOHOL CONSUMPTION		
Yes	0	0%
No	45	100%

TABLE 4.1. FREQUENCY AND PERCENTAGE DISTRIBUTION OF SELECETED VARIABLES

TABLE 4.1 presents the distribution of the participants based on frequency and percentage in relation to age, gender, history of fatty liver, previous knowledge about fatty liver disease and diet. Among the 45 participants majority of the students, 88.88% were in the age group 18-19 years, followed by 8.9% in the 20-21 years age group, while 2.22% were aged 22 years and above. Regarding the gender of the students, 80% were female and 20% were male. No students have history of fatty liver disease and habit of alcohol consumption. In terms of previous knowledge of fatty liver disease only 2.23% had previous knowledge and 97.77% did not have previous knowledge. And regarding the diet 6.67% were vegetarians and 93.33% were non-vegetarians.

DISTRIBUTION OF PARTICIPANTS BY AGE

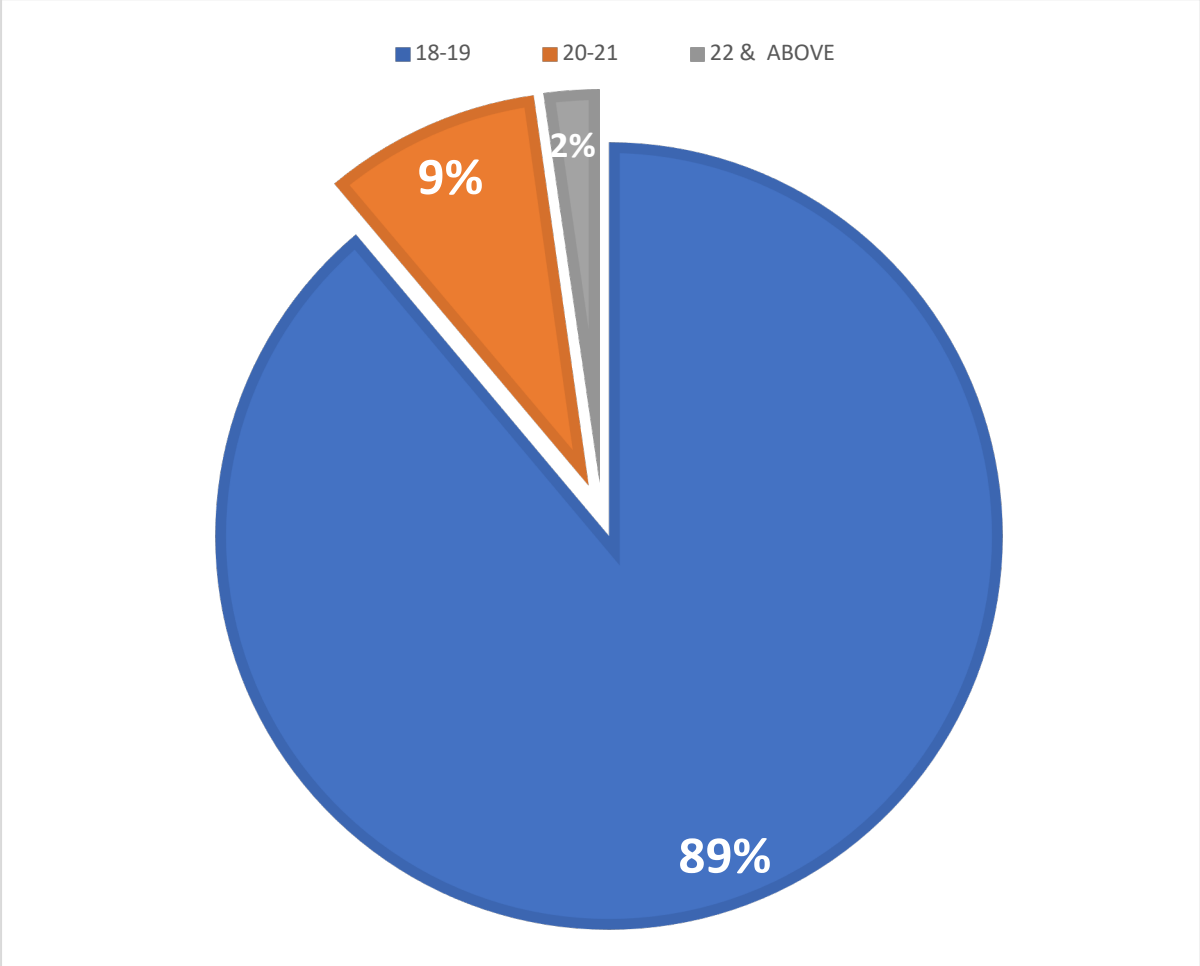

FIG 4.1 DISTRIBUTION OF PARTICIPANTS BY AGE

FIG 4.1 illustrates the distribution of the participants in relation to the age. Among the 45 participants, the majority of students were within the age group of 18-19 years (89%) followed by 20-21 years (9%) while the age group 22 and above(2%).

DISTRIBUTION OF PARTICIPANTS BY GENDER

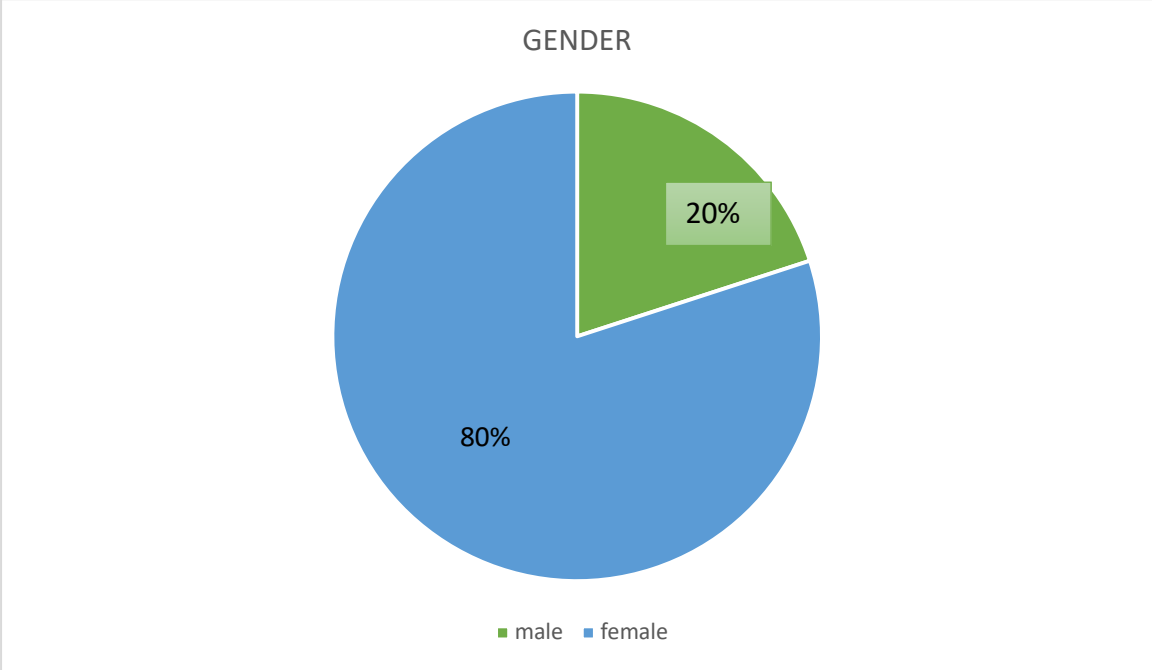

FIG 4.2 DISTRIBUTION OF PARTICIPANTS BY GENDER

FIG 4.2 illustrates the distribution of the participants in the relation to the gender. Among the 45 participants, the majority were female (80%) ,while only 20% were males

DISTRIBUTION OF PARTICIPANTS BY THE HISTORY OF FATTY LIVER

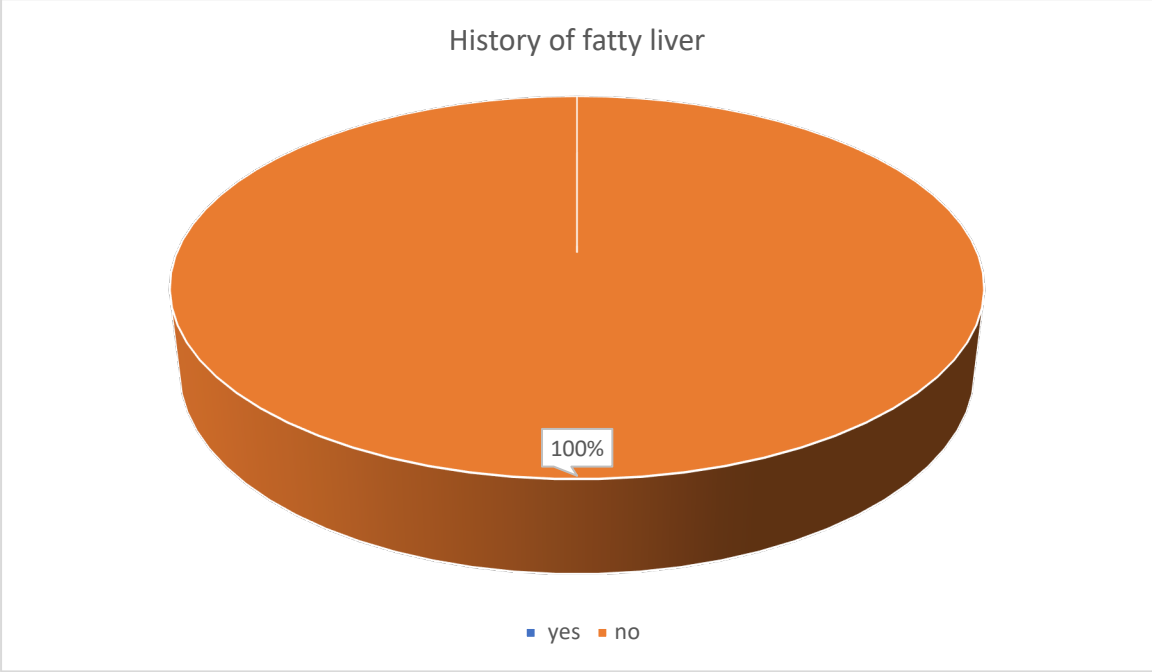

FIG 4.3 DISTRIBUTION OF PARTICIPANTS BY HISTORY OF FATTY LIVER

FIG 4.3 illustrates the distribution of participants in the relation to the history of fatty liver. Among the 45 participants, all of the participants were reported of having no history of Fatty liver disease.

DISTRIBUTION OF PARTICIPANTS BY PREVIOUS KNOWLEDGE OF FATTY LIVER DISEASE

FIG 4.4 DISTRIBUTION OF PARTICIPANTS BY PREVIOUS KNOWLEDGE OF FATTY LIVER DISEASE

FIG 4.4 illustrates the distribution of the samples in relation to the previous knowledge about fatty liver disease. Among 45 participants, only 2.23% of the participants had the previous knowledge, while the large majority (97.77%) reported of having no previous knowledge about fatty liver disease.

DISTRIBUTION OF PARTICIPANTS BY DIET

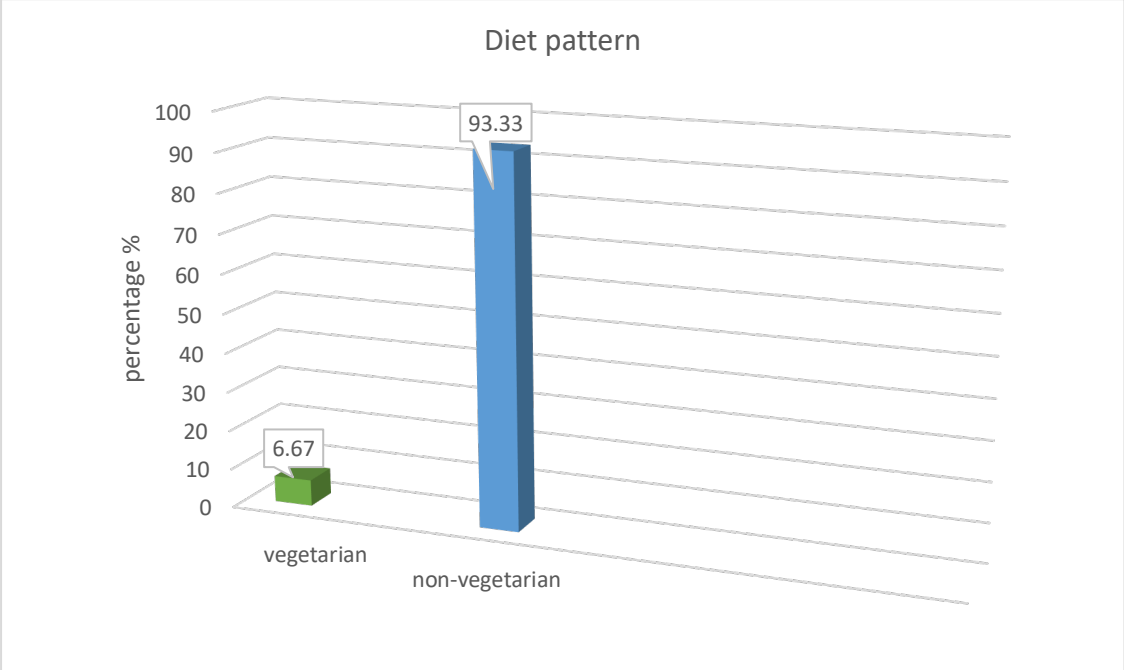

FIG 4.5 DISTRIBUTION OF PARTICIPANTS BY DIET

FIG 4.5 illustrates the distribution of samples in relation to diet. Among 45 participants, 93.33% were non-vegetarians and only 6.67% were vegetarian.

