# PREVALENCE AND KNOWLEDGE, ATTITUDE AND PRACTICE (KAP) OF ULTRA PROCESSED FOOD CONSUMPTION AMONG FEMALE COLLEGE STUDENTS IN KOCHI

ST. TERESA'S COLLEGE
(AUTONOMOUS)
ESTD 1925

**PROJECT SUBMITTED**

**In partial fulfilment of requirement for the award of the degree of**

**B. Sc. NUTRITION AND DIETETICS**

**BY**

**ANN JACOB, FATHIMATH SHAHMA, IFRA, MAHA JAHFAR, SIMRAH FATHIMA**

**(Register No: SB22ND009, SB22ND018, SB22ND024, SB22ND028, SB22ND043)**

**DEPARTMENT OF CLINICAL NUTRITION AND DIETETICS**

**ST. TERESA'S COLLEGE (AUTONOMOUS)**

**ERNAKULAM**

**APRIL 2025**

**CERTIFIED AS BONAFIDE RESEARCH WORK**

ST. TERESA'S COLLEGE (AUTONOMOUS) ★ ERNAKULAM
DEPT. OF CLINICAL NUTRITION AND DIETETICS

2/5/25

**Signature of Internal Examiner** **Signature of External Examiner**

# DECLARATION

We hereby declare that the project entitled **"PREVALENCE AND KNOWLEDGE, ATTITUDE AND PRACTICE (KAP) OF ULTRA PROCESSED FOOD CONSUMPTION AMONG FEMALE COLLEGE STUDENTS IN KOCHI"** submitted in partial fulfilment of the requirement for the award of the degree of B. Sc. Nutrition and Dietetics is a record of original research work done by me under the supervision and guidance of **Ms. NAMITHA PRASTHEENA JOSEPH**, Assistant Professor, Department of Clinical Nutrition and Dietetics, St. Teresa's College (Autonomous), Ernakulam and has not been submitted in part or full of any other degree/diploma/fellowship or the similar titles to any candidate of any other university.

**Place: Ernakulam**

**Date: 02/05/2025**

**ANN JACOB**

**FATHIMATH SHAHMA**

**IFRA**

**MAHA JAHFAR**

**SIMRAH FATHIMA**

# CERTIFICATE

I hereby certify that the project entitled **"PREVALENCE AND KNOWLEDGE, ATTITUDE AND PRACTICE (K A P) OF ULTRA PROCESSED FOOD CONSUMPTION AMONG FEMALE COLLEGE STUDENTS IN KOCHI"** submitted in partial fulfillment of the requirement for the award of the degree of B. Sc. Nutrition and Dietetics is a record of original work done by **Ms. ANN JACOB, Ms. FATHIMATH SHAHMA, Ms. IFRA, Ms. MAHA JAHFAR and Ms. SIMRAH FATHIMA** during the period of the study under my guidance and supervision.

**Signature of HOD**

Ms. Surya M. Kottaram
Assistant Professor
Department of Clinical Nutrition
and Dietetics
St. Teresas College (Autonomous)
Ernakulam

**Signature of the Research Guide**

Ms. Namitha Prastheena Joseph
Assistant Professor
Department of Clinical Nutrition
and Dietetics
St. Teresas College (Autonomous)
Ernakulam

# PREVALENCE AND KNOWLEDGE, ATTITUDE AND PRACTICE (KAP) OF ULTRA PROCESSED FOOD CONSUMPTION AMONG FEMALE COLLEGE STUDENTS IN KOCHI

**PROJECT SUBMITTED**

**In partial fulfilment of requirement for the award of the degree of**

**B. Sc. NUTRITION AND DIETETICS**

**BY**

**ANN JACOB, FATHIMATH SHAHMA, IFRA, MAHA JAHFAR, SIMRAH FATHIMA**

**(Register No: SB22ND009, SB22ND018, SB22ND024, SB22ND028, SB22ND043)**

**DEPARTMENT OF CLINICAL NUTRITION AND DIETETICS**

**ST. TERESA'S COLLEGE (AUTONOMOUS)**

**ERNAKULAM**

**APRIL 2025**

**CERTIFIED AS BONAFIDE RESEARCH WORK**

**Signature of Internal Examiner** **Signature of External Examiner**

# DECLARATION

We hereby declare that the project entitled **"PREVALENCE AND KNOWLEDGE, ATTITUDE AND PRACTICE ( K A P ) OF ULTRA PROCESSED FOOD CONSUMPTION AMONG FEMALE COLLEGE STUDENTS IN KOCHI"** submitted in partial fulfilment of the requirement for the award of the degree of B. Sc. Nutrition and Dietetics is a record of original research work done by me under the supervision and guidance of **Ms. NAMITHA PRASTHEENA JOSEPH**, Assistant Professor, Department of Clinical Nutrition and Dietetics, St. Teresa's College (Autonomous), Ernakulam and has not been submitted in part or full of any other degree/diploma/fellowship or the similar titles to any candidate of any other university.

**Place: Ernakulam**
**Date: 02/05/2025**

**ANN JACOB**
**FATHIMATH SHAHMA IFRA**
**MAHA JAHFAR**
**SIMRAH FATHIMA**

# CERTIFICATE

I hereby certify that the project entitled **"PREVALENCE AND KNOWLEDGE, ATTITUDE AND PRACTICE ( K A P ) OF ULTRA PROCESSED FOOD CONSUMPTION AMONG FEMALE COLLEGE STUDENTS IN KOCHI"** submitted in partial fulfillment of the requirement for the award of the degree of B. Sc. Nutrition and Dietetics is a record of original work done by **Ms. ANN JACOB, Ms. FATHIMATH SHAHMA, Ms. IFRA, Ms. MAHA JAHFAR and Ms. SIMRAH FATHIMA** during the period of the study under my guidance and supervision.

**Signature of HOD**
Ms. Surya M. Kottaram
Assistant Professor
Department of Clinical Nutrition and Dietetics
St. Teresas College (Autonomous)
Ernakulam

**Signature of the Research Guide**
Ms. Namitha Prastheena Joseph
Assistant Professor
Department of Clinical Nutrition and Dietetics
St. Teresas College (Autonomous)
Ernakulam

# ACKNOWLEDGEMENT

The successful completion of this project is the result of the unwavering support, guidance, and encouragement we have received from many individuals, each of whom played a significant role in our academic journey. We would like to take this opportunity to express our sincere and heartfelt gratitude to all those who have contributed directly or indirectly to the realization of this work.

First and foremost, we extend our humble gratitude to the Almighty, whose divine grace, strength, and wisdom guided us through every phase of this project.

We extend our deepest appreciation to Rev. Sr. Nilima CSST, Provincial Superior and Manager, Rev. Sr. Francis Ann CSST, Director, and Dr. Alphonsa Vijaya Joseph, Principal, St. Teresa's College (Autonomous), Ernakulam, for granting us the permission and institutional support needed to carry out our research. Their encouragement and belief in our potential have been a constant source of motivation.

We are profoundly grateful to Ms. Surya M Kottaram, Head of the Department of Clinical Nutrition and Dietetics, for her steadfast support, valuable insights, and enthusiastic encouragement throughout this project. Her leadership and commitment to academic excellence have been truly inspiring.

Our heartfelt thanks go to our research guide, Ms. Namitha Prastheena Joseph, for her exceptional guidance, constructive feedback, and continuous encouragement during the course of our study. Her meticulous attention to detail, professional expertise, and patience have played an indispensable role in shaping the quality and direction of our work. This project would not have reached its present form without her valuable contributions.

We also wish to express our sincere appreciation to all the esteemed faculty members of the Department of Clinical Nutrition and Dietetics for their academic input, critical evaluations, and warm support.

We are thankful to the students studing at various colleges of Kochi who willingly participated in our study and contributed their valuable time to our data collection process.

Last but not least, we extend our warmest thanks to our well-wishers for their constant love, prayers, moral support, and understanding throughout this academic journey.

# LIST OF CONTENTS

# LIST OF TABLES

# LIST OF FIGURES

# LIST OF PLATES

# INTRODUCTION

# REVIEW OF LITERATURE

# METHODOLOGY

# RESULTS
# AND
# DISCUSSION

# SUMMARY

# AND

# CONCLUSION

# REFERENCES

# APPENDIX

# CHAPTER-I
# INTRODUCTION

In this current era of rapid globalization and urbanization, the global food system has drastically transformed, which has led to increased production and consumption of industrially manufactured and packaged food products. These days, food is being mass-produced in factories and sold in packets, making it easy for people to eat on the go. Among these, ultra-processed foods (UPFs) have become a dominant feature of modern diets. These foods are now a big part of what many people eat every day. Ultra-processed foods are defined as industrial formulations typically containing five or more ingredients, including substances not commonly used in home cooking such as preservatives, emulsifiers, sweeteners, flavour enhancers, and colorants (Monteiro *et al*., 2019). They are made in factories using unfamiliar ingredients like chemicals and additives to improve taste and shelf life. These products are designed to be hyper-palatable, convenient, attractive, and affordable, making them widely consumed, especially by the younger population. Common examples of UPFs include packaged chips, carbonated soft drinks, instant noodles, processed meats, confectioneries, biscuits, cakes, and ready-to-eat meals. Ultra-processed foods have become a dietary staple across the globe. To better understand and categorize modern food items, the NOVA classification system was introduced. It groups foods based on the extent and purpose of industrial food processing into four categories: Group 1 includes unprocessed or minimally processed foods such as fresh fruits, vegetables, milk, rice, and meat; Group 2 consists of processed culinary ingredients like vegetable oils, butter, sugar, and salt; Group 3 comprises processed foods including canned vegetables, fruits in syrup, cheeses, and freshly made breads and Group 4 refers to ultra-processed foods which are industrial formulations typically containing little or no whole foods and made with ingredients such as refined starches, added sugars, hydrogenated oils, flavour enhancers, colours, emulsifiers, and other additives rarely used in home kitchens (Monteiro *et al*., 2019).