DISTRIBUTION OF PARTICIPANTS BY HABIT OF ALCOHOL CONSUMPTION

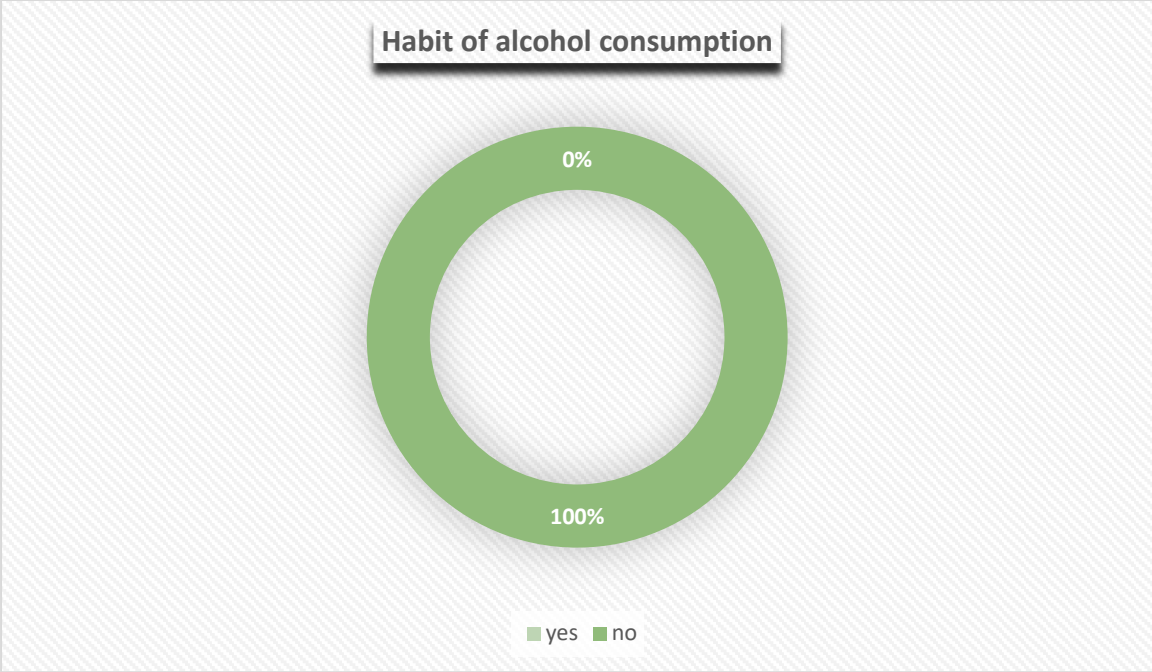

FIG 4.6. DISTRIBUTION OF PARTICIPANTS BY HABIT OF ALCOHOL CONSUMPTION

FIG 4.6 illustrates the distribution of samples in relation to the habit of alcohol consumption. Among 45 participants, all of the participants were reported of having no habit of alcohol consumption.

SECTION 2

This section consists of the effect of structured teaching programme on knowledge regarding Fatty liver disease among 1st semester BSc. nursing students who are studying in college of nursing, Kannur medical college, anjarakandy.

(N=45)

KNOWLEDGE LEVEL	SCORE RANGE	PRE-TEST		POST-TEST	
		FREQUENCY	PERCENTAGE	FREQUENCY	PERCENTAGE
INADEQUATE	0-10	26	57.77%	0	0%
MODERATELY ADEQUATE	11-20	19	42.22%	0	0%
ADEQUATE	21-30	0	0%	45	100%

TABLE 4.2: FREQUENCY AND PERCENTAGE DISTRIBUTION OF PARTICIPANTS ON PRE-TEST AND POST-TEST SCORES.

Table 4.2 presents the frequency and percentage distribution of students based on their knowledge levels in the pre-test and post-test among the participants. In the pre-test 26 participants(57.77%) had inadequate knowledge, 19 participants(42.22%) had moderately adequate knowledge and no one had adequate knowledge. And in the post-test all 45 participants(100%) had adequate knowledge score.

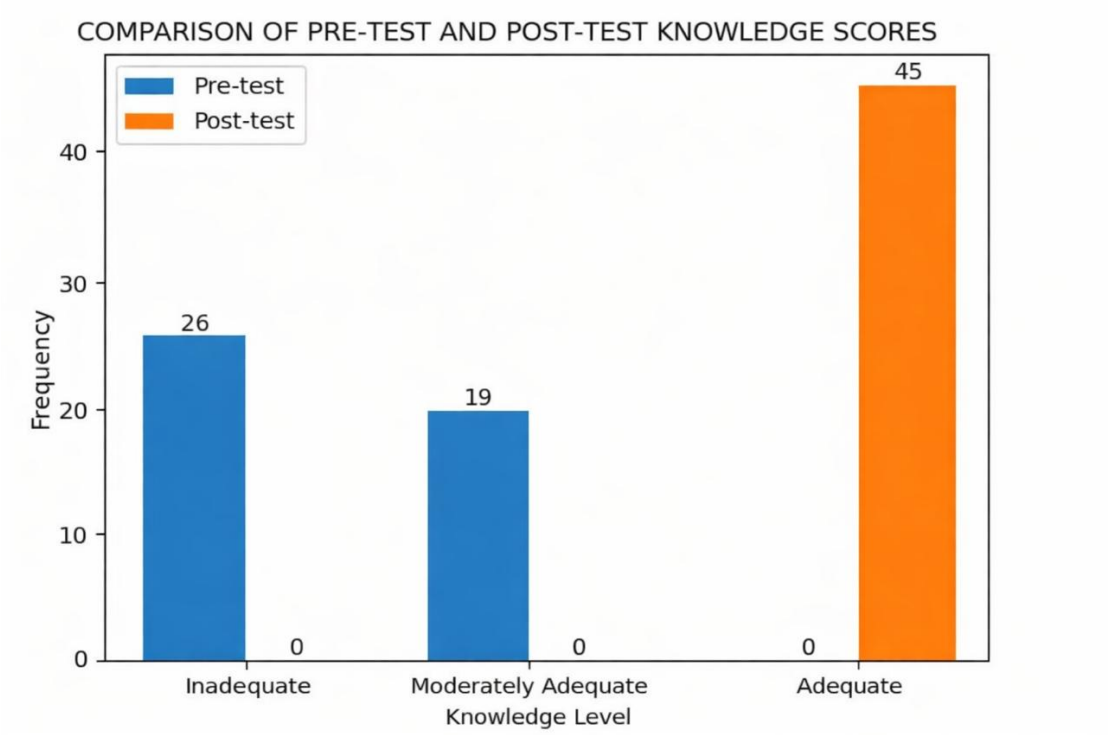

FIG 4.7 COMPARISON OF PRE-TEST AND POST-TEST KNOWLEDGE SCORES

FIG 4.7 illustrates the comparison of pre-test and post-test knowledge scores among the participants showing that in the pre-test 57.77% participants had inadequate knowledge, 42.22% had moderately adequate knowledge and no one had adequate knowledge and in the post-test all of the participants had adequate knowledge.

(N=45)

	MEAN	SD	MEAN DIFFERENCE	CALCULATED t VALUE	df	P VALUE	INFERENCE
PRE-TEST	10.82	3.29	17.49	3.39	44	P<0.05	SIGNIFICANT
POST-TEST	28.31	1.64					

t_{44} = 2.015 at 0.05 level of significance

TABLE 4.3: EFFECTIVENESS OF STRUCTURED TEACHING PROGRAMME ON FATTY LIVER DISEASE KNOWLEDGE SCORES

Table 4.3 presents the comparison of mean knowledge scores of participants before and after the implementation of structured teaching programme on fatty liver disease. The pre- test mean score was 10.82 with a standard deviation(SD) of 3.29, while the post-test mean score significantly increased to 28.31 with a standard deviation(SD) of 1.64. The calculated mean difference between post-test and pre-test was 17.49. A paired t-test yielded a t-value of 3.39, that is much greater than the critical value, indicating a highly significant improvement in knowledge levels following the intervention at significant level 0.05.

SECTION 3

This section consists of association between pre-test knowledge and selected variables (such as age, gender, history of fatty liver disease, previous knowledge of fatty liver disease, diet, habit of alcohol consumptions) among 1st semester B.Sc. nursing students who are studying in college of nursing, Kannur medical college, anjarakandy.

(N=45)

VARIABLES	INADEQUATE KNOWLEDGE	MODERATELY ADEQUATE KNOWLEDGE	ADEQUATE KNOWLEDGE	CALCULATED CHI-SQUARE VALUE	CRITICAL VALUE	LEVEL OF SIGNIFICANCE	INFERENCE
AGE							
18-19	20	20	0	1.83	9.48	0.05	Non-significant
20-21	3	1	0				
22 &above	1	0	0				
GENDER							
Male	5	4	0	0.02	5.99	0.05	Non-significant
Female	21	15	0				
DIET							
Veg	3	0	0	2.56	5.99	0.05	Non-significant
Non-veg	22	20	0				
HISTORY OF FATTY LIVER							
Yes	0	0	0	0	0	0.05	Non-significant
No	26	19	0				
HISTORY OF ALCOHOL CONSUMPTION							
Yes	0	0	0	0	0	0.05	Non-significant
No	26	19	0				
PREVIOUS KNOWLEDGE ABOUT FATTY LIVER DISEASE							
Yes	0	1	0	1.41	5.99	0.05	Non-significant
No	26	18	0				

TABLE 4.4: ASSOCIATION BETWEEN PRE-TEST KNOWLEDGE SCORES AND SELECTED VARIABLES

Table 4.4 depicts the association between pre-test knowledge scores regarding fatty liver disease and selected variables of the participants, that is age, gender, diet, history of fatty liver disease, history of alcohol consumption, and previous knowledge about

fatty liver disease. The pre-test knowledge levels were categorized into inadequate, moderately adequate, and adequate knowledge. The chi-square analysis revealed that there was no statistically significant association between pre-test knowledge scores and any of the selected variables at the 0.05 level of significance. For age, the calculated chi-square value (1.83) was lower than the critical value (9.48), indicating a non-significant association. Similarly, gender ($\chi^2 = 0.02$, CV = 5.99), diet ($\chi^2 = 2.56$, CV = 5.99), and previous knowledge about fatty liver disease ($\chi^2 = 1.41$, CV = 5.99) also showed non-significant associations. Furthermore, all participants reported no history of fatty liver disease and no history of alcohol consumption; hence, no meaningful association could be established for these variables. Overall, the findings indicate that the pre-test knowledge regarding fatty liver disease was independent of the selected variables, suggesting that baseline knowledge levels were uniformly distributed among the participants.

4.6 SUMMARY

The analysis and interpretation of the data clearly demonstrate the significant effectiveness of the structured teaching programme in enhancing knowledge regarding fatty liver among 1st semester B.Sc. nursing students at selected college in Kannur. A substantial improvement was observed between pre-test and post-test scores, with the entire group moving from varying levels of understanding to complete adequacy post-intervention. This highlights the strong educational impact of the structured teaching approach. Furthermore, no meaningful association was found between pre-test knowledge and variables such as age, gender, previous knowledge of fatty liver , diet, previous history of fatty liver disease, habit of alcohol consumption indicating that personal experience alone may not equate to formal understanding without educational reinforcement. Overall, the findings underscore the critical role of structured, targeted teaching strategies in addressing knowledge gaps and promoting health literacy among nursing students, preparing them to better understand and manage lifestyle-related health conditions in clinical practice.