The increasing consumption of UPFs, especially among the youth, has raised some global health concerns. As the populace and youth, in particular, start using these foods in their diets more often, concern regarding their diet and health is increasingly casting shadows. Overconsumption of ultra-processed foods is associated with a higher risk of developing obesity, cardiovascular diseases, type 2 diabetes mellitus, metabolic syndrome, gastrointestinal diseases, and cancer (Pagliai *et al.*, 2021). As per the studies, too much UPF consumption is

linked to an increased risk of serious health complications such as obesity, heart disease, diabetes, digestive disorders, and cancer. Repeated eating of ultra-processed foods is one of the main reasons behind the intake of excess UPFs as they aid in the easy consumption of calorie-dense diets without providing any sense of fullness (Elizabeth *et al*., 2020). These foods are easy to consume and provide a high amount of calories, which makes it hard for an individual to feel full. Furthermore, UPFs tend to have trans fats, artificial sweeteners, and other chemical compounds which are known to cause chronic low-grade inflammation, reasoned insulin resistance, change gut bacteria, and amplify non-communicable chronic diseases (Fardet & Rock, 2022). Such foods contain unhealthy additives that induce bodily inflammation and contribute to other chronic diseases. In addition, these foods have been linked with unfavourable mental health consequences like depression and chronic anxiety.

Globally, ultra-processed foods account for more than 50-60% of daily calorie intake in high-income countries such as the United States, United Kingdom, and Canada (Elizabeth *et al*., 2020). In rich countries like the US and UK, over half of daily calories come from UPFs. These foods are aggressively marketed, especially to children, adolescents, and young adults, through various media platforms and social media, making them easily accessible and highly desirable (Monteiro *et al*., 2019). Companies advertise these products heavily, especially to kids and teens, making them seem cool and irresistible. The modern food environment, characterized by busy lifestyles, increasing reliance on convenience foods, and widespread advertising, has facilitated the displacement of traditional, home-cooked, balanced meals by UPFs. Because of busy lives and smart marketing, traditional home-cooked meals are being replaced with packaged, processed ones.

India has always relied on a home-cooked, plant-based, and minimally processed diet. But there has been a substantial growth in the consumption of ultra-processed foods in the past few decades. People in India usually stick to home-cooked food, but there is an increasing trend towards consuming packaged meals. Due to rapid urbanization, increased disposable incomes, and changing lifestyles, Indian markets are now overflowing with affordable and convenient processed and packaged foods (Anand *et al*., 2022). As cities develop and their populations grow, there is a clear shift towards fast and cheap snacks. Research shows that urban Indian youth, and especially college students, are more susceptible to fast food, packaged snacks, and sugar-laden drinks (Pries *et al*., 2023). Students living in cities have greater access to and are faced with the lifestyle of junk foods and sugary beverages. The global influence of food cultures, the spread of fast-food joints, and the increase in food delivery services has made

ultra-processed foods the go-to option for many students, especially those short on time and living away from home. With the rise of global food trends, fast-food outlets, and food delivery services, it becomes increasingly convenient for students to choose ultra-processed foods.

Research indicates that Indian youths frequently indulge in ultra-processed foods such as chips, instant noodles, burgers, pizzas, and soft drinks, which contribute to increasing obesity, diabetes, and cardiovascular disease risk within this age group (George *et al*., 2020). Adolescents consume a lot of noodles, chips, and soda which is unhealthy. Therefore, studying the consumption patterns of ultra processed foods (UPFs) in India, especially younger populations, has become an important focus of research. Hence, studying how much UPF is consumed by youths in India is vital for their health.

Among all age groups, female college students represent a particularly vulnerable population for UPF consumption. Academic stressors like course loads and the demand to remain socially relevant pushes sets of scholars towards UPFs. Poor body image, malnourishment, eating disorders at such tender ages deeply affects a woman's ability to make crucial decisions, and pre-nutrition will always be a concern (Kauret *et al*., 2023). Students deal with numerous challenges such as social pressures, body image concerns, and time constraints, all of which contribute to the increasing shift towards ultra-processed foods (UPFs). A significant number of female students attend colleges away from home and end up relying on hostel food or commercial food services. These students often skip meals, which fosters a greater reliance on packaged, ready-to-eat foods. With the convenience that UPFs offer, many no longer bother preparing nutritious meals, which frees up more of their time. A lot of studies have found that eating habits established during early adulthood play a major role in shaping a woman's future lifestyle, with consequential impacts on maternal health and household nutrition (Wang *et al*., 2021). The place they currently reside in has a direct impact on their present and future health, and vice versa. It is important to address how female students, who will eventually be in charge of family nutrition, play a vital role in shaping the nutrition culture of their future households.

## RELEVANCE OF THE STUDY

Ultra-processed foods (UPFs) encompass a wide range of foods such as sweeteners, color additives, preservatives, and emulsifiers, which have been industrially processed to the extent that they are not cooked (or likely even prepared) in a home setting. Spending patterns, along with globalization and urbanization, have led to increased popularity of UPFs, especially

among youth. College females are frequent consumers of UPFs as noted by Nasreddine *et al*. (2018). This is due to lack of time, peer pressure, academic responsibilities and low awareness of nutrition. The overconsumption of UPFs is associated with obesity, cardiovascular diseases, type 2 diabetes, GI issues, and even psychological disorders. These dietary UPFs have been shown to have adverse consequences on the health of female college students with easy access to fast food, processed snacks and fast-food outlets in urbanized cities like Kochi. The dietary habits of younger women are of vital importance, as they are future caregivers and educators of diet and health to the next generation. Despite international research exploring the consumption of UPF, there is little available research around Indian female college students, especially in the city of Kochi. Within this study it is important to understand female students' knowledge of ultra-processed foods, their perception of its risks, and their actual consumption patterns.

**AIM**

The present study entitled **"Prevalence and Knowledge, Attitude, and Practice (KAP) of Ultra-Processed Food Consumption among Female College Students in Kochi"** aims to assess the extent of ultra-processed food consumption among female college students in Kochi. It also aims to identify the most important factors that affect their dietary choices as well as their understanding, perceptions and practices related to ultra-processed foods.

**OBJECTIVES**

The specific objectives of the study are as follows:

1. To assess the prevalence and consumption pattern of ultra-processed foods among female college students.
2. To analyze the nutritional status of female students in college in relation to consumption of ultra-processed foods.
3. To identify the factors influencing consumption of ultra-processed foods among female college students.
4. To analyze the knowledge, attitude and practices related to ultra-processed foods among female college students.

# CHAPTER-II
# REVIEW OF LITERATURE

The review pertaining to the present study entitled "**Prevalence and Knowledge, Attitude and Practice (KAP) of Ultra-Processed Food Consumption among Female College Students in Kochi"** is discussed under the following headings.

**2.1 Prevalence of Ultra-Processed Food Consumption Among College Students**

**2.2 Ultra-Processed Food Consumption Pattern Among College Students**

**2.3 Health Effects of Ultra-Processed Foods**

**2.4 Knowledge, Attitude and Practices of College Students Towards Ultra-Processed Foods**

## 2.1 PREVALENCE OF ULTRA-PROCESSED FOOD CONSUMPTION AMONG COLLEGE STUDENTS

The increasing prevalence of ultra-processed food (UPF) consumption among young adults is evident in the study by Ghosh and Muley (2025), which explored the association between UPF consumption and various health parameters among college students aged 18–25 years in Pune, India. The study involved 110 university students of both genders, with a predominance of female participants (74.8%). The researchers aimed to assess the relationship of UPF intake with body composition, bowel movements, and menstrual irregularities, particularly among female students. A validated Food Frequency Questionnaire (FFQ) based on the NOVA classification was used to evaluate UPF consumption, while anthropometric data including BMI, body fat percentage, and visceral fat were collected using an Omron Karada Analyzer. Bowel habits and menstrual health were assessed through the Constipation Scoring System (CSS) and the Premenstrual Symptoms Screening Tool, respectively. The findings of the study that 52.3% of participants consumed more than three meals daily, and 42.1% ate outside food 2–3 times per week. Their findings revealed a significant association between high UPF consumption and increased visceral fat ($p < 0.05$), and a near-significant trend with body fat percentage ($p = 0.053$), although no significant associations were observed with gastrointestinal or menstrual health ($p > 0.05$). This study highlights the

increasing prevalence of UPF consumption among young adults and its potential impact on metabolic health and body composition.

Garrido-Arismendis et al., (2024) conducted a quantitative, survey-based study involving 827 university students from Sullana Province, Peru, using an online questionnaire to examine patterns and perceptions surrounding the consumption of ultra-processed foods (UPFs). The findings revealed a high prevalence of UPF consumption among students, particularly of products like cookies, pastries, and chocolate snacks, with cost, convenience, and accessibility identified as the primary drivers of these dietary choices. Despite receiving formal education on nutrition, many students continued to prioritize convenience over health, indicating a disconnect between knowledge and practice. The study highlighted those regulations restricting the sale of unhealthy food options, commonly enforced at primary and secondary school levels, are largely absent in university settings, allowing widespread availability and promotion of UPFs around campuses. The research utilized a five-point Likert scale in a 26-question online survey, uncovering that most students frequently opted for UPFs due to time constraints and economic limitations. Furthermore, the study emphasized the lack of a strong culture of healthy eating among university students and the significant influence of the food environment in shaping their habits. These results raise concerns about long-term health risks, such as obesity and metabolic disorders, and point to an urgent need for targeted policy reforms, on-campus food regulations, and educational strategies that go beyond theoretical instruction to foster healthier and more sustainable eating behaviors among university populations.

A multicenter cross-sectional study conducted by Durán-Agüero et al., (2021) examined the prevalence of ultra-processed food (UPF) consumption and its association with obesity among a sample of 2,039 university students from six Chilean universities. The researchers collected dietary data using validated food frequency questionnaires and assessed body mass index (BMI) through objective measurements of height and weight. The study found a high prevalence of UPF consumption, with sugary beverages being the most frequently consumed category. Results indicated that consuming at least one serving of sugary beverages daily was significantly associated with increased odds of obesity, with the likelihood of obesity rising further among students who consumed two or more servings per day. Conversely, the intake of sweet or salty snacks, even at or above one serving per day, was not significantly associated with differences in

obesity risk. These findings highlight the role of sugary beverage consumption as a key

dietary factor linked to obesity in this population. The authors emphasize the importance of developing and implementing public health policies aimed at reducing the intake of UPFs particularly sugary drinks among young adults to combat rising obesity rates in Chilean universities.

## 2.1 ULTRA-PROCESSED FOOD CONSUMPTION PATTERN AMONG COLLEGE STUDENTS

Silva et al., (2024) identified four detailed and distinct patterns of ultra-processed food (UPF) consumption among university students, based on data collected through food frequency questionnaires and analyzed using the NOVA classification system. The largest group, consisting of 56.4% of students, was categorized as having a consistently moderate intake of UPFs, indicating regular but not excessive consumption of processed items such as packaged snacks, instant noodles, sugary beverages, and fast food. These students showed steady consumption over time without significant increases or decreases. The second-largest group, 17.1%, maintained a consistently high intake of UPFs throughout the study period, reflecting a strong dependence on convenience foods, likely influenced by time constraints, limited cooking skills, and campus food environments. A smaller group, 15.4%, was classified as having a consistently low UPF intake, suggesting a pattern of healthier eating habits with limited reliance on processed foods and a possible preference for fresh or minimally processed meals. Finally, 11.2% of students exhibited an increasing intake pattern, transitioning from low or moderate consumption to higher UPF intake over time, potentially due to lifestyle changes during university years, such as increased academic stress, reduced parental oversight, and greater exposure to on-the-go food options. These consumption patterns not only illustrate the diverse dietary behaviors among college students but also highlight how academic life and personal habits can influence long-term food choices. The study's nuanced categorization provides a foundation for targeted interventions aimed at reducing UPF intake and promoting healthier eating patterns among university populations.

Smith et al., (2020) conducted a longitudinal analysis using national dietary and time-use data from 1965 to 2008, focusing on university students aged 19 to 25 years. The study documented a marked decline in home cooking practices and time spent preparing meals over the decades, with only 54–57% of students reporting regular cooking activity by 2008. Despite this overall reduction, students from lower-income backgrounds were found to cook more frequently and derive a larger proportion of their daily energy intake from home-prepared

meals compared to their higher- income peers. The most significant declines in cooking participation and time spent cooking occurred between 1965 and 1992 ($p \leq 0.001$), after which the trend began to plateau. By 2007– 2008, home-prepared meals still contributed 65–72% of students' daily energy intake, even though fewer students reported actually engaging in cooking. This shift suggests an increasing reliance on pre-prepared or convenience foods consumed at home. *Smith et al.* highlight the complexity of modern student dietary behaviors, influenced by factors such as time constraints, budget limitations, and campus food environments. While the decline in cooking has stabilized in recent decades, the persistence of low cooking participation raises concerns about students' nutrition quality. The authors emphasize the importance of public health strategies that encourage nutritious home meal preparation while acknowledging the practical limitations faced by the student population.

## 2.2 HEALTH EFFECTS OF ULTRA-PROCESSED FOODS

Aramburu et al., (2024) conducted a detailed review of four randomized controlled trials (RCTs) that included a total of 455 participants, with a median intervention duration of 12 weeks, to assess the health impacts of reducing ultra-processed food (UPF) consumption. Despite 30 out of 42 reported outcomes being statistically non-significant, the review identified some modest yet meaningful improvements in health markers. In a controlled feeding trial involving adults with stable weight, reductions in energy intake, carbohydrate, and fat consumption were observed, although these findings were supported by low-certainty evidence due to methodological limitations such as small sample sizes and short follow-up periods. Moderate-certainty evidence from other trials indicated slight decreases in body weight, total cholesterol, and HDL cholesterol levels. Educational interventions, particularly those targeting obese women, showed reductions in body weight and waist circumference, along with minor enhancements in certain quality-of-life dimensions, though these outcomes were based on very low-certainty evidence. In contrast, trials involving children, adolescents with obesity, and overweight pregnant women failed to show significant improvements or reductions in UPF consumption, suggesting that the observed benefits in adult populations may have resulted from broader lifestyle modifications rather than direct effects of reducing UPF intake. The authors emphasized that while observational studies have consistently linked high UPF consumption with adverse health outcomes, RCT evidence remains limited, inconclusive, and insufficient to establish a clear causal relationship. The findings highlight the complexity of studying UPFs in controlled settings and underscore the urgent need for

well-designed, long-term RCTs to provide stronger, more reliable evidence that can guide dietary recommendations and inform public health strategies aimed at reducing UPF consumption and mitigating associated health risks.

Smith et al., (2024) published a narrative review exploring the significant role of ultra- processed foods (UPFs) in the global obesity epidemic, highlighting how these foods contribute to excessive caloric intake, disrupted appetite regulation, and metabolic dysregulation. The review emphasizes that UPFs characterized by high levels of added sugars, unhealthy fats, artificial additives, and low nutritional value are strongly associated with increased rates of obesity and other cardiometabolic conditions such as dyslipidemia, hypertension, and insulin resistance. These associations underscore how UPFs not only promote weight gain but also elevate the risk of chronic diseases, including type 2 diabetes and cardiovascular disease. The widespread consumption of UPFs is facilitated by their affordability, accessibility, and convenience, particularly in modern societies where busy schedules and limited time for home cooking prevail. *Smith et al.* argue that this shift away from whole foods toward heavily processed diets has profoundly altered dietary habits and health outcomes worldwide. To address this pressing issue, the review calls for early intervention through school-based nutrition education, promotion of whole food dietary patterns, and the integration of personalized nutrition approaches that consider individual metabolic responses and genetic factors. Despite these recommendations, challenges such as socioeconomic disparities, aggressive marketing by the food industry, and behavioral resistance to dietary change continue to hinder progress. The authors stress the importance of future research leveraging emerging tools such as nutrigenomics, behavioral science, and digital health platforms to design targeted interventions that can effectively reduce UPF intake. Additionally, they advocate for collaborative efforts among public health authorities, policymakers, educators, and the food industry to implement sustainable solutions aimed at improving dietary quality and mitigating the long-term health risks posed by UPFs.

Leonie et al., (2020) carried out a systematic review and conducted a systematic review of 43 studies focusing on UPFs and their health impacts. Of those, 37 marked consumptions of UPF and health risks were reported as significant negative health outcomes. UPFs among adults was linked with obesity, type 2 diabetes, cardiovascular diseases, depression, some types of cancer, and mortality due to all cases. Asthma and metabolic diseases were the child and adolescent counterparts found alongside. There were biological mechanisms such as disruption of gut microbiota, inflammation, low nutrient profile, and

excessive amounts of sugar and fat and Ultra- processed foods (UPFs) are increasingly recognized as a major contributor to unhealthy diets, with their widespread consumption linked to numerous adverse health outcomes. These foods, characterized by extensive industrial processing and the inclusion of additives, preservatives, artificial flavors, and sweeteners, have become a dominant part of global diets. In children and adolescents, UPFs were associated with a higher risk of metabolic disorders such as insulin resistance and obesity, as well as respiratory conditions like asthma. Notably, no study found any beneficial health outcomes related to UPF consumption, underscoring the urgent need for dietary interventions. The review also highlighted emerging evidence on the biological mechanisms through which UPFs contribute to disease, including their poor nutritional profile, high levels of added sugars, unhealthy fats, sodium, and potential disruption of gut microbiota and metabolic processes. Additionally, food additives, emulsifiers, and artificial compounds in UPFs may impair immune function and promote chronic inflammation, further exacerbating health risks. Given the strong and consistent evidence linking UPFs to a range of adverse outcomes, public health authorities and policymakers are urged to incorporate UPF reduction strategies into dietary guidelines and nutrition policies. Addressing the overconsumption of UPFs through public health initiatives, regulations, and educational efforts is essential to mitigating their harmful impact on global health and preventing the rise of diet-related chronic diseases.