CHAPTER 5
RESULTS

No great discovery was ever made without a bold guess – and a careful analysis of the results.

- Issac Newton.

5.1 INTRODUCTION

The study indents to assess the effectiveness of structured teaching programme on knowledge regarding fatty liver disease among 1st semester BSc. nursing students at selected college in Kannur. The investigator found that structured teaching programme was an effective intervention to increase knowledge level. The findings of the present study have been discussed on objectives, hypotheses and results.

5.2 OBJECTIVES OF THE STUDY

- To assess the pre-test and post-test level of knowledge on fatty liver disease among 1st semester BSc. nursing students at selected college in Kannur.
- To assess the effectiveness of structured teaching programme on fatty liver disease among 1st semester BSc. nursing students at selected college in Kannur.
- To assess the significant association between the knowledge scores and selected variables.(age, gender, history of fatty liver, diet, habit of alcohol, previous knowledge about fatty liver disease)

5.3 HYPOTHESES

- H_1: There will be a significant difference between pre-test and post-test knowledge scores regarding the knowledge on fatty liver disease among 1st semester BSc. nursing students at selected college in Kannur.
- H_2: There will be a significant association between knowledge scores and the selected variables.(age, gender, history of fatty liver, diet, habit of alcohol, previous knowledge about fatty liver disease)

5.4 RESULTS

Result presents the detailed analysis of the data collected to assess the effectiveness of a structured teaching programme on knowledge regarding fatty liver disease among 1st semester BSc. nursing students studying in college of nursing, Kannur medical college, anjarakandy.

1.To assess the pre-test and post-test level of knowledge on fatty liver disease among 1st semester BSc. nursing students at selected college in Kannur.

This section presents the distribution of knowledge scores regarding fatty liver disease among 1st semester B.Sc. nursing students before and after the implementation of the structured teaching programme.

Prior to the structured teaching programme, a pre-test was conducted to assess the baseline knowledge of the students regarding fatty liver disease. The findings revealed that 26 students (57.78%) had inadequate knowledge, including 5 males and 21 females. 19 students (42.22%) demonstrated moderate knowledge, comprising 4 males and 15 females. And no student had adequate knowledge at this stage. The mean pre-test knowledge score was 10.82 with a standard deviation of 3.29, indicating a low level of knowledge and moderate variability among the students before the educational intervention. Following the implementation of the structured teaching programme, a post-test was conducted to evaluate the effectiveness of the intervention. The results showed that all 45 students (100%) attained adequate knowledge, with scores ranging from 20–30. No student remained in the inadequate or moderate knowledge categories. The mean post-test knowledge score increased substantially to 28.31 with a standard deviation of 1.64, reflecting a significant improvement in knowledge and reduced variability among the students after the structured teaching programme. Overall, the findings indicate that the structured teaching programme was highly effective in enhancing the knowledge of 1st semester B.Sc. nursing students regarding fatty liver disease.

2.To assess the effectiveness of structured teaching programme on fatty liver disease among 1st semester BSc. nursing students at selected college in Kannur.

This section evaluates the overall effectiveness of the structured teaching programme in improving the knowledge of students regarding fatty liver disease. The effectiveness of the structured teaching programme was assessed by comparing the pre-test and post-test mean knowledge scores. The mean knowledge score in the pre-test was 10.82, which increased to 28.31 in the post-test after the administration of the structured teaching programme. The improvement in the post-test mean score indicates a marked enhancement in the knowledge of students regarding fatty liver disease following the intervention. The calculated t value (3.39) was found to be greater than the table value of 2.015 at the 0.05 level of significance, indicating that the difference between pre-test and post-test knowledge scores was statistically significant. This statistically significant improvement suggests that the increase in knowledge was not due to chance but was the result of the structured teaching programme. Hence, the research hypothesis(H_1) were accepted. The findings confirm that the structured teaching programme was effective in enhancing the knowledge of nursing students regarding Fatty liver disease.

3.To assess the significant association between the knowledge scores and selected variables.(age, gender, history of fatty liver, diet, habit of alcohol, previous knowledge about fatty liver disease)

This section analyses the association between the pre-test knowledge levels of students and selected variables such as age, gender, history of fatty liver disease, habit of alcohol, previous knowledge about fatty liver disease, and diet about fatty liver disease, using the chi-square test. The chi-square analysis revealed that there was no statistically significant association between pre-test knowledge scores and any of the selected variables at the 0.05 level of significance. For age, the calculated chi-square value (1.83) was lower than the critical value (9.48), indicating a non-significant association. Similarly, gender (χ^2 = 0.02, CV = 5.99), diet (χ^2 = 2.56, CV = 5.99), and previous knowledge about fatty liver disease (χ^2 = 1.41, CV = 5.99) also showed non-significant

associations. Furthermore, all participants reported of having no history of fatty liver disease and no history of alcohol consumption; hence, no meaningful association could be established for these variables. Overall, the findings indicate that pre-test knowledge regarding fatty liver disease was independent of the selected variables, suggesting that baseline knowledge levels were uniformly distributed among the participants. Hence, the research hypothesis (H_2) were rejected.

5.5 SUMMARY

The results of the study enable to get the total picture of the findings. A summarized form helps to orient the discussion. The results clearly demonstrate that the structured teaching programme was highly effective in improving the knowledge of 1st semester B.Sc. nursing students regarding fatty liver disease. A significant difference was found between pre-test and post-test scores, and no notable association was observed between selected variables and pre-test knowledge levels. The findings support the need for continued educational interventions to address knowledge gaps among nursing students on emerging health conditions such as fatty liver disease.

CHAPTER 6
DISCUSSION, SUMMARY AND CONCLUSION

"After all, the ultimate goal of all research is not objectivity, but truth"
– Helene Deutsch

6.1 INTRODUCTION

This chapter presents the discussion, summary, and conclusion of the present study. The major findings are interpreted, summarized, and appropriately generalized. The findings are discussed in relation to the objectives of the study and are compared with findings of previous related studies. Based on the results, recommendations are suggested for nursing practice, education, research, and administration.

6.2 DISCUSSION

The present study was conducted to assess the effectiveness of a structured teaching programme on knowledge regarding fatty liver disease among 1st semester B.Sc. nursing students at selected college in Kannur. This chapter discusses the findings of the study in relation to the objectives, hypotheses, and existing literature. The discussion also attempts to interpret the findings in the light of similar studies and highlights the significance of structured educational interventions in improving knowledge among nursing students.

Fatty liver disease is an emerging public health problem globally, affecting both alcoholic and non-alcoholic populations. The increasing prevalence of unhealthy dietary habits, physical inactivity, obesity, and early exposure to alcohol has contributed significantly to the rise of fatty liver disease among younger age groups. Nursing students, as future healthcare professionals, require adequate knowledge regarding fatty liver disease to promote early prevention, lifestyle modification, and community awareness. Hence, the structured teaching programme was planned to enhance their understanding of this condition.

1.To assess the pre-test and post-test level of knowledge on fatty liver disease among 1st semester BSc. nursing students at selected college in Kannur.

This section present the level of knowledge among students before and after the structured teaching programme. In the pre-test, 26 students demonstrated inadequate knowledge while 19 shows moderately adequate knowledge. The mean score was 10.82 with a standard deviation of 3.29 indicating that the students generally lacked comprehensive knowledge about fatty liver disease before the intervention**.** After the administration of the structured teaching programme, all students (100%) scored within an adequate knowledge range with a mean score of 28.31 and the standard deviation of 1.64.The post-test findings showed an increase in understanding related to the causes, risk factors, symptoms, management, and prevention of fatty liver disease. The complete shift from inadequate to adequate knowledge highlights the effectiveness of the structured teaching programme. These findings are supported by a study conducted by Abhijith N, Thirumala Rao B, Radhika K, and Appala Naidu S. A study to assess the knowledge and awareness regarding non-alcoholic fatty liver disease among degree college students in Prakasam district. Indian Journal of Community Health.

2022;34(2):245-249. Their study also reported a significant improvement as before the intervention, only 9% of students had heard of NAFLD, which increased to 57% after the FGD.[4] Similarly, a study conducted by Roshymol PK, Tuse S, Devadas K. Effectiveness of a multicomponent instructional module on knowledge and lifestyle practices among adult patients with non-alcoholic fatty liver disease. Galore Int J Health Sci Res. 2024. The results showed that the mean knowledge score increased from 45.9%(pre-test) to 66.12%(post-test). These results are in line with the presents study, confirming the efficacy of structured educational approaches.[5]

2.To assess the effectiveness of structured teaching programme on fatty liver disease among 1st semester BSc. nursing students at selected college in Kannur.

The effectiveness of the structured teaching programme was evaluated by comparing pre-test and post-test scores. The mean pre-test score of 10.82 significantly increased to 28.31 in the post-test. The computed t-value of 3.36 was much higher than the critical value of 2.015 at a 0.05 level of significance. This statistically significant result clearly demonstrates that the improvement in knowledge was not due to chance, but due to the impact of the structured teaching programme. The findings of the present study was supported by multiple other research studies. As mentioned earlier, Ramachandran R. Effectiveness of a structured teaching programme on knowledge regarding diet and exercise in non-alcoholic fatty liver disease patients. ResearchGate . 2024. The mean knowledge score increased from 34.40%(pre-test) to 71.46%(post-test), showing a 37.06% improvement. Statistical analysis confirming the effectiveness.[23]

3.To assess the significant association between the knowledge scores and selected variables.(age, gender, history of fatty liver, diet, habit of alcohol, previous knowledge about fatty liver disease)

The association between knowledge scores and selected variables such as age, gender, previous knowledge, dietary pattern, habit of alcohol consumption and history of fatty liver disease was analysed. The analysis revealed that there was no significant association between pre-test knowledge scores and selected variables. This indicates that inadequate knowledge regarding fatty liver disease was common among students irrespective of their age, gender, dietary habits, previous exposure , alcohol consumption and previous knowledge. These findings emphasize the need for structured teaching programmes to improve baseline knowledge uniformly among nursing students

6.3 SUMMARY

The research study titled “effectiveness of structured teaching programme on knowledge regarding fatty liver disease among 1st semester B.Sc. nursing students at selected college in Kannur” was conducted to assess the impact of an educational intervention. According to WHO, fatty liver is defined as the accumulation of fat in more than 5% of hepatocytes(liver cells) by weight, or when fat constitutes more than 5-10% of the liver’s weight, in the absence of significant alcohol intake or other secondary causes. Fatty liver disease has become an increasingly prevalent health problem among young adults due to rapid lifestyle changes, including unhealthy dietary patterns, physical inactivity, obesity, and increased stress levels. Despite its rising incidence, fatty liver disease often remains asymptomatic in the early stages, leading to

under diagnosis and delayed management. Young adults frequently underestimate the seriousness of the condition, resulting in poor awareness and limited adoption of preventive measures. To address this educational gap, the researchers implemented a structured teaching programme designed to educate nursing students about fatty liver disease. The underlying conceptual/theoretical framework used in this study is based on the "Pender's health promotion model (HPM) ". A pre-experimental one-group pre-test post-test design was adopted. The sample consisted of 45 first-semester B.Sc. nursing students, selected using non-probability purposive sampling. Data were collected using a structured knowledge questionnaire. The demographic findings revealed that the majority of students were aged 18–19 years, female, non-vegetarian, and had no previous knowledge or personal history of fatty liver disease. In the pre-test, 26 students demonstrated inadequate knowledge while 19 shows moderately adequate knowledge. The mean score was 10.82 with a standard deviation of 3.29 indicating that the students generally lacked comprehensive knowledge about fatty liver disease before the intervention**.** After the administration of the structured teaching programme, all students (100%) scored within an adequate knowledge range with a mean score of 28.31 and the standard deviation of 1.64.The post-test findings showed an increase in understanding related to the causes, risk factors, symptoms, management, and prevention of fatty liver disease. This indicates that the structured teaching programme was effective in enhancing knowledge among the students. The findings showed a marked improvement in knowledge after the structured teaching programme, proving its effectiveness.

6.4 CONCLUSION

"Tell me and I forget, teach me and I may remember, involve me and I learn."

— Benjamin Franklin

Evaluating the effectiveness of a structured teaching programme showed a marked improvement in the knowledge of 1st semester B. Sc. nursing students regarding fatty liver disease. Post-test scores were significantly higher than pre-test scores, demonstrating the positive impact of structured and focused educational interventions. Statistical analysis confirmed that the difference was highly significant, indicating that the teaching programme was effective in enhancing awareness. No significant associations were found between knowledge and selected variables such as age, gender, history of fatty liver, dietary pattern, alcohol consumption and previous knowledge about fatty liver disease. These findings highlight the need for regular inclusion of evidence-based and current health topics in nursing education. Structured teaching programmes can serve as a powerful tool to strengthen nursing student's preparedness in managing emerging health conditions like fatty liver disease.

6.5 IMPLICATIONS OF THE STUDY

NURSING PRACTICE

Nursing students equipped with accurate and current knowledge regarding fatty liver disease are better prepared to identify risk factors, recognize early signs and symptoms, and assist in the management of individuals affected by the condition. The study suggests that improving theoretical knowledge through structured education can

enhance nursing practice related to lifestyle modification, dietary counselling, weight management, and monitoring of liver health. Nurses with adequate knowledge of fatty liver disease can actively participate in health education, early detection, prevention of disease progression, and support patients in adopting healthy lifestyle practices. It also strengthens their role in providing psychological support and motivation to individuals at risk of non-communicable diseases associated with fatty liver.

NURSING EDUCATION

The findings of the study show that the structured teaching programme significantly improved students' knowledge regarding fatty liver disease, indicating its effectiveness as an educational strategy. This has important implications for nursing education, highlighting the need to incorporate evidence-based and structured teaching modules related to lifestyle diseases into the undergraduate nursing curriculum. As fatty liver disease is an emerging public health concern associated with obesity, diabetes, and sedentary lifestyle, nursing students must be provided with up-to-date knowledge to manage and prevent such conditions effectively. The study emphasizes the need for curriculum planners and educators to periodically update content related to non-communicable diseases. Nurse educators should also adopt innovative teaching methods such as structured teaching programmes, case studies, simulations, and interactive sessions to enhance student understanding and clinical application.

NURSING RESEARCH

The study contributes valuable evidence to the field of nursing research, particularly in relation to educational interventions for improving knowledge about fatty liver disease. The findings provide a foundation for future research studies to evaluate the effectiveness of different teaching strategies in enhancing knowledge, attitude, and practices among nursing students. This study highlights the usefulness of a pre-experimental pre-test post-test research design in assessing educational programmes. Similar studies can be replicated among different populations such as patients, community members, or health workers. Further research can also be conducted to assess long-term retention of knowledge and the impact of improved knowledge on preventive practices and patient outcomes related to fatty liver disease.

NURSING ADMINISTRATION

From an administrative perspective, the study provides evidence supporting the inclusion of structured educational programme on fatty liver disease in nursing institutions. Nursing administrators can utilize these findings to plan and implement continuing nursing education programme, orientation programmes, and in-service education for students and nursing personnel. The study also emphasizes the importance of administrative support in faculty development programme to enhance teaching skills related to non-communicable diseases and lifestyle management. Collaboration between nursing colleges and public health departments can be encouraged to address current health priorities such as fatty liver disease. This will contribute to the preparation of knowledgeable, competent, and practice-ready nurses who can play a significant role in prevention and management of lifestyle-related disorders.

6.6 LIMITATIONS OF THE STUDY

1.The study was conducted only in one selected nursing college in Kannur district. Hence, the findings may not reflect the knowledge levels of students in other institutions or regions.

2.The study assessed only knowledge and not attitude or practice.

6.7 RECOMMENDATIONS

1.Structured teaching programmes on fatty liver disease should be conducted regularly.

2.The topic should be included in the undergraduate nursing curriculum.

3.Similar studies can be conducted among other healthcare professionals.

4. A comparative study among rural and urban people can be conducted.

5.Further studies with larger samples and experimental designs are recommended.

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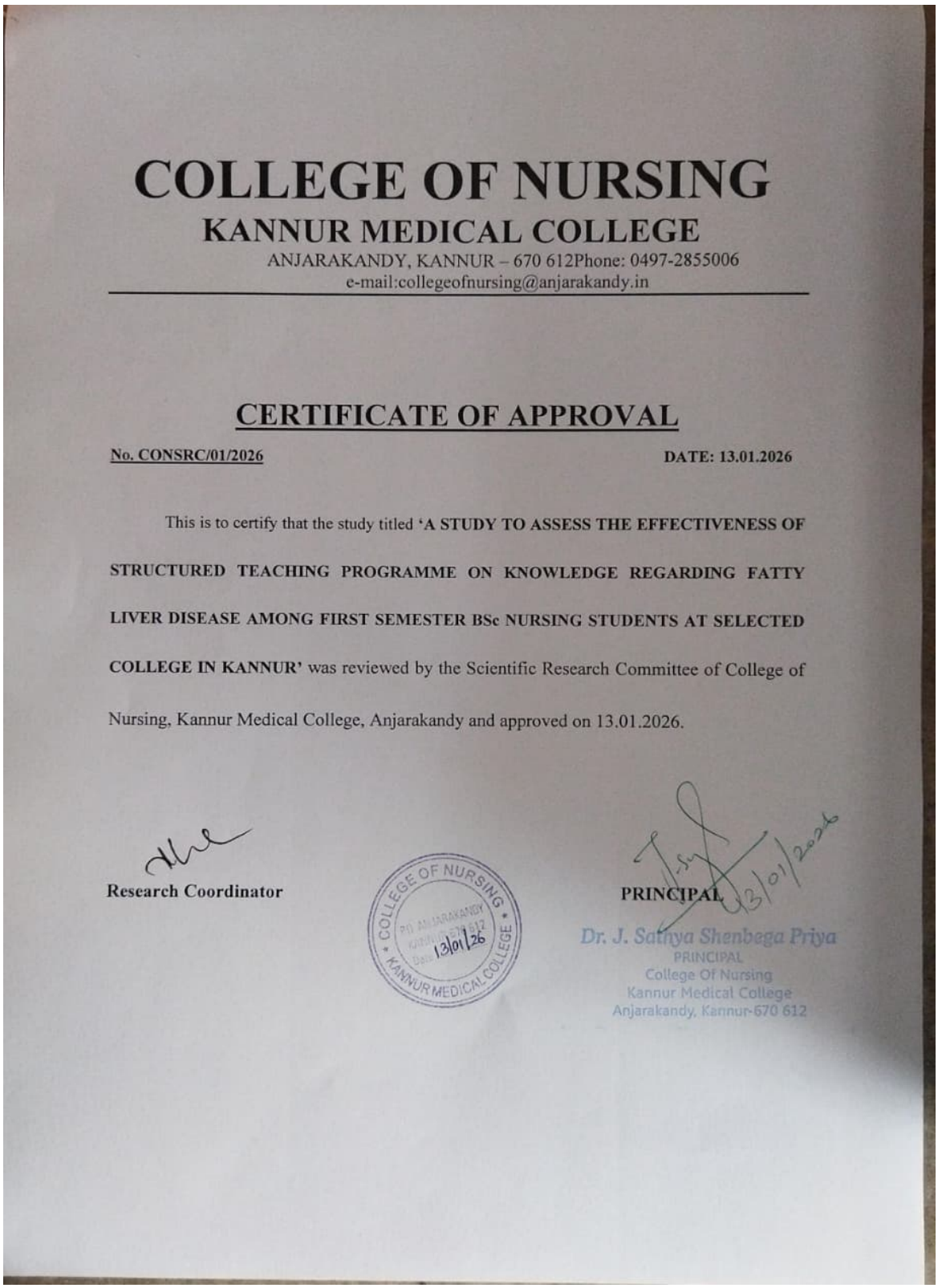
ANNEXURE A
INSTITUTIONAL ETHICAL CLEARANCE CERTIFICATE



COLLEGE OF NURSING

KANNUR MEDICAL COLLEGE

ANJARAKANDY, KANNUR – 670 612Phone: 0497-2855006

e-mail:collegeofnursing@anjarakandy.in

CERTIFICATE OF APPROVAL

No. CONSRC/01/2026 **DATE: 13.01.2026**

This is to certify that the study titled **'A STUDY TO ASSESS THE EFFECTIVENESS OF STRUCTURED TEACHING PROGRAMME ON KNOWLEDGE REGARDING FATTY LIVER DISEASE AMONG FIRST SEMESTER BSc NURSING STUDENTS AT SELECTED COLLEGE IN KANNUR'** was reviewed by the Scientific Research Committee of College of Nursing, Kannur Medical College, Anjarakandy and approved on 13.01.2026.

Research Coordinator

COLLEGE OF NURSING * KANNUR MEDICAL COLLEGE * P.O. ANJARAKANDY KANNUR-670 612 Date 13/01/26

PRINCIPAL

13/01/2026

Dr. J. Sathya Shenbega Priya
PRINCIPAL
College Of Nursing
Kannur Medical College
Anjarakandy, Kannur-670 612

ANNEXURE B
LETTER SEEKING PERMISSION TO CONDUCT PILOT STUDY

COLLEGE OF NURSING
KANNUR MEDICAL COLLEGE
(Recognized by Indian Nursing Council and Kerala Nurses and Midwives Council, affiliated to Kerala University of Health Sciences)
ANJARAKANDY, KANNUR – 670 612, Phone: 0497-2855006
e - mail: collegeofnursing@anjarakandy.in

CON/01/2026/01 DATE: 09.01.2026

To

The Principal
Co-operative College of Nursing
Thalipparamba

Subject: Request for permission to conduct Pilot study by seventh semester BSc Nursing students Reg:-

Respected Madam,

As part of BSc Nursing curriculum, the following seventh semester BSc Nursing students need to conduct Pilot Study. The students are selected the topic "A study to assess the effectiveness of structured teaching progrmme on knowledge regarding fatty liver disease among young adult in First year BSc Nursing Students at Co-operative college of Nursing, Thalipparamba ".

1. Fathima Farzana P
2. Fathima Shana V P
3. Fidha Fathima M R
4. Hanan Mohammed Haneef
5. Hridya R K
6. Lakshmipriya K S
7. Malavika P S

I request you to kindly help our students to conduct the study at your esteemed institution from 14.01.2026 to 19.01.2026. The students will meet you personally.