Zhang et al., (2020) conducted a systematic review of 20 studies, including 12 cohort and 8 cross-sectional studies, involving 334,114 participants, which demonstrated a significant association between high ultra-processed food (UPF) intake and a range of adverse health outcomes, such as metabolic syndrome, hypertension, obesity, and depression. UPFs, which are typically characterized by high levels of added sugars, unhealthy fats, artificial additives, and low nutritional quality, were found to contribute to metabolic disturbances and inflammation, exacerbating the risk of chronic diseases. The review also found strong associations between UPF consumption and increased risk of all-cause mortality, coronary heart disease, cerebrovascular diseases, overweight and obesity, postmenopausal breast cancer, gestational obesity, adolescent asthma, and frailty. However, no significant associations were found with cardiovascular mortality, prostate cancer, or colorectal cancer, suggesting that the effects of UPF consumption might vary depending on the specific health outcomes examined. These findings highlight the critical role of UPFs in contributing to the global rise in diet-related non-communicable diseases (NCDs),

underscoring the need for further prospective studies to explore the long-term effects of UPF consumption and establish clearer causal relationships. It has been emphasized the importance of public health interventions, including education, regulation, and the promotion of healthier food alternatives, to mitigate the risks associated with UPF consumption and reduce the growing burden of diet-related diseases globally.

## 2.3 KNOWLEDGE, ATTITUDE AND PRACTICES OF COLLEGE STUDENTS TOWARDS ULTRA-PROCESSED FOODS

Ilieva et al., (2025) conducted a systematic quantitative study analyzing 290 fully completed surveys to examine the psychological, sociological, and economic factors influencing consumer knowledge, attitudes, and practices (KAP) toward ultra-processed foods (UPFs). Utilizing structural equation modeling (SEM), machine learning (ML), and multi-criteria decision- making (MCDM) techniques, the study revealed complex, often hidden relationships that shape consumer behavior. UPFs, widely consumed despite their known health risks, are characterized by high levels of added sugars, unhealthy fats, artificial additives, and preservatives, contributing to their convenience and palatability but diminishing their nutritional value. The research found that while many consumers are aware of the health hazards posed by UPFs—including associations with obesity, metabolic disorders, and chronic illnesses—factors such as convenience, affordability, taste, social norms, and aggressive marketing continue to drive consumption. Even among health-conscious individuals, external pressures like time constraints and accessibility lead to unintentional consumption. The study also highlighted a growing concern regarding the environmental sustainability of UPFs, noting perceptions related to excessive packaging and high resource use. These findings have significant implications for stakeholders including policymakers, health professionals, and the food industry. They suggest public health campaigns, clearer food labeling, school-based education, and stricter regulations as necessary interventions to curb UPF consumption. Food manufacturers are encouraged to reformulate products and embrace transparency to meet rising consumer demand for healthier options. Additionally, digital tools such as mobile applications and AI-driven nutritional guidance may empower consumers to make better choices, while personalized nutrition strategies based on genetic and lifestyle factors offer promising future directions. As awareness of UPFs' health and environmental impact grows, ongoing collaboration among governments, industry, and consumers will be critical in fostering a more sustainable and

health-oriented food system.

Gutiérrez-Henao et al., (2024) conducted a study using a validated questionnaire to assess the knowledge, attitudes, and practices (KAP) related to ultra-processed food (UPF) consumption among 450 college students. The study found that while students generally exhibited a moderate level of understanding and awareness of the health risks associated with UPFs, this knowledge did not translate into healthier eating behaviors. Factors such as convenience, affordability, peer influence, and time constraints contributed significantly to the high consumption of UPFs, revealing a clear gap between awareness and action. Despite the availability of nutritional information and food labeling, many students ignored this information, making dietary choices based on ease and habit rather than health considerations. Socioeconomic status and limited access to healthier food options were also identified as key determinants shaping dietary practices, indicating that knowledge alone is insufficient to drive behavioral change. The findings underscore the importance of addressing the environmental and social factors that influence food choices, particularly in college settings where UPFs are easily accessible. To mitigate the long-term health risks associated with UPF consumption, the study advocates for targeted interventions such as campus-based nutrition education, improved food environments, digital tools to promote informed choices, and policy measures to increase the availability of healthier alternatives. Collaborative efforts between academic institutions, public health authorities, and policymakers are essential to foster a supportive food environment that empowers students to adopt and sustain healthier dietary habits.

Angarita-Díaz et al., (2024) evaluated the knowledge, attitudes, and practices (KAPs) related to nutritional labeling, the selection of sweetened ultra-processed foods (UPFs), and the implications for children's oral health by conducting a cross-sectional study involving 298 parents and caregivers of children aged 1 to 12 in Villavicencio, Colombia. A validated questionnaire was used and the responses were categorized into low, medium, and high KAP levels and analyzed through frequency distributions, median scores, and the chi-square test. The study found that 41.6% of participants had moderate knowledge, 49.3% had a moderate attitude, and 43.3% showed a low level of practice, indicating a significant gap between awareness and behavioral change. A statistically significant association ($p<0.05$) was observed between KAP levels and socioeconomic and educational backgrounds, suggesting that individuals from lower-income or less-educated groups were less likely to understand food labeling and more likely to make poor dietary choices for their children. These findings highlight the urgent need for comprehensive interventions—such as community nutrition

education, improved food labeling, professional counseling, and supportive technology tools to address the negative impact of sweetened UPFs on oral health and promote healthier dietary habits.

# CHAPTER – III
# METHODOLOGY

The methodology adopted for the present study entitled **"Prevalence and Knowledge, Attitude, and Practice (KAP) of Ultra-Processed Food Consumption among Female College Students in Kochi"** is discussed under the following headings:

**3.1 Selection of Area**

**3.2 Selection of Subjects**

**3.2.1 Inclusion and Exclusion Criteria**

**3.2.1.1 Inclusion Criteria**

**3.3.1.2 Exclusion Criteria**

**3.3 Selection of Tool**

**3.4 Collection of Data**

**3.4.1 Socio-demographic and socio-economic information**

**3.4.2 Anthropometric measurements**

**3.4.2.1 Measurement of Height**

**3.4.2.2 Measurement of Weight**

**3.4.2.3 Body Mass Index**

**3.4.3 Prevalence of Ultra Processed Food Consumption**

**3.4.4 Knowledge on Ultra Processed Foods**

**3.4.5 Attitude towards Ultra Processed Foods**

**3.5 Consumption Practices of Ultra Processed Foods**

**3.6 Data Analysis and Interpretation**

## 3.1 SELECTION OF AREA

The present study was carried out in colleges across Kochi. Kochi was selected as it is a metropolitan city with many colleges and diverse college student population, making it ideal for accessing the subjects. Moreover, there is increased exposure to ultra processed

foods, making it a suitable area to study prevalence, consumption pattern and KAP related to ultra processed food among female college students.

## 3.2 SELECTION OF SUBJECTS

The consumption of ultra-processed foods has been rising globally, particularly among young adults, including college students, due to factors such as convenience, affordability, and aggressive marketing strategies (Monteiro *et al*., 2019). A 100 samples of female college students aged between 18-25 years were selected for the study. Samples enrolled in various undergraduate and postgraduate courses were selected across the colleges in Kochi.

The selection was made using a convenience sampling method, where samples were chosen based on their availability and willingness to participate. This approach allowed for efficient data collection while ensuring that the study included students with varying levels of exposure to ultra-processed foods. Convenience sampling was employed as it allows researchers to gather data from easily accessible individuals, making it a practical approach for studies conducted within educational settings. This non-probability sampling technique is commonly used when time and resource constraints exist, as it enables quick and efficient data collection. Convenience sampling remains a useful approach in behavioral and dietary studies where participant availability is a key factor (Etikan *et al*., 2016; Bornstein *et al*., 2013).

### 3.2.1 Inclusion and Exclusion Criteria:

Inclusion and exclusion criteria are essential in designing high-quality research protocols. Inclusion criteria are the key features of the target population, such as demographic, clinical, and geographic characteristics. Exclusion criteria are those who meet the inclusion criteria but have additional characteristics that could interfere with the study's success or increase the risk of adverse outcomes. Common exclusion criteria include factors like having a medical issue that could affect the results, or not meeting the required conditions. Having clear criteria helps the researcher avoid confusion, reduce errors, and make the study more reliable. It also ensures that the study is safe and fair for participants (Patino & Ferreira, 2018).

#### 3.2.1.1 Inclusion Criteria:

- Female college students aged between 18–25 years.

- Female students enrolled in undergraduate or postgraduate programmes in colleges across Kochi.
- Students who consume food from outside sources (canteen, supermarkets, online food shopping etc.), as well as those who prepare food at home.
- Students who are willing to participate in the study.

#### 3.2.1.2 Exclusion Criteria:

- Female college students who do not fall in the age group of 18–25 years.
- Students who followed strict or medically prescribed diets.
- Students who are not willing to participate in the study.

## 3.3 SELECTION OF TOOL

The tool selected for the study was a researcher-administered interview schedule. An interview schedule is a structured set of questions used by the researcher to collect data through direct interaction with participants, ensuring uniformity and clarity in responses (Kothari, 2004). In this method, the researcher asks the questions and records the responses, minimizing misinterpretation and allowing for further probing if needed. A well-structured interview schedule was designed in this present study to collect data on socio-demographic and socio-economic details, anthropometric measurements, prevalence, knowledge, attitude, and practice related to ultra-processed food consumption. This method ensures better accuracy in data collection and reduces the chances of missing responses. The interview schedule used for the present study is provided in Appendix-I.