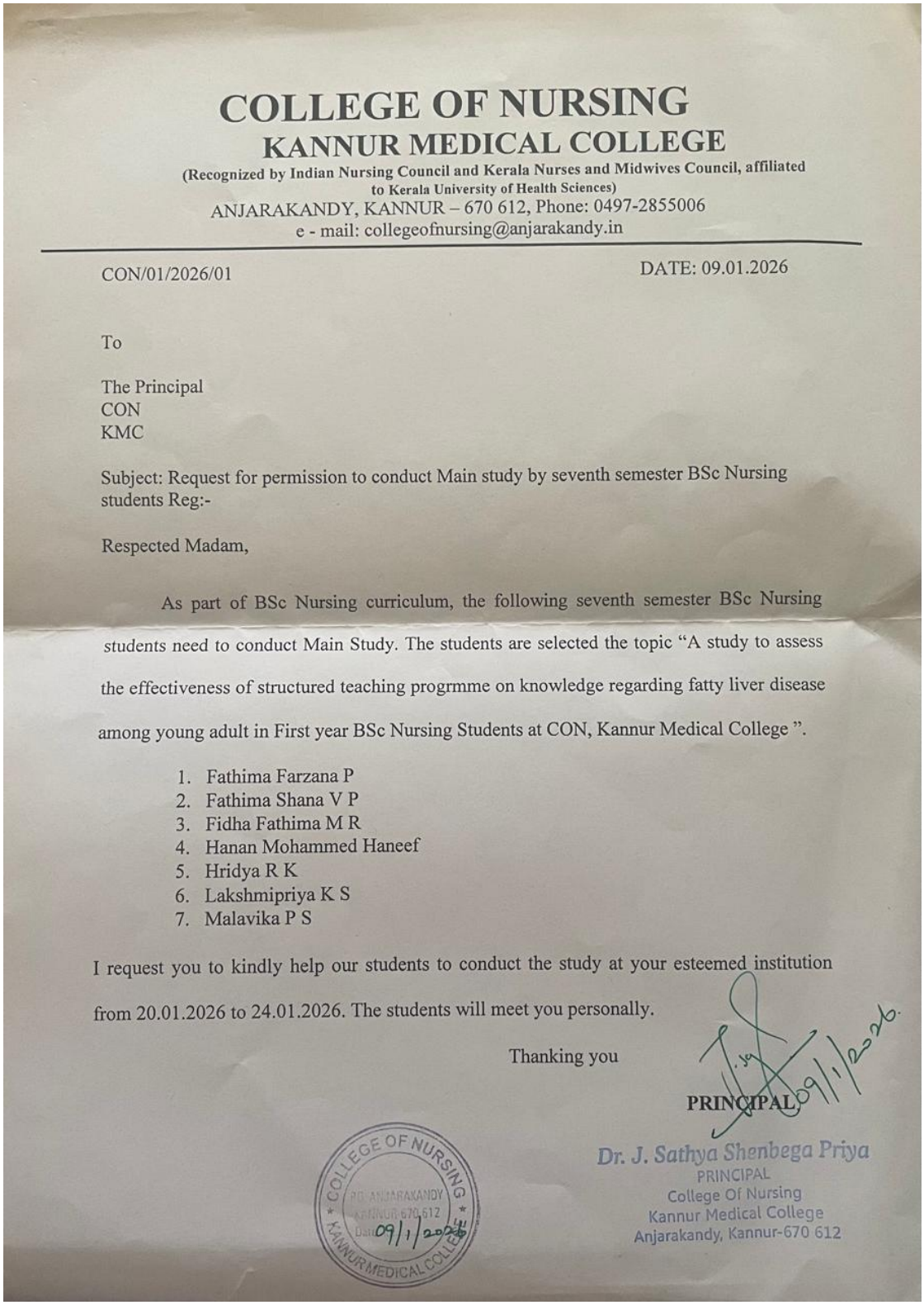
Thanking you

09/1/2026

COLLEGE OF NURSING * KANNUR MEDICAL COLLEGE * P.O. ANJARAKANDY KANNUR 670 612 Date 09/1/26

PRINCIPAL
Dr. J. Sathya Shenbega Priya
PRINCIPAL
College Of Nursing
Kannur Medical College
Anjarakandy, Kannur-670 612

ANNEXURE C
LETTER SEEKING PERMISSION TO CONDUCT MAIN STUDY



COLLEGE OF NURSING
KANNUR MEDICAL COLLEGE
(Recognized by Indian Nursing Council and Kerala Nurses and Midwives Council, affiliated to Kerala University of Health Sciences)
ANJARAKANDY, KANNUR – 670 612, Phone: 0497-2855006
e - mail: collegeofnursing@anjarakandy.in

CON/01/2026/01 DATE: 09.01.2026

To

The Principal
CON
KMC

Subject: Request for permission to conduct Main study by seventh semester BSc Nursing students Reg:-

Respected Madam,

As part of BSc Nursing curriculum, the following seventh semester BSc Nursing students need to conduct Main Study. The students are selected the topic "A study to assess the effectiveness of structured teaching progrmme on knowledge regarding fatty liver disease among young adult in First year BSc Nursing Students at CON, Kannur Medical College ".

1. Fathima Farzana P
2. Fathima Shana V P
3. Fidha Fathima M R
4. Hanan Mohammed Haneef
5. Hridya R K
6. Lakshmipriya K S
7. Malavika P S

I request you to kindly help our students to conduct the study at your esteemed institution from 20.01.2026 to 24.01.2026. The students will meet you personally.

Thanking you

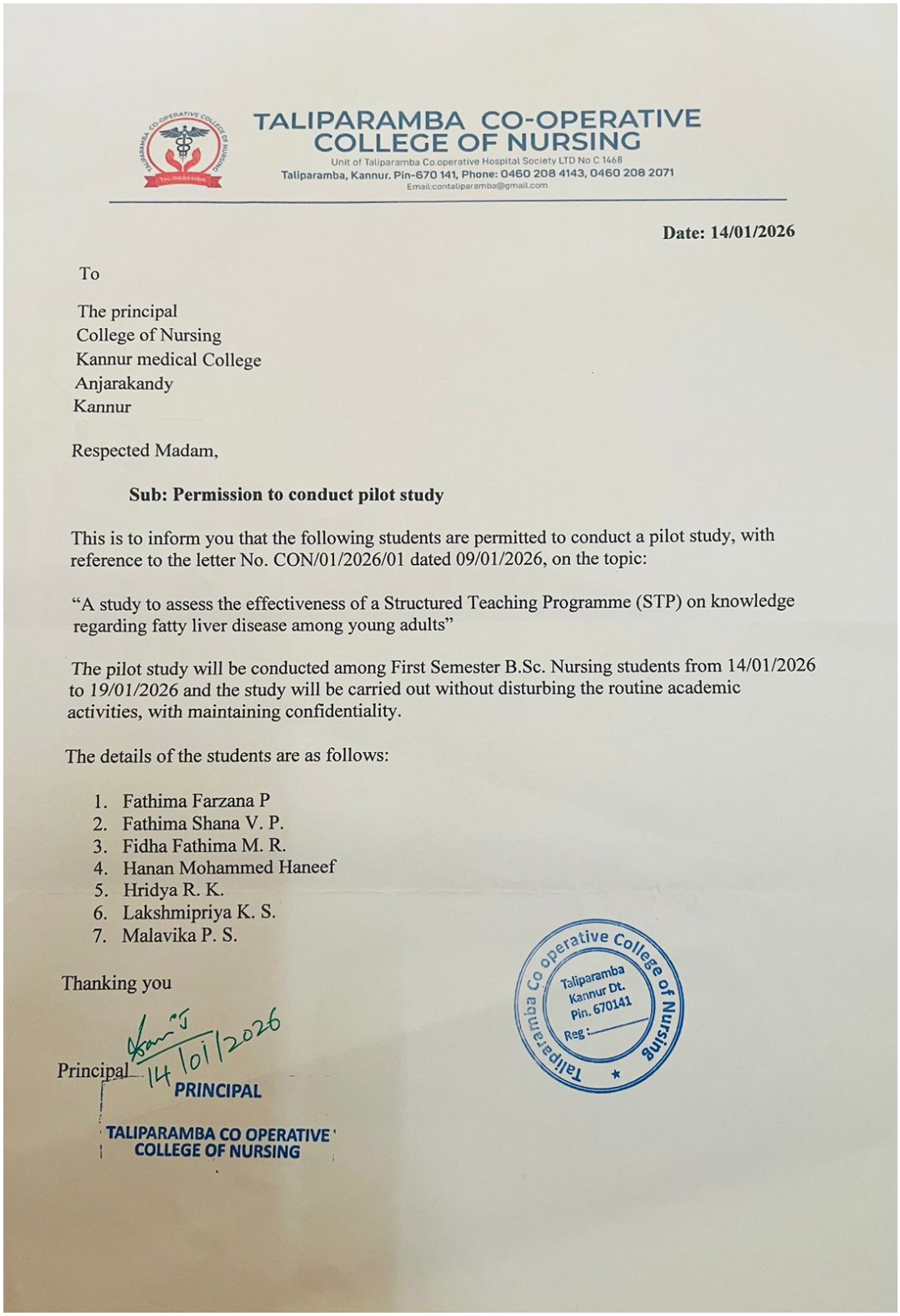
PRINCIPAL

09/1/2026

COLLEGE OF NURSING * KANNUR MEDICAL COLLEGE * PO: ANJARAKANDY KANNUR 670 612 Date: 09/1/2026

Dr. J. Sathya Shenbega Priya
PRINCIPAL
College Of Nursing
Kannur Medical College
Anjarakandy, Kannur-670 612

ANNEXURE D
LETTER GRANTING PERMISSION TO CONDUCT PILOT STUDY



TALIPARAMBA CO-OPERATIVE COLLEGE OF NURSING
Unit of Taliparamba Co.operative Hospital Society LTD No C 1468
Taliparamba, Kannur. Pin-670 141, Phone: 0460 208 4143, 0460 208 2071
Email:contaliparamba@gmail.com

Date: 14/01/2026

To

The principal
College of Nursing
Kannur medical College
Anjarakandy
Kannur

Respected Madam,

Sub: Permission to conduct pilot study

This is to inform you that the following students are permitted to conduct a pilot study, with reference to the letter No. CON/01/2026/01 dated 09/01/2026, on the topic:

"A study to assess the effectiveness of a Structured Teaching Programme (STP) on knowledge regarding fatty liver disease among young adults"

The pilot study will be conducted among First Semester B.Sc. Nursing students from 14/01/2026 to 19/01/2026 and the study will be carried out without disturbing the routine academic activities, with maintaining confidentiality.

The details of the students are as follows:

1. Fathima Farzana P
2. Fathima Shana V. P.
3. Fidha Fathima M. R.
4. Hanan Mohammed Haneef
5. Hridya R. K.
6. Lakshmipriya K. S.
7. Malavika P. S.

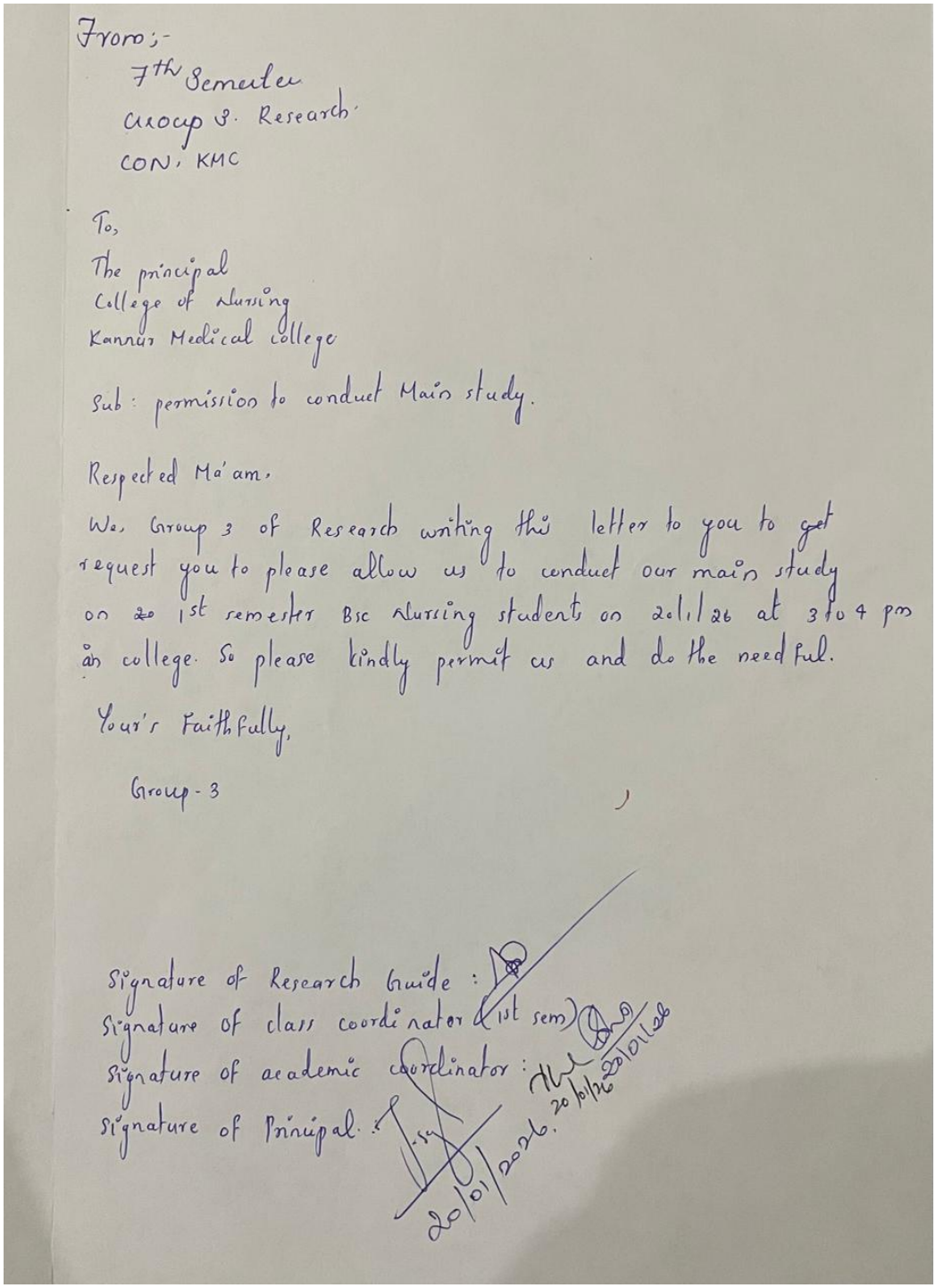
Thanking you

Principal 14/01/2026

PRINCIPAL
TALIPARAMBA CO OPERATIVE
COLLEGE OF NURSING

Taliparamba Co operative College of Nursing
Taliparamba
Kannur Dt.
Pin. 670141
Reg :

ANNEXURE E
LETTER GRANTING PERMISSION TO CONDUCT MAIN STUDY



From;-
7th Semester
Group 3. Research.
CON, KMC

To,
The principal
College of Nursing
Kannur Medical college

Sub: permission to conduct Main study.