## 3.4 COLLECTION OF DATA

The data was collected through face-to-face interviews with 100 female college students from various colleges in Kochi. The researcher asked the questions and recorded their responses in the interview schedule. Additionally, height and weight measurements were taken to assess the nutritional status of the subjects. The details collected from the subjects were:

### 3.4.1 Socio-demographic and Socio-economic Information

The socio-demographic information includes the details of subjects such as name, age, education, type of residence. Socio-economic information collected were education and occupation of the family head and monthly family income. Socio-economic status of the subjects was assessed using Kuppuswamy Socioeconomic Scale (2024) which is provided in

Appendix-II. Collecting this data helps analyze disparities in food consumption and healthcare access (Krieger et al., 1997; Galobardes et al., 2007).

#### 3.4.1.1 Anthropometric Assessment

Anthropometric measurements were taken to evaluate the nutritional status of the subjects. The height and weight of each individual were measured and recorded in order to calculate their body mass index (BMI).

#### 3.4.1.2 Measurement of Height

The height of the subjects was measured using a measuring tape and a ruler. They were asked to remove their shoes and stand straight against a wall, ensuring their head, shoulders, and buttocks touched the wall with their feet flat on the floor. A ruler was placed slightly above their head and lowered until it made contact with their hair. A mark was then made on the wall, and the height was measured using a measuring tape. The final measurement was recorded in centimeters.

**Plate 1: Measuring height of the subjects**

#### 3.4.1.3 Measurement of Body Weight

The weight of the subjects was recorded using the bathroom scale. They were asked to remove their shoes and any heavy objects on them. Subjects were then asked to stand still on the bathroom scale which was placed on a flat surface to record the precise measurement. The weight was recorded in kg.

**Plate 2: Measuring body weight of the subjects**

#### 3.4.1.4 Body Mass Index (BMI)

Body Mass Index (BMI) is a numerical value derived from an individual's weight and height, calculated by dividing weight in kilograms by the square of height in meters. It serves as a screening tool to categorize individuals into weight status groups such as underweight, normal weight, overweight, and obesity, helping to assess potential health risks associated with body weight (CDC, n.d.). BMI was calculated from the recorded height and weight using the formula:

$$\text{BMI} = \text{Weight (kg)} / \text{Height (m}^2\text{)}$$

### 3.4.2 Prevalence of Ultra Processed Foods Consumption

This section collected data on the prevalence, frequency, type and pattern of ultra-processed food consumption among female college students. This section also examined the factors influencing consumption, purchasing habits, preferred consumption times, and weekly expenditure on UPFs.

### 3.4.3 Knowledge on Ultra Processed Foods

This section evaluated subjects' knowledge of ultra-high processed foods, their health risks, and the NOVA classification system. It also explores beliefs about additives, sugar/salt content, and potential nutritional deficiencies.

### 3.4.4 Attitude towards Ultra Processed Food

This section examined the attitude of the subjects toward ultra-high processed foods, including whether they should be avoided, their impact on health, and their potential addictiveness. It also explored opinions on warning labels, willingness to reduce consumption with healthier alternatives, and concerns about long-term health effects.

### 4.1 Consumption Practices of Ultra Processed Foods

This section assessed eating habits, including home-cooked meal frequency, meal skipping, and UPF consumption. It also assesses attempts to replace UPFs with healthier alternatives and awareness of nutrition labels.

## 3.5 DATA ANALYSIS AND INTERPRETATION

The data collected from the subjects were analysed, tabulated and interpreted to identify the prevalence, pattern, knowledge, attitude and practice related to consumption of ultra processed food among female college students. The interpretation was based on the mean, standard deviation (SD), coefficient of variation (CV) and percentage analysis of the collected data which helped to align with the study objective.

# CHAPTER-IV

# RESULTS AND DISCUSSION

The results pertaining to the present study entitled "**Prevalence and Knowledge, Attitude and Practice (KAP) of Ultra-Processed Food Consumption among Female College Students in Kochi"** are presented under the following headings:

**4.2 Socio-demographic and Socio-economic Characteristics of the Subjects**

**4.3 Anthropometric Assessment of the Subjects**

**4.4 Prevalence of Ultra Processed Food Consumption among the Subjects**

**4.5 Knowledge on Ultra Processed Food among the Subjects**

**4.6 Attitude of the Subjects toward Ultra Processed Foods**

**4.7 Consumption Practices of Ultra Processed Foods among the Subjects**

## 4.1 SOCIO-DEMOGRAPHIC AND SOCIO-ECONOMIC CHARACTERISTICS OF THE SUBJECTS

The socio-demographic characteristics give basic information on the age, type of residence of the selected subjects. Socio-economic characteristics provide details on the educational level, occupational status and family income of the selected subjects, based on which subjects were classified into various socio-economic classes. The socio-demographic characteristics of the selected subjects are presented in table-1.

**Table 1: Socio-demographic and Socio-economic Characteristics of the Female College Students**

| Characteristics | Frequency (n) | Percentage (%) |
|---|---|---|
| **Age** | | |
| 18-21 years | 66 | 66 |
| 22-25 years | 34 | 34 |
| **Type of residence** | | |
| Home | 18 | 18 |
| College hostel | 29 | 29 |
| Off campus accommodation | 53 | 53 |

| **Socio-economic status** | | |
|---|---|---|
| Upper class | 25 | 25 |
| Upper middle class | 57 | 57 |
| Lower middle class | 17 | 17 |
| Upper lower class | 1 | 1 |
| Lower class | **0** | 0 |

College students between the age group of 18-25 years were selected for the study. Out of 100 students, majority (73%) of them were in the age group of 21-25 whereas only 27% of subjects were in the age group of 18-20. The samples were selected from various college in Kochi. Majority (53%) of the subjects resided outside the campus whereas 29% was staying in college hostels and the remaining 18% resided in their home. Similar findings on residential information were reported in a study conducted by Bawadi *et al.*, (2019).

According to socio-economic profile, majority (57%) belong to upper middle socio-economic class whereas 25% comes under upper socio-economic class, 17% comes under lower middle class and only 1% belong to upper lower socio-economic class.

## 4.2 ANTHROPOMETRIC ASSESSMENT OF THE SUBJECTS

Anthropometry studies the measurements of the human body totally or partially. The anthropometric measures are useful to understand the nutritional status of the subjects. The anthropometric measurements like height and weight of the subjects were recorded and was then used to calculate the Body Mass Index. The anthropometric measurements of the subjects are presented in table-2.

**Table 2: Anthropometric Measurements of the Female College Students**

| **Anthropometric parameters** | **Mean** | **SD** | **CV %** |
|---|---|---|---|
| Height (cm) | 158.99 | 6.07 | 3.82 |
| Weight (Kg) | 54.79 | 9.30 | 16.97 |
| BMI ($Kg/m^2$) | 21.55 | 3.45 | 16.01 |

From the above table, it is clear that the mean height of the subjects was 158.99 cm with a standard deviation of 6.07 cm and CV of 3.82% while the mean, standard deviation and CV calculated for weight were 54.79 kg, 9.30 kg and 16.97% respectively. This indicates that there is a very low and a moderate variation in height and weight of the subjects but the mean

height and weight of the subjects were within the normal range which is typical for young adults between the ages of 18 to 25 years. This variation in body weight might be due to the different dietary habits, physical activity levels and lifestyle practices among the subjects.

The calculated mean BMI of the subjects were 21.55 kg/m² which indicates that the college students were within the normal range (18.5–24.9 kg/m²), according to the World Health Organization's BMI classification. However, it was important to note that the standard deviation and CV was 3.45 kg/m² and 16.01% revealing a variation in BMI within the subjects and indicating that some subjects may fall outside the normal range which suggest the cases of underweight and overweight.

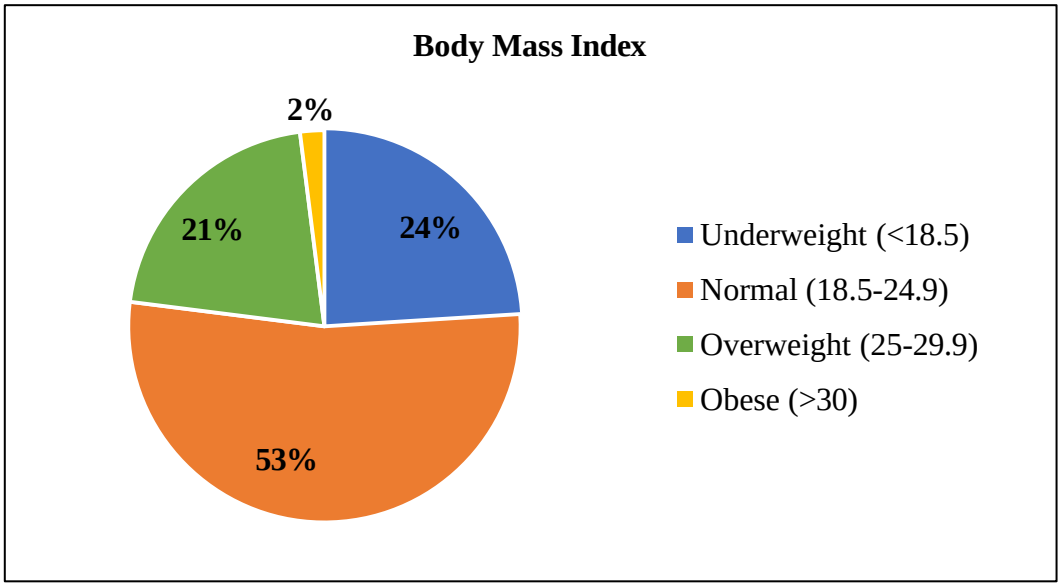


**Figure 1: BMI of the Female College Students**

The Body mass index was calculated by using height and weight measurements of the subjects. It was found that majority (53%) of the subjects belong to normal category despite consuming UPFs on a regular basis. About 24% of the subjects were underweight which can be due to various factors like excessive stress, poor dietary habits and limited access to nutrient dense meals. It was also noted that 21% of the subjects were overweight and only 2% of them were obese. Verma and Chaturvedi (2014) reported a 37.5% prevalence of overweight and obesity among university students, which is higher than the prevalence observed in the present study.

## 4.3 PREVALENCE OF ULTRA PROCESSED FOOD CONSUMPTION AMONG THE SUBJECTS

Prevalence of ultra-processed food (UPF) consumption plays a significant role in understanding the dietary behaviours of young adults. Consumption patterns are influenced by various factors such as convenience, taste appeal, and affordability. The widespread and easy accessibility of UPFs have contributed to their increased intake among college students. Understanding the prevalence is essential to assess the nutritional risks and the potential long-term health consequences, such as obesity and metabolic disorders, associated with frequent UPF consumption (Monteiro *et al.*, 2018).

`

**Table 3: Ultra Processed Food Consumption Pattern among Female College Students**

| Food items | Daily | | 1-2 times a week | | 3-5 times a week | | 1-2 times a month | | Never | |
|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % | n | % |
| Instant food | 0 | 0 | 33 | 33 | 14 | 14 | 46 | 46 | 7 | **7** |
| Packaged snacks | 2 | 2 | 43 | 43 | 33 | 33 | 18 | 18 | 4 | 4 |
| Soft drinks/sugary beverages | 7 | 7 | 28 | 28 | 17 | 17 | 36 | 36 | 12 | 12 |
| Fast food | 1 | 1 | 26 | 26 | 12 | 12 | 57 | 57 | 4 | 4 |
| Frozen processed meals | 0 | 0 | 11 | 11 | 9 | 9 | 34 | 34 | 46 | 46 |
| Bakery items | 8 | 8 | 24 | 24 | 20 | 20 | 45 | 45 | 3 | 3 |
| Processed meats | 5 | 5 | 7 | 7 | 6 | 6 | 49 | 49 | 33 | 33 |

The data in the above table represents the consumption patterns of various ultra-processed foods (UPFs) among the subjects. Fast food is predominantly consumed 1-2 times a month by 57% of the subjects, while packaged snacks were most commonly consumed 1-2 times a week by 43%. Fast foods were taken 1-2 times a month by 57%, and fast food by 57%. Frozen processed meals are consumed 1-2 times a month by 34% of the respondents, whereas bakery items and processed meats are reported at 45% and 49% respectively in the same frequency category. Daily consumption is relatively low across all items, with bakery items showing the highest daily intake at 8%, followed by soft drinks at 7%. Notably, frozen processed meals have the highest rate of non-consumption, with 46% of subjects reporting they never consume them. In contrast, packaged snacks and fast food exhibit the lowest non-consumption rates, each at 4%.

**Table 4: Association between BMI and UPF Consumption**

| BMI Category | UPFs Consumption Pattern | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Low UPF consumption (1-2 times/month) | | Moderate UPF consumption (1-2 times/week) | | High UPF consumption (3-5 times/week or daily) | | Total students n=100 | |
| | n | % | n | % | n | % | n | % |
| Underweight | 7 | 29.16 | 13 | 54.16 | 4 | 16.6 | 24 | 24 |
| Normal | 13 | 24.53 | 21 | 39.62 | 19 | 35.85 | 53 | 53 |
| Overweight | 4 | 19.05 | 6 | 28.57 | 11 | 52.38 | 21 | 21 |
| Obese grade I | 1 | 50 | 0 | 0 | 1 | 50 | 2 | 2 |
| Obese grade II | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Obese grade III | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Among the underweight subjects(n=24), majority (54.16%) reported highest prevalence of moderate UPF consumption, followed by 29.16% with low consumption and only 16.6% had high consumption. This suggests that lower UPF intake is slightly more common in this group. In the normal category (n=53), majority (39.62) reported moderate UPF consumption, followed by 35.85% with high consumption and 24.53% had low consumption. In the overweight category (n=21), 52.38% reported high UPF consumption, indicating a potential association between frequent intake of UPFs and elevated body weight whereas moderate consumption was seen in 28.57%, and only 19.05% had low intake. For subjects with Obese Grade I (n=2), reported high and low UPF consumption. Thus, these findings suggest that higher UPF consumption might increase the BMI which was very evident among overweight subjects.

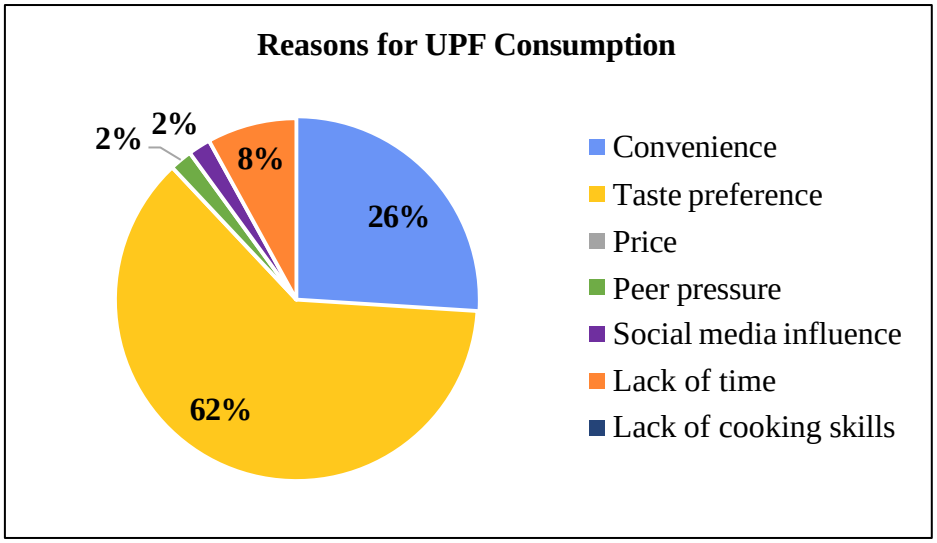


**Figure 2: Reasons for UPF Consumption among Female College Students**

From the above figure, it was observed that majority (62%) of the respondents consumed UPF due to the taste preference. About 26% of the respondent's reported convenience was the reason for their UPF consumption. For 8% of the respondents, lack of time was the reason behind UPF consumption while only 2% of the respondents consumed UPF because of social media influence and for another 2%, peer pressure was the reason for UPF consumption. None of the reported price and lack of cooking skills as reason for UPF consumption.

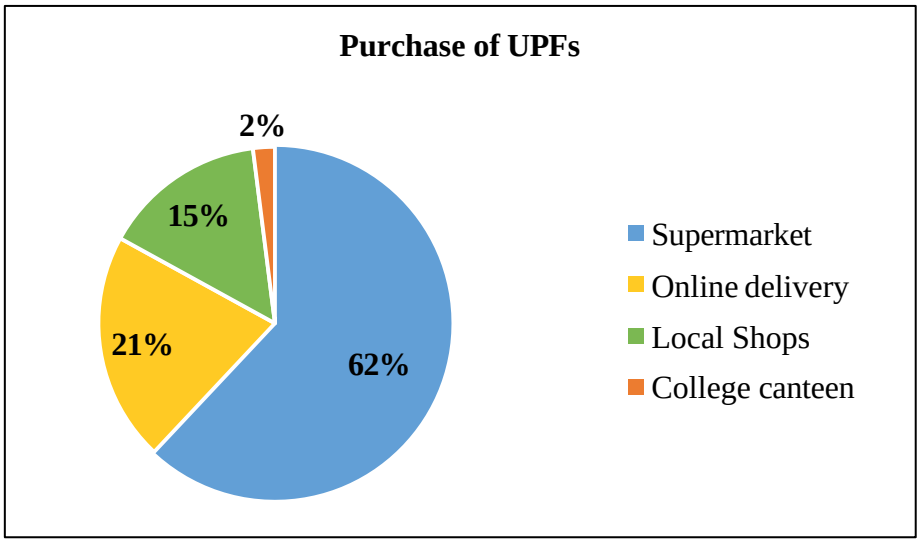


**Figure 3: Sources of Ultra-Processed Food**

From figure 3, it was clear that majority (62%) of the respondents purchases UPF from supermarket, 21% through online delivery whereas 15% purchases from local shops. It was also noted that only 2% uses college canteen as the source of UPF.