Respected Ma'am,

We, Group 3 of Research writing this letter to you to get request you to please allow us to conduct our main study on 2o 1st semester Bsc Nursing students on 2o.1.26 at 3 to 4 pm in college. So please kindly permit us and do the needful.

Your's Faithfully,

Group-3

Signature of Research Guide :
Signature of class coordinator (1st sem)
Signature of academic coordinator :
Signature of Principal :

20/01/2026
20/01/26
20/01/2026

ANNEXURE F
INFORMED CONSENT FORM

I ..... , is willing to participate in the project carried out by Ms. Fathima Farzana, Ms Fathima Shana, Ms. Fidha Fathima, Ms. Hanan Mohammed Haneef, Ms. Hridya RK, Ms. Lakshmipriya KS, Ms. Malavika PS, BSc Nursing students of College of Nursing, Kannur Medical College, Anjarakandy on the topic of "**A study to assess the effectiveness of structured teaching programme on knowledge regarding fatty liver disease among 1st semester BSc. Nursing students at selected college in Kannur."** I am willing to cooperate with the researcher by providing necessary information. I am informed that information provided by me will be used only for study purpose and that the confidentiality of my response will be maintained. I am also informed that I can refrain from study whenever I want.

Name:
Signature:
Date:

ANNEXURE G
TOOL

SECTION A : BASELINE DATA FOR SELECTED VARIABLES

INSTRUCTION: select only one response per question.

1. Gender:
   A. Male
   B. Female
2. History of fatty liver disease:
   A. Yes
   B. No
3. Diet:
   A. Vegetarian
   B. Non-vegetarian
4. Habit of alcohol consumption:
   A. Yes
   B. No
5. Previous knowledge about fatty liver disease:
   A. Yes
   B. No

SECTION B: STRUCTURED QUESTIONARE ON KNOWLEDGE REGARDING FATTY LIVER DISEASE

INSTRUCTIONS:

- Read the questions carefully and select only one correct option.
- You have 10 minutes to complete the questionnaire.
- Each question carries 1 mark each. Total mark: 30 marks. Wrong answer carries 0 mark.

1. What is fatty liver disease?
a) Accumulation of protein in liver cells
b) Accumulation of fat in more than 5% of hepatocytes
c) Inflammation of the liver due to infection
d) Fibrosis of liver tissue

2.How much fat accumulation in the liver indicates fatty liver disease?
a) When fat is less than 3% of liver weight
b) When fat exceeds 10–15% of liver weight
c) When fat exceeds 5–10% of liver weight
d) When fat is present only in obese individuals

3. What does MASLD stand for?
a) Metabolic Associated Severe Liver Disease
b) Metabolic Dysfunction-Associated Steatotic Liver Disease

c) Moderate Alcohol-Related Steatotic Liver Disease
d) Metabolic Acute Steatotic Liver Disorder

4. What is the earliest stage of fatty liver disease?
a) Cirrhosis
b) Fibrosis
c) Steatosis
d) Hepatitis

5. Why is fatty liver disease often asymptomatic?
a) Liver has no blood supply
b) Liver damage is minimal in early stage
c) Pain receptors are absent
d) Enzymes remain normal always

6. What is the most common cause of fatty liver disease worldwide?
a) Viral hepatitis
b) Alcohol consumption
c) Metabolic dysfunction
d) Autoimmune disorders

7. Which type of obesity is strongly associated with fatty liver disease?
a) Peripheral obesity
b) Childhood obesity
c) Visceral obesity
d) Genetic obesity

8. Which viral infection is associated with fatty liver disease?
a) Hepatitis A
b) Hepatitis B
c) Hepatitis C genotype 3
d) Hepatitis E

9. Which drug is known to cause drug-induced fatty liver?
a) Paracetamol
b) Amiodarone
c) Aspirin
d) Penicillin

10. When does acute fatty liver of pregnancy usually occur?
a) First trimester
b) Second trimester
c) Third trimester
d) Postpartum period

11. Why does insulin resistance contribute to fatty liver?
a) It reduces fat synthesis
b) It increases free fatty acid delivery to the liver
c) It decreases liver enzymes
d) It enhances fat oxidation

12. Which hormone fails to suppress the breakdown of fats in fatty acid?
a) Glucagon
b) Cortisol
c) Insulin
d) Thyroxine

13. How does adipose tissue dysfunction contribute to fatty liver?
a) By decreasing lipolysis
b) By increasing free fatty acid release
c) By increasing bile secretion
d) By reducing triglyceride synthesis

14. What causes right upper quadrant pain in fatty liver disease?
a) Intestinal obstruction
b) Stretching of liver capsule
c) Gall bladder infection
d) Ascites

15. Why is steatosis considered reversible?
a) It requires surgery
b) It improves with lifestyle modification
c) It heals spontaneously
d) It responds only to drugs

16. Which diagnostic measure is most commonly used to detect fatty liver?
a) Liver biopsy
b) Ultrasound
c) MRI
d) CT scan

17. Which liver enzymes are commonly elevated in fatty liver?
a) ALP and GGT
b) AST and ALT
c) LDH and CK
d) Amylase and lipase

18. Why is liver biopsy not routinely done in all NAFLD patients?
a) It is inaccurate
b) It is expensive and invasive
c) It cannot detect NASH
d) It is outdated

19. What occurs during the fibrosis stage of fatty liver?
a) Fat accumulation only
b) Inflammation without scarring
c) Replacement of normal liver tissue with fibrous tissue
d) Complete liver failure

20. What is a major complication of cirrhosis?
a) Hypoglycemia
b) Portal hypertension
c) Gallstones
d) Pancreatitis

21. What is the first-line treatment for fatty liver disease?
a) Pharmacotherapy
b) Surgery
c) Lifestyle modification
d) Liver transplantation

22. Why is gradual weight loss preferred in fatty liver management?
a) Rapid loss has no effect
b) Rapid loss may worsen inflammation
c) Gradual loss increases fibrosis
d) Weight loss is not effective

23. Which exercise is beneficial for fatty liver disease?
a) Only yoga
b) Aerobic exercise
c) Bed rest
d) Stretching only

24. How does exercise help in fatty liver disease?
a) Increases bile secretion
b) Reduces insulin resistance
c) Causes liver enlargement
d) Increases triglycerides

25. Which oil is recommended in a healthy diet for fatty liver?
a) Butter
b) Coconut oil
c) Olive oil
d) Hydrogenated oil

26. Which type of food content is rich in Mediterranean diet?
a) Saturated fats
b) Processed foods
c) Fruits and vegetables
d) Sugary drinks

27. Which diet is recommended for MASLD?
a) Ketogenic diet
b) High-protein diet
c) Mediterranean diet
d) Liquid diet

28. Which vaccine is recommended for fatty liver patients?
a) Rabies
b) Hepatitis B
c) Typhoid
d) Polio

29. What is the recommended sleep duration for patient with MASLD?
a) 4–5 hours
b) 5–6 hours
c) 6–7 hours
d) 7–9 hours

30. Why should alcohol be avoided in MASLD?
a) It increases appetite
b) It causes vitamin deficiency
c) It worsens liver inflammation
d) It reduces insulin resistance

ANSWER KEY

1.B	16.B
2.C	17.B
3.B	18.B
4.C	19.C
5.B	20.B
6.C	21.C
7.C	22.B
8.C	23.B
9.B	24.B
10.C	25.C
11.B	26.C
12.C	27.C
13.B	28.B
14.B	29.D
15.B	30.C

ANNEXTURE H
CONTENT ON FATTY LIVER DISEASE

LESSON PLAN ON TOPIC FATTY LIVER DISEASE

GROUP NUMBER : 03

COURSE : BSC. NURSING 7TH SEMESTER

SUBJECT : ADULT HEALTH NURSING

TOPIC : FATTY LIVER IN YOUNG ADULTS

METHOD OF TEACHING : LECTURE CUM DISSCUSSION

TEACHING AIDS : PPT SLIDES

NUMBER OF PARTICIPANTS : 45

VENUE : 1ST SEMESTER CLASSROOM
TIME : 3:00 PM
DATE : 20/01/2026
DURATION : 45 MINS
GROUP: 1ST SEMESTER

GENERAL OBJECTIVES:

At the end of the Structured teaching programme the students will be able to gain adequate knowledge regarding the definition, etiology, types, clinical manifestations, diagnostic evaluation, management and preventive strategies of fatty liver and apply this knowledge in their day to day life with a positive attitude.

SPECIFIC OBJECTIVES:

At the end of the class, the students will be able to understand about,

- define fatty liver
- enumerate the causes of fatty liver
- enlist the types of fatty liver
- enumerate the stages of fatty liver
- list down the clinical features of fatty liver
- explain the pathophysiology of fatty liver
- list down the diagnostic evaluations of fatty liver
- discuss the medical management of fatty liver
- discuss the nutritional management of fatty liver
- discuss the pharmacological therapies of fatty liver
- discuss the surgical management of fatty liver
- explain the preventive strategies of fatty liver

SL. NO	TIME	OBJECTIVES	CONTENT	TEACHING ACTIVITY	LEARNING ACTIVITY	AV AIDS	EVALUATION
1.	3 mins	introduce the topic	**INTRODUCTION** Fatty liver disease occurs when excess fat builds up in the liver cells. It is also known as MASLD (Metabolic Dysfunction-Associated Steatotic Liver Disease). When it is normal for the liver to contain a small amount of fat, it is considered a medical condition when fat accounts for more than 5%-10% of liver's total weight. In most people liver damage can be reversed. According to WHO, the estimated global prevalence of NAFLD(Non-alchemy fatty liver disease)among adults is approximately 25-32%. In India the estimated prevalence among adults ranges from 9%-53%. Prevalence is generally higher in urban areas(around 40%) compared to rural areas(around 29.2%). Studies from Kerala have reported high prevalence rates. A large population-based study in Trivandrum found the prevalence of NAFLD to be approximately 49.8% across the general population.[1]	discussion cum lecture	active listening and participate on discussion	PPT	
2.	1min	define fatty liver	**DEFINITION** According to WHO, fatty liver is defined as the accumulation of fat in more than 5% of hepatocytes (liver cells) by weight, or when fat constitutes more than 5–10% of the liver's weight, in the absence of significant alcohol intake or other secondary causes.[2]	lecture	active listening	PPT	What is fatty liver ?

3.	5 mins	enumerate the causes of fatty liver	**ETIOLOGY** 1. Primary Etiological Categories The etiology is generally divided into several key categories based on the underlying driver of fat accumulation. >Metabolic Dysfunction (MASLD): This is the most common cause worldwide and is strongly linked to metabolic syndrome. The liver becomes a "barometer" for cardiometabolic health, where fat builds up due to: a)Insulin Resistance: This is considered a critical trigger, especially in type 2 diabetes, leading to increased fat synthesis in the liver. b)Obesity: Particularly abdominal or "visceral" obesity, which increases the delivery of free fatty acids to the liver. c)Hyperlipidaemia: High levels of triglycerides or cholesterol in the blood. >Alcohol-Associated (ALD): Caused by excessive alcohol intake, which produces toxic metabolites like aldehydes during metabolism, disrupting the liver's ability to break down fats. It typically occurs in individuals who consume more than 40–60g of alcohol daily. >Drug-Induced and Iatrogenic: Certain medications can cause fat to accumulate as a side effect. Common examples include:	lecture	active listening	PPT	What are the causes of fatty liver ?

			-Corticosteroids and Glucocorticoids. -Amiodarone (heart medication) and Tamoxifen (cancer treatment). -Methotrexate (for autoimmune disorders) and certain Antiviral drugs (e.g., HAART for HIV). >Total Parenteral Nutrition (TPN): Long-term intravenous feeding can deplete nutrients like choline necessary for fat removal. 2. Secondary and Less Common Causes a)Genetic Factors: Mutations in genes like PNPLA3 or TM6SF2 can predispose individuals to store liver fat regardless of lifestyle. b)Rapid Weight Loss: Crash diets or surgeries (like the now-abandoned jejunoileal bypass) can paradoxically overwhelm the liver with a sudden influx of free fatty acids from broken-down body fat. c)Viral Infections: Hepatitis C (especially genotype 3) is a known contributor to fat build up. d)Pregnancy: Acute Fatty Liver of Pregnancy (AFLP) is a rare but serious condition occurring in the third trimester, often linked to genetic defects in mitochondrial fat processing. d)Other Disorders: Underactive thyroid (hypothyroidism), polycystic ovary syndrome				

			(PCOS), sleep apnea, and rare metabolic diseases like Wilson disease or Alpha-1 antitrypsin deficiency.[1,2]				
4.	4 mins	enlist the types of fatty liver	**<u>TYPES OF FATTY LIVER DISEASE</u>** 1. Non-alcoholic fatty liver disease (NAFLD): NAFLD is when fat builds up in the liver of people who don't drink a lot of alcohol. If there is excess fat in your liver and no history of heavy alcohol use, you may receive a diagnosis of NAFLD. If there is no inflammation or other complications, the condition is known as simple NAFLD. 2. Alcoholic fatty liver disease (AFLD) Drinking a lot of alcohol damages the liver. Alcoholic fatty liver disease (AFLD) is the earliest stage of alcohol-related liver disease. If there is no inflammation or other complications, the condition is known as simple alcoholic fatty liver. Alcoholic steatohepatitis (ASH) is a type of AFLD. It occurs when a build-up of excess fat in the liver is accompanied by inflammation, which is also known as alcoholic hepatitis. 3. Acute fatty liver of pregnancy (AFLP): AFLP is when excess fat builds up in the liver during pregnancy. It's a rare but serious pregnancy complication.	lecture	active listening	PPT	What are the types of fatty liver ?

			The exact cause is unknown, although genetics may be a reason. When AFLP develops, it usually appears in the third trimester of pregnancy. If left untreated, it poses serious health risks to the mother and baby.[1,2]				
5.	3 mins	enumerate the stages of fatty liver	**STAGES OF FATTY LIVER** 1.Steatosis(Fat Accumulation Stage) Excess intake of calories (especially fats and sugars) leads to insulin resistance which causes increased free fatty acid release from adipose tissue and increased fat synthesis in the liver and reduced fat oxidation and export from the liver. >Outcome: -Usually asymptomatic -Reversible with lifestyle modification 2.Fibrosis (Scarring Stage): Chronic inflammation activates hepatic stellate cells. Excess collagen and extracellular matrix deposition. Replacement of normal liver tissue with fibrous tissue. >Outcome: -Liver structure starts to distort -May still be partially reversible in early stages 3.Cirrhosis (End-Stage Liver Disease)	lecture	active listening	PPT	What are the stages of fatty liver ?

			Long-standing fibrosis becomes widespread and irreversible causes formation of regenerative nodules and severe distortion of liver architecture and blood flow. >Outcome: -Portal hypertension -Liver failure -Increased risk of hepatocellular carcinoma (HCC).[3]				
6.	4 mins	list down the clinical features of fatty liver	**<u>CLINICAL FEATURES OF FATTY LIVER</u>** 1.Often asymptomatic (especially early stage): In early fatty infiltration, liver function remains compensated, so no obvious symptoms appear. 2.Fatigue and generalized weakness: Altered liver metabolism and mild hepatic dysfunction reduce energy production, leading to tiredness. 3.Loss of appetite (anorexia): Liver inflammation affects digestion and bile secretion, reducing appetite. 4.Nausea and vomiting: Accumulation of fat and toxins in the liver interferes with gastrointestinal function. 5.Right upper quadrant abdominal discomfort or pain:	lecture	active listening	PPT	What are the symptoms may experience an individual with fatty liver ?

			Hepatomegaly causes stretching of the liver capsule (Glisson's capsule), resulting in pain. 6.Hepatomegaly (enlarged liver): Excess triglyceride accumulation within hepatocytes increases liver size. 7.Mild weight gain or obesity (commonly associated): Insulin resistance and altered fat metabolism promote fat storage in the liver. 8.Mild jaundice (in advanced stages): Impaired bilirubin metabolism occurs due to progressive liver cell damage. 9.Elevated liver enzymes (ALT, AST) – clinical finding: Hepatocyte injury leads to leakage of enzymes into the bloodstream. 10.Abdominal bloating: Poor fat digestion and altered gut motility contribute to bloating. 11.Pruritus (itching) – rare, late stage: Accumulation of bile salts in circulation due to impaired bile flow. 12.Signs of metabolic syndrome (diabetes, hypertension):				

			Fatty liver is strongly associated with insulin resistance and metabolic imbalance.[3]				
7.	5 mins	explain the pathophysiology of fatty liver	**<u>PATHOPHYSIOLOGY</u>** 1.Role of Metabolic Syndrome NAFLD is strongly associated with: * Obesity * Type 2 diabetes mellitus * Dyslipidaemia * Insulin resistance * These metabolic abnormalities contribute to abnormal lipid handling in the liver. 2. Adipose Tissue Dysfunction Dysfunctional adipose tissue leads to: * Increased release of free fatty acids (FFAs) into circulation * Altered secretion of adipokines (e.g., decreased adiponectin, increased pro-inflammatory cytokines) * Increased FFAs are delivered to the liver, overwhelming its metabolic capacity. 3.. Insulin Resistance and Lipid Metabolism Insulin resistance plays a central role in NAFLD pathogenesis. It causes: * Increased peripheral lipolysis * Elevated circulating free fatty acids * Increased hepatic uptake of FFAs	lecture	active listening	PPT	What is the pathophysiology of fatty liver ?

			Insulin resistance also stimulates: * Increased triglyceride synthesis * Increased hepatic fat storage 4. Hepatic Lipid Accumulation Fat accumulation in the liver occurs due to: * Increased FFA influx from adipose tissue * Increased de novo lipogenesis within hepatocytes * Reduced fatty acid oxidation * Decreased export of triglycerides as very-low-density lipoproteins (VLDL) * These mechanisms lead to hepatic steatosis. 7. Oxidative Stress and Hepatocellular Injury Excessive oxidation of fatty acids in the liver generates reactive oxygen species (ROS). In NASH, antioxidant defence mechanisms are overwhelmed. ROS causes: * Lipid peroxidation * Mitochondrial dysfunction * Hepatocyte injury and apoptosis 7. Inflammation and Progression to NASH Hepatocyte injury triggers: * Release of inflammatory mediators * Recruitment of inflammatory cells * Persistent inflammation differentiates NASH from simple steatosis. * Hepatocyte ballooning is a hallmark of				

			NASH and indicates cellular injury. 7. Activation of Hepatic Stellate * Chronic liver injury leads to activation of hepatic stellate cells. * Activated stellate cells: * Transform into myofibroblast-like cells * Produce collagen and extracellular matrix proteins * Continuous matrix deposition results in progressive liver fibrosis. 8. Wound-Healing Response and Cirrhosis * Chronic inflammation initiates a wound-healing response. * Excessive fibrosis leads to: * Distortion of liver architecture * Formation of regenerative nodules * This stage is defined as liver cirrhosis, which can impair liver function. 9. Pathologic Distribution of Fat in the Liver Hepatocytes near the central vein are most susceptible to metabolic stress. Two patterns of steatosis are seen: * Micro vesicular steatosis: - Numerous small lipid droplets - No nuclear displacement * Macro vesicular steatosis: - Single large fat vacuole - Displacement of nucleus - Most common in NAFLD				

			10. Histological Features of NAFLD and NASH Common histological findings include: * Steatosis * Hepatocyte ballooning * Lobular inflammation * Perisinusoidal fibrosis 11. Advanced Disease and Complications Progressive fibrosis results in: * Loss of normal liver architecture * Portal hypertension * Liver failure * Cirrhosis increases the risk of: * Hepatocellular carcinoma * Liver-related mortality.[4]				
8.	4 mins	list down the diagnostic measures of fatty liver	**<u>DIAGNOSTIC MEASURES</u>** •Blood tests alone cannot clearly differentiate NAFLD from NASH, but they are useful for initial evaluation. • Initial tests include liver function tests, lipid profile, and iron studies. • Tests such as HOMA-IR and QUICKI help assess insulin resistance. •Tests to rule out other causes of liver disease (viral hepatitis, hemochromatosis) should be done.	lecture	active listening	PPT	What are the diagnostic studies of fatty liver ?

			•If liver enzymes remain high or there is a family history of liver disease, further tests like ANA, SMA, alpha-1 antitrypsin, ceruloplasmin, and TSH are recommended. •In alcoholic liver disease, liver enzyme levels may or may not be elevated. •Typically, AST is 2-3 times higher than ALT, and GGT levels are increased. • Ultrasound is the most commonly used imaging method for diagnosing NAFLD because it is safe, inexpensive, and non-invasive. •CT and MRI can also be used but are more expensive and not much better than ultrasound. •Liver biopsy is required to confirm NASH, but it is not needed for all NAFLD patients. •Biopsy is done only in selected patients based on risk factors and disease severity.[2,4]				
9.	5 mins	discuss the medical management for fatty liver	**MEDICAL MANAGEMENT** Although NAFLD treatment methods have common points of AFLD treatment methods, they differ in some ways.	lecture	active listening	PPT	What are the medical management of fatty liver ?

			1.Lifestyle Modification (First-line Therapy): >Weight Reduction- •Most effective and essential treatment •Indicated especially in overweight/obese patients (BMI ≥25 kg/m²) >7–10% weight loss: •Reduces liver fat •Improves hepatic inflammation •Improves liver histology and enzyme levels •Gradual weight loss is preferred (≈1 kg/week) •Rapid weight loss may worsen liver inflammation and fibrosis. 2. Dietary Therapy: >Calorie Restriction: •Reduction of total daily energy intake •Recommended: ~2,000–2,500 kcal/day (men) ~1,700–2,000 kcal/day (women) •Daily calorie reduction of 400–500 kcal is effective. >Macronutrient Modification: •Reduce carbohydrate intake, especially: High-carbohydrate High-fructose diets. •Low-carbohydrate and low-fat diets reduce: Liver fat Liver enzyme levels •Recommended diet:				

			Carbohydrates <65% of total calories Fat <20% of total calories. 3.Exercise Therapy: > Benefits- •Improves insulin resistance •Reduces metabolic disorders •Decreases liver fat, even without weight loss. > Type and Duration- -Aerobic exercises: -Walking -Running -Swimming -Cycling -Moderate intensity (50–70% of maximal heart rate) At least 30–60 minutes, 3–5 times per week Exercise alone reduces liver fat; effect on inflammation still under study 4.Self care: >Sleep:- •Poor sleep quality increases the risk of MASLD •Too little or too much sleep may worsen metabolic dysfunction MASLD itself increases the risk of: Obstructive Sleep Apnea (OSA)				

			Common Sleep Disorders Associated with MASLD -Insomnia -Obstructive Sleep Apnea (OSA) -Poor sleep quality and irregular sleep patterns >Medical Evaluation of Sleep Problems: •Discuss sleep habits with healthcare providers •Assessment includes; -Sleep history -Daytime sleepiness -Snoring or breathing issues during sleep >Recommended Sleep Duration: •7–9 hours of quality sleep per night is ideal •Helps improve: -Metabolic health -Liver function -Overall well-being >Healthy Sleep Habits (Sleep Hygiene): •Maintaining a Sleep Schedule •Go to bed and wake up at the same time daily •Consistency helps regulate the body's internal clock. The 20-Minute Rule If unable to sleep within 20 minutes: -Leave the bed -Do a relaxing activity (reading, calm music) -Return to bed only when sleepy				

			5. Vaccination and Infection Prevention: > Hepatitis Vaccination Stay up to date with; -Hepatitis A vaccine -Hepatitis B vaccine Prevents additional liver inflammation >Other Recommended Vaccines: -Pneumococcal vaccine -Annual influenza (flu) vaccine Reduces risk of complications in MASLD patients.[5,6]				
10.	4 mins	discuss the nutritional management of fatty liver	**<u>NUTRITIONAL MANAGEMENT</u>** >The Mediterranean diet is recommended for people who have MASLD. >Eating a Mediterranean diet can help you lose weight. Losing 5% to 10% of body weight can significantly improve MASLD. But even without weight loss, the Mediterranean diet is a powerful tool against liver disease. >The Mediterranean diet is rich in fruits, vegetables, lean proteins and healthy fats. It's high in fiber, vitamins, minerals and polyphenols, which are plant compounds that contain antioxidants and anti-inflammatory properties. The diet includes the following foods.	lecture	active listening	PPT	What are the nutritional management of fatty liver ?