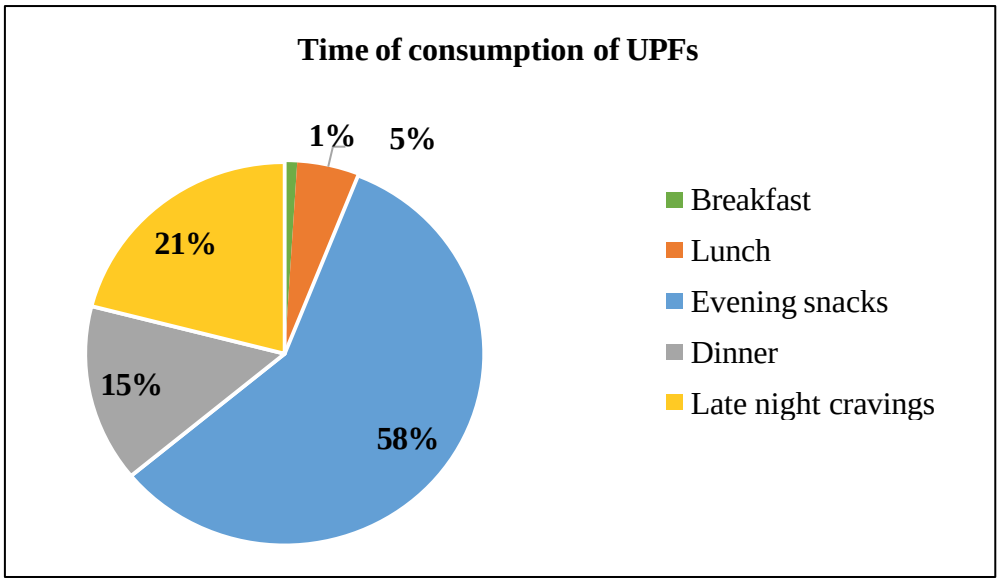


**Figure 4: Time of Consumption of UPFs among Female College Students**

From the above figure, it was observed that the majority (58%) of the subjects consumed UPFs during evening snack time. Moreover, 21% of the subjects reported consumption of UPFs which was due to late night cravings. It was also noted that 15% of the subjects consumed UPFs during dinner while 5% of the subjects consume during lunch and only 1% of the subjects consume UPFs during breakfast time. Thus, these findings indicate that UPF consumption is higher during non-meal times, especially in the evening and late at night.

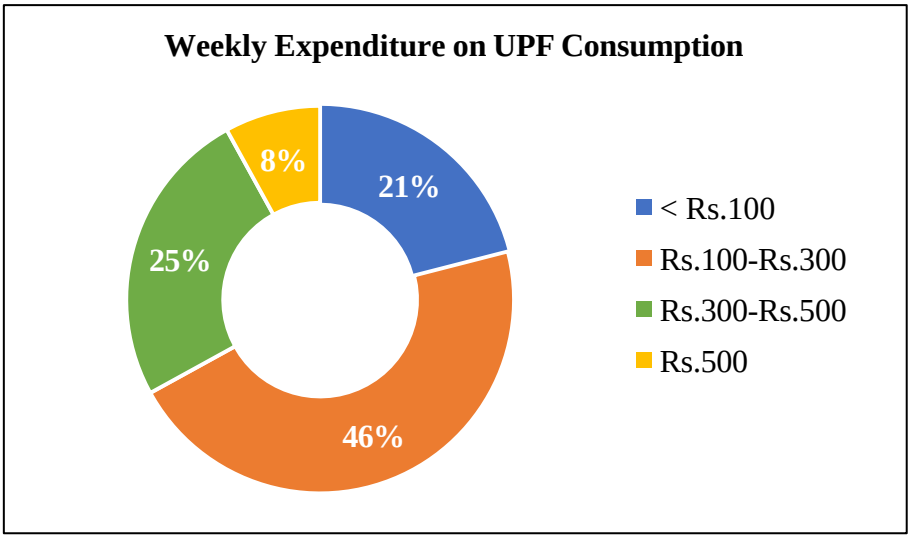


**Figure 5: Weekly UPF Expenditure among Female College Students**

From the figure 5, it was clear that majority (46%) of the respondents spend between Rs.100 to Rs.300 weekly for UPF consumption, about 25% of the respondents spend between

Rs.300 to Rs.500 weekly, 21% of the respondents reported that they spend less than Rs.100 weekly for UPF consumption and only 8% of the respondents spend roughly Rs. 500 on UPFs weekly.

### 4.4 KNOWLEDGE ON ULTRA PROCESSED FOODS AMONG THE SUBJECTS

Knowledge about ultra-processed foods (UPFs) plays an important role in shaping individuals' eating habits and overall health. Being aware of what UPFs are, how they are made, their nutritional content, and the possible health risks they carry such as obesity, diabetes, and heart disease helps individuals make better food choices. A better understanding on UPFs can encourage people to move towards healthier, less processed options for a healthy life.

**Table 5: Knowledge about Ultra Processed Foods among Female College Students**

| Questions | Options | Frequency (n) | Percentage (%) |
|---|---|---|---|
| Are you familiar with the term "ultra-high processed foods"? | Yes | 76 | 76 |
| | No | 24 | 24 |
| Are you aware of the NOVA food classification system that categorizes ultra-processed foods? | Yes | 7 | 7 |
| | No | 93 | 93 |
| Which of the following do you consider health risks of consuming ultra-high processed foods? (Select all that apply) | Obesity | 87 | 87 |
| | Diabetes | 60 | 60 |
| | Heart disease | 70 | 70 |
| | High blood pressure | 49 | 49 |
| | Cancer | 34 | 34 |
| | Don't know | 4 | 4 |
| Do you think ultra-high processed foods contain artificial additives, preservatives and high amount of sugar/salt? | Yes | 99 | 99 |
| | No | 1 | 1 |
| Do you think consuming ultra-processed foods can lead to nutritional deficiencies? | Yes | 99 | 99 |
| | No | 1 | 1 |

The data presented in the table indicates that, in terms of knowledge, 76% of participants reported being familiar with the term "ultra-high processed foods," whereas only

7% were aware of the NOVA food classification system that categorizes such foods. A majority (87%) of the respondents identified obesity as the most frequently associated health risk, followed by heart disease (70%), diabetes (60%), high blood pressure (49%), and cancer (34%). A small proportion (4%) indicated that they were unaware of the potential health risks. Furthermore, 99% of participants believed that ultra-high processed foods contain artificial additives, preservatives, and high amounts of sugar or salt and also, they believed that UPFs consumption can lead to nutritional deficiencies. Thus, these findings indicate that the subjects had a good awareness and knowledge about UPFs and its health risks but knowledge on NOVA food classification system that categorizes ultra-processed foods was poor.

### 4.5 ATITUDE OF THE SUBJECTS TOWARDS ULTRA PROCESSED FOODS

Understanding the attitude of subjects towards Ultra-Processed Foods (UPFs) provides valuable insights into their eating habits and health awareness. Their perceptions, whether positive or negative, reflect not only personal preferences but also broader influences such as nutritional knowledge, lifestyle, and social trends. Understanding these attitudes is essential for addressing nutritional challenges and promoting healthier eating behaviours.

**Table 6: Attitude of the Subject towards Ultra Processed Foods**

| Questions | Options | Frequency (n) | Percentage (%) |
|---|---|---|---|
| Do you think ultra-processed foods should be avoided? | Strongly agree | 22 | 22 |
| | Agree | 47 | 47 |
| | Neutral | 22 | 22 |
| | Disagree | 7 | 7 |
| | Strongly disagree | 2 | 2 |
| Do you believe that ultra-high processed food consumption negatively affects health? | Strongly agree | 56 | 56 |
| | Agree | 37 | 37 |
| | Neutral | 7 | 7 |
| | Disagree | 0 | 0 |
| | Strongly disagree | 0 | 0 |
| Do you think ultra-high processed foods are addictive? | Yes | 91 | 91 |
| | No | 5 | 5 |
| | Not sure | 4 | 4 |

| | | | |
|---|---|---|---|
| Do you think ultra processed foods should have warning labels like tobacco products? | Yes | 79 | 79 |
| | No | 21 | 21 |
| Would you be willing to reduce your consumption of ultra-processed foods if provided with healthier options? | Yes | 76 | 76 |
| | No | 4 | 4 |
| | May be | 20 | 20 |
| How much do you care about the long-term health impact of consuming ultra-processed foods? | A lot | 54 | 54 |
| | Somewhat | 45 | 45 |
| | Not at all | 1 | 1 |

The data presented in the table indicates the attitude of the subjects towards UPFs. Majority (69%) of the participants either strongly agreed or agreed that ultra-processed foods should be avoided, while only 9% either strongly disagreed or disagreed with the question. A significant majority (93%) believed that the consumption of ultra-high processed foods negatively impacts health. Furthermore, 91% of participants considered these foods to be addictive. The idea of implementing warning labels on ultra-processed foods, similar to those used for tobacco products, was supported by 79% of the respondents. When asked about their willingness to reduce consumption if healthier alternatives were available, 76% indicated they would do so, 20% responded “maybe,” and only 4% stated they would not. Regarding concern for long-term health impacts, 54% of participants expressed a high level of concern, 45% indicated moderate concern, and only 1% reported no concern at all.

## 4.6 CONSUMPTION PRACTICES OF ULTRA PROCESSED FOOD AMONG THE SUBJECTS

The consumption practices UPFs among subjects offer critical insights into their eating patterns and lifestyle behaviours. Examining the frequency, quantity, and types of UPFs consumed helps to understand the extent to which these foods are integrated into their daily diets. Analysing these patterns is essential for identifying potential nutritional risks and informing targeted health interventions.