			>Vegetables: •Aim for at least three servings of vegetables daily. • One serving is equal to 1 cup raw or ½ cup cooked vegetables. •In-season vegetables and fresh frozen options without sauce are best. •Focus on non starchy vegetables such as asparagus, broccoli, carrots and spinach. •Limit starchy vegetables such as potatoes. >Fruits: • Get at least two servings of fruit daily. •One serving is equal to 1 cup of fresh fruit. •Choose fresh or frozen fruits or fruit canned in its own juice. •Drain the juice in canned fruit before eating. •Avoid fruit juices, which are high in calories and low in fibre. >Fish and seafood: • Aim for three or more servings of fish and seafood a week. •One serving is 3 to 5 ounces, which is about the size of a deck of cards. • Fatty, cold-water fish such as salmon, tuna, lake trout, sardines, mackerel and herring are especially high in anti-inflammatory omega-3 fatty acids. >Poultry and eggs:				

			• White meat chicken without the skin and eggs are good sources of protein. •One serving of chicken is 3 ounces, which is about the size of a deck of cards. •One serving of eggs is one large egg. >Legumes and beans: •Eat three or more servings a week of legumes and beans. •One serving equals half a cup. •Peas and lentils, along with a variety of beans — red, black, lima, kidney, soy and navy — are good choices. >Whole grains: •Choose 100% whole grains when adding breads and other grain foods, such as rice, pasta, oatmeal and tortillas, to your diet. >Nuts and seeds: • Aim for four servings of nuts and seeds a week. •One serving equals ¼ cup. •Choose raw, unsalted varieties, such as almonds, walnuts, Brazil nuts, cashews, sunflower seeds and chia seeds. >Healthy fats: •When cooking, use a healthy, unsaturated fat such as olive oil. •Grapeseed and avocado oils are also healthy oils. •These plant-based oils are liquid at room temperature and can be used instead of butter or margarine.				

			• Don’t use oils with the terms “hydrogenated” or “partially hydrogenated” on their nutrition labels. These are not healthy fats. -Foods to avoid:-- >Highly processed foods, such as frozen meals and pizzas, cheeses, canned vegetables with added salt, and canned fruit with added sugar. >Sugary foods and drinks, such as sodas, fruit juices, candy and sugary cereals. >Refined carbohydrates, such as potato chips, baked goods and white bread. >Foods that are high in saturated fat, such as fatty meats, 82rench fries, butter and whole milk. >Red and processed meats, such as lunch meats, hot dogs and chicken nuggets. >Alcohol. People with MASLD should not drink wine, beer or other types of alcohol. -Diet plan for a day : 7 am — Weak tea 8:30 am — Chapatti (whole wheat), Vegetable stew, Sprouted green gram salad 11 am — Cut fruits				

			1 pm: Rice Sardine curry Bitter gourd foagath Curd Vegetable salad 4 pm: Tea Ragi balls 8 pm: Oats upama Egg white Soya bean masala 10 pm: Milk 6				
11.	3 mins	discuss the pharmacological therapy for fatty liver	**PHARMACOLOGICAL THERAPY** a. Vitamin E Therapy: *Improves liver function and oxidative stress markers *Shows histological improvement in NASH *Effectiveness varies; not beneficial in all patients *High-dose supplementation associated with long-term risks b. Pentoxifylline: *Inhibits pro-inflammatory cytokines (TNF-α) *Reduces inflammation and fibrosis *Shows improvement in NAFLD activity scores c. Metformin: *Improves insulin sensitivity *Useful in patients with type 2 diabetes mellitus	lecture	active listening	PPT	What are the pharmacological therapies of fatty liver ?

			*Limited evidence for histological liver improvement.[5,7]				
12.	4 mins	discuss the surgical management of fatty liver	**SURGICAL MANAGEMENT** 1.Bariatric Surgery: Recommended for severely obese individuals; •BMI > 40 kg/m², or •BMI ≥ 35 kg/m² with obesity-related comorbid conditions •Considered when lifestyle and medical therapy are insufficient. >Effects of Bariatric Surgery on Weight and Metabolism: •Produces significant and sustained weight loss •Improves or resolves metabolic abnormalities •Associated with up to 40% reduction in long-term obesity-related morbidity >Relationship Between Obesity, Metabolic Syndrome, and NAFLD Strong causal link between: -Obesity -Metabolic syndrome (MS) -NAFLD -Weight loss induced by surgery is expected to improve NAFLD >Histological Changes After Surgery: Consistent improvement in: -Liver fat (steatosis) -Inflammation	lecture	active listening	PPT	What are the surgical management of fatty liver ?

			-Fibrosis 2.Liver transplantation for Non-Alcoholic Fatty Liver Disease (NAFLD/NASH): • Effectively cures the liver failure but presents unique challenges, as the underlying metabolic issues (obesity, diabetes, hypertension) often persist and can worsen post-transplant due to immunosuppressants, increasing risks for cardiovascular events.[5]				
13.	6 mins	discuss the preventive strategies of fatty liver	**PREVENTIIVE STRATERGIES OF FATTY LIVER :** 1. Maintain a Healthy Body Weight– Measure: •Overweight or obese individuals should aim for 5–10% reduction in body weight through healthy diet and regular physical activity. Rationale: •Excess body fat increases the accumulation of triglycerides in liver cells. •Even modest weight loss improves insulin sensitivity, reduces hepatic fat content, and lowers liver enzyme levels. •Weight reduction also decreases inflammation and prevents progression to steatohepatitis and fibrosis. 2. Consume a Balanced and Nutritious Diet– Measure:	lecture	active listening	PPT	What are the preventive strategies of fatty liver ?

			•Include fruits, vegetables, whole grains, legumes, and lean proteins in the daily diet. •Limit intake of processed foods, sugary items, refined carbohydrates, and saturated fats. Rationale: •A balanced diet reduces calorie overload and prevents fat deposition in the liver. •High-fiber foods improve satiety, reduce energy intake, and enhance gut health. •Limiting unhealthy fats and sugars decreases oxidative stress and inflammation in liver tissue. 3. Engage in Regular Physical Activity– Measure: •Perform at least 150 minutes of moderate-intensity exercise per week, such as brisk walking, cycling, swimming, or aerobic exercises. Rationale: •Physical activity increases energy expenditure and supports weight management. •Exercise enhances insulin sensitivity, promotes lipid oxidation, and reduces hepatic fat accumulation. •Regular activity also lowers the risk of metabolic syndrome and cardiovascular complications. 4. Manage Associated Medical Conditions Measure:				

			•Effectively control diabetes mellitus, hypertension, and hyperlipidaemia through medications, dietary modifications, and lifestyle changes. Rationale: •These metabolic disorders worsen insulin resistance and contribute to fatty liver progression. •Proper management reduces hepatic fat accumulation and prevents disease complications. •Control of comorbid conditions improves overall metabolic health and liver function.[1,7,8]				
14.	2 mins	conclude the topic	**<u>CONCLUSION</u>** •Fatty liver is also known as Hepatic Steatosis. •When there is accumulation of TG's, the liver becomes fatty. •The normal fat content is 3-8% and when it becomes higher then 10%, the liver becomes fatty. •Types of fatty liver disease: NAFLD, AFLD, AFLP. •Many people with fatty liver disease do not experience significant symptoms until severe liver damage has occurred. When early symptoms are present, they can be non-specific and include things like upper right abdominal pain and fatigue. •The primary treatment for fatty liver disease is to make lifestyle changes that promote liver health. It's possible for the damage caused by fatty liver				

			disease to be reversed when it's treated in its early stages. •Dietary management is necessary and regular heath cares for a fatty liver patient.				
			RECAPTULIZATION • What is the definition of fatty liver? • What are the causes of fatty liver? • What are the types of fatty liver? • What are the stages of fatty liver? • What are clinical features of fatty liver? • What is the pathophysiology of fatty liver? • What are the diagnostic measures of fatty liver? • What is the medical management of fatty liver? • What is the nutritional management of fatty liver? • What are the pharmacological therapies of fatty liver? • What is the surgical management of fatty liver? • What are the preventive strategies of fatty liver?				
			REFERENCE 1. Bayoumi, A., Grønbæk, H., George, J., & Eslam, M. (2021). MAFLD: A new era				

			for fatty liver disease. Journal of Hepatology 2. Catiele Antunes, Mohammedreza Azadfard, Gilles J. Hoilat, Mohit Gupta. 2023. Fatty Liver. NCBI Bookshelf 3. Sharad Maheshwari, Sachin Kumar, Bharatbhai V. Nakshiwala, Ayush Srivastav, Vinaya Chavan, Abhijit Raut, Anoushka Maheshwari. 2022. Fatty liver disease: Pathophysiology and Imaging features. Shop.theime.in 4. James Maurice A, Pinelopi Manousou B,2018, Non-alcoholic fatty liver disease,National Library of Medicine 5. Naalt S,Gurria J,Holterman AL,surgical Treatment of Non-alcoholic Fatty liver disease in severely obese patients,29 October 2014 volume 2014;6 page 103-112 6. Fatty liver disease (MASLD) diet. Mayo Clinic Health Letter. Digital Edition 7. Self-care for fatty liver disease (MASLD). Mayo Clinic Health Letter. Digital Edition 8. Wong VW, Ekstedt M, Wong GL, et al. 2023.Changing epidemiology, global trends and implications for outcomes of NAFLD. J Hepatol. PubMed				

ANNEXURE I
LETTER SEEKING EXPERT OPINION IN VALIDATING TOOL & CONTENT

From,
Research group 3
VIIth semester BSc Nursing
College of Nursing, Kannur medical college

Respected Ma'am / Sir,

We VIIth Semester BSc Nursing students conducting a research project on the statement " **A study to assess the effectiveness of structured teaching programme on knowledge regarding fatty liver disease among 1st semester BSc. nursing students at selected college in Kannur.**" In the second week of January by using a structured knowledge questionnaire as a tool for the study. We would like to get your valuable suggestions about the tool that was prepared by us. Kindly go through our questionnaire and validate the tool.

Yours's sincerely,
VIIth semester students
Group-3 of Research and statistics, College of Nursing,
Kannur Medical College

Place: Anjarakandy.

Date:09/01/2026

CONTENT AND TOOL VALIDITY CERTIFICATION

I _____ hereby certify that I have validated the content and tool of VIIth semester BSc. Nursing Group – 3, who is undertaking the following study :

"A study to assess the effectiveness of structured teaching programme on knowledge regarding fatty liver disease among 1st semester BSc. nursing students at selected college in Kannur."

Place:

Date:

Name of the expert:

Signature:

Designation and seal:

ANNEXURE J

LIST OF EXPERTS FOR CONTENT VALIDITY

SL. NO.	NAME OF THE EXPERT	DESIGNATION
1.	Dr. T. Rameshan	Professor, HOD, Dept. of Physiology, Kannur Medical College, Anjarakandy.
2.	Dr. Bithun	Asst. Professor, Dept of Pathology, Kannur Medical College, Anjarakandy.
3.	Dr. J. Sathya Shenbaga Priya	Principal, College of Nursing, Kannur Medical College, Anjarakandy.
4.	Prof. K Thenmozhi	Professor, HOD, Dept. of Mental Health Nusring, College of Nursing, Kannur Medical College, Anjarakandy.
5.	Ms. Jeyachithra S. S	Asso. Professor, HOD, Dept. of Midwifery/Obstetrics and Gynaecological Nursing, College of Nursing, Kannur Medical College, Anjarakandy.
6.	Mrs. Little Flower. P	Asso. Professor, HOD, Dept of Community Health Nursing, College of Nursing, Kannur Medical College, Anjarakandy.
7.	Mrs. Chaithanya Vijayan CK	Statistician, Kannur Medical College, Anjarakandy
8.	Mrs. Shalaka Vijay KT	Assistant Professor, Institute of Arts and Commerce, Nadukani, Kannur

PICTURES OF PILOT STUDY CONDUCTED AT CO-OPERATIVE COLLEGE OF NURSING, THALIPARABA

PICTURES OF RESEARCH STUDY CONDUCTED AT COLLEGE OF NURSING, KANNUR MEDICAL COLLEGE, ANJARAKANDY.