**Table 7: Consumption Practices of Ultra Processed Food among Female College Students**

| Questions | Options | Frequency (n) | Percentage (%) |
|---|---|---|---|
| How frequently do you prepare home-cooked meals instead of consuming processed foods? | Daily | 67 | 67 |
| | 3-5 times a week | 23 | 23 |
| | 1-2 times a week | 6 | 6 |
| | Rarely | 3 | 3 |
| | Never | 1 | 1 |
| Do you skip meals and consume ultra processed foods instead? | Always | 6 | 6 |
| | Sometimes | 41 | 41 |
| | Rarely | 41 | 41 |
| | Never | 12 | 12 |
| Have you ever tried to replace ultra-high processed foods with healthier alternatives? | Yes, successfully | 41 | 41 |
| | Yes, but failed | 40 | 40 |
| | No | 19 | 19 |
| When hungry, do you usually opt for quick, ready-to-eat ultra-processed snacks? | Yes | 81 | 81 |
| | No | 19 | 19 |
| Do you read nutrition labels before purchasing packaged food products? | Always | 9 | 9 |
| | Sometimes | 60 | 60 |
| | Rarely | 14 | 14 |
| | Never | 17 | 17 |

From the above table, it was found that majority (67%) of the subjects reported preparing home-cooked meals daily, while remaining 23% did so three to five times per week. With regard to meal-skipping behaviour, 41% of participants reported skipping of meal sometimes and another 41% rarely skipped meals in favour of consuming ultra-processed foods, whereas 12% of the subjects stated they never did so. It was also noted that majority (41%) of participants were successful in replacing ultra-processed foods with healthier alternatives while 40% attempted but were unsuccessful, and 19% did not make any attempt. Moreover, majority (81%) of the participants usually opted for quick, ready-to-eat ultra-processed snacks when feeling hungry. In terms of reading nutrition labels on packaged foods, majority (60%) reported doing so sometimes, 17% stated they never did, 14% rarely did, and only 9% always checked the labels before making a purchase.

# CHAPTER-V

# SUMMARY AND CONCLUSION

The purpose of the present study entitled **"Prevalence and Knowledge, Attitude, and Practice (KAP) of Ultra-Processed Food Consumption among Female College Students in Kochi"** was to determine the prevalence, knowledge, attitude and practice of UPFs consumption among female college students in Kochi.

Around 100 female students between the ages of 18 and 25 years were chosen for the study through convenience sampling method from various educational institutions. A researcher administered interview schedule was used to gather information from the selected subjects on general profile, socio demographic and socio-economic information, anthropometric measurements, prevalence, knowledge, attitude and practices on UPF consumption. The collected data was further analyzed, tabulated and interpreted based on the percentage analysis, mean and standard deviation.

The important points of the study are summarized below:

- The socio-demographic profile indicated that:
  - Majority (66%) of the selected samples were found to be between 18-21 years old whereas, 34% of the subjects were between the ages of 22-25.
  - Regrading residential information, majority (53%) of the subjects were residing in Off campus accommodation, about 29% of the subjects were residing in college hostel, and only 18% of the subjects were residing in their home.
  - According to socio-economic profile, majority (57%) belong to upper middle socio-economic class and only 1% belong to upper lower socio-economic class.
- The anthropometric measurements revealed that:
  - The mean height of the subjects was 158.99 cm with a standard deviation of 6.07 cm and CV of 3.82%.
  - The mean, standard deviation and CV calculated for weight were 54.79 kg, 9.30 kg and 16.97% respectively.
  - Finally, the mean value obtained for BMI was 21.55 Kg/m2 with a standard deviation of 3.45 $Kg/m^2$ and CV of 16.01%.

- It was found that majority of the subjects (53%) were found to be in the normal BMI category. About 24% of the subjects were underweight and 21% were overweight. The remaining 2% were seen to be in the obese category.

➢ The prevalence of UPFs consumption indicated that:

- Among underweight subjects (n=24), the majority (54.16%) had moderate UPF consumption. In the normal category (n=53), majority (39.62) reported moderate UPF consumption and in the overweight group (n=21), most (52.38%) reported high UPF intake, suggesting a link between higher UPF consumption and increased BMI.
- Majority (57%) of the subjects consumed fast food 1-2 times a month by 46%. Packaged snacks are most often eaten 1-2 times a week by 43% whereas 33% of the subjects consumed packaged foods 3-5 times a week. However, daily intake remains low, with bakery items highest at 8% and soft drinks at 7%. Frozen meals have the highest non-consumption rate at 46%, while packaged snacks and fast food are the least avoided, each at 4%.
- During the analysis of reason for UPF consumption, it was found that 62% of the subjects consumed UPF because of taste preference. Convenience was cited as the reason for UPF consumption by 26% of the subjects. Additionally, 8% reported consuming UPF due to lack of time. Social media influence was 2% and peer pressure was a factor for 2% of subjects was another reason for UPF consumption.
- Regarding the purchase of UPFs, the data revealed that majority (62%) of the subjects purchased from supermarkets. Online delivery was identified as the preferred location for UPF purchase by 21% of the subjects, while an 15% percentage was from local shop. A minority of respondents (2%) reported purchasing from college canteen.
- In terms of time of UPF consumption, a large majority (58%) of the subjects were consuming as evening snack, whereas 21% were consumed as late-night cravings. 15% of the subjects consumed as dinner and rest 5% as lunch and least amount (1%) as breakfast.
- The majority (46%) of subjects spent between Rs 100-300 weekly for UPF purchase, about 25% of the subjects spend between Rs.300 to Rs.500 weekly, 21% of the subjects reported that they spend less than Rs.100 weekly for UPF consumption and only 8% of the respondents spend roughly Rs. 500 on UPFs weekly.

- The knowledge of the subjects about UPFs:
  - It was found that 76% of the respondents are familiar with UPF, while only 24% are not familiar with the word.
  - Majority (93%) of the subjects are unfamiliar with NOVA food classification system, while only 7% is familiar with the classification.
  - Most of the subjects (99%) do think that UPFs contain artificial additives, preservatives and high amount of sugar/salt, while only 1% think they don't.
  - It was found out that majority (99%) of the subjects do think UPF consumption can lead to nutritional deficiencies and only 1% disagree.

- The attitude of the subjects towards UPFs consumption:
  - It was found out that 47% of the subjects agree on avoiding UPF, while having equal stance on strongly agree and neutral with 22%. 7% of the subjects disagree in avoiding it while only 2% strongly disagree.
  - Majority of the subjects (56%) strongly agree that UPF consumption affect health negatively, with 37% of the subjects agreed and 7% shows neutral stance. None of the subjects disagreed or strongly disagreed with this.
  - While looking at the response in terms of UPF additive, 91% subjects do think its additive and 5% subjects think they don't while other 4% respondents were not sure about it.
  - Most of the subjects (79%) do think that UPF should have warning labels and the rest 21% think that they shouldn't have.
  - When looking into the number of subjects willing to reduce UPF consumption on giving healthier options, it was found that majority (76%) are willing while 20% of the subjects may be willing and the rest 2% is not willing on reduction of UPF consumption.
  - Most of the subjects, that is 54% care a lot about the long-term health impact on UPF consumption while 45% somewhat care and 1% does not care at all.

- Practice of UPFs consumption among the subjects:
  - The practice of daily preparing home cooked meal instead of UPF consumption is found high (67%), 23% cooks 3-5 times a week, 6% cooks 1-2 times a week and the rest 3% rarely cooks and 1% never cooks.
  - Majority of the subjects (41%) were equally distributed between sometimes and rarely

each on asking whether they skip meals and consume UPF instead. 12% never skips and 6% always skips.

- It is found that majority (41%) have tried to replace UPF and was successful but on the other hand 40% tried but failed. Only the rest 19% didn't try.
- Most of the subjects (81%) choose UPF when hungry and the balance 19% don't choose UPFs.
- It is shown that majority of the subjects (60%) sometimes read the nutritional label before purchasing packaged food and 17% never read the nutritional labels. 14% of the subjects rarely reads and 9% always read the nutritional labels.

**CONCLUSION**

From the present study it can be concluded that majority of the female college students were in the age group of 18 and 21 and resided off- campus. Most of the subjects had a normal BMI but a frequent consumption of UPFs, mainly bakery items and sugary beverages was observed. However, it was found the higher UPF consumption tends to increase the BMI. Taste preference was the main reason for UPFs consumption among female college students was preferred during evening snack time. The majority of the subjects exhibited higher knowledge about UPFs and its health effects. In terms of attitude towards UPFs, most of the subjects had a negative perception indicating strong health concerns and expressed willingness to avoid UPF consumption if healthier options are provided. Most of them cook at home but often rely on quick snacks and don't always check nutrition labels, showing a need for better healthy food choices among the female college students.

# REFERENCES


1. Anand, S., Kumar, A., & Verma, P. (2022). Changing dietary patterns in urban India: A shift towards processed foods. Journal of Urban Health and Nutrition, 8(2), 95–101.
2. Bornstein, M. H., Jager, J., & Putnick, D. L. (2013). Sampling in developmental science: Situations, shortcomings, solutions, and standards. Developmental Review, 33(4), 357–370. https://doi.org/10.1016/j.dr.2013.08.003
3. Bryman, A. (2012). Social research methods (4th ed.). Oxford University Press.
4. Centers for Disease Control and Prevention. (n.d.). About body mass index (BMI). https://www.cdc.gov/bmi/about/index.html
5. Creswell, J. W., & Creswell, J. D. (2018). Research design: Qualitative, quantitative, and mixed methods approaches (5th ed.). SAGE Publications.
6. Elizabeth, L., Machado, P., Zinöcker, M., Baker, P., & Lawrence, M. (2020). Ultra- processed foods and health outcomes: A narrative review. Nutrition Reviews, 78(11), 798–812. https://doi.org/10.1093/nutrit/nuaa023
7. Etikan, I., Musa, S. A., & Alkassim, R. S. (2016). Comparison of convenience sampling and purposive sampling. American Journal of Theoretical and Applied Statistics, 5(1), 1–4. https://doi.org/10.11648/j.ajtas.20160501.11
8. Fardet, A., & Rock, E. (2022). Ultra-processed foods and chronic disease: A review of available literature. Current Opinion in Clinical Nutrition & Metabolic Care, 25(2), 100–106. https://doi.org/10.1097/MCO.0000000000000811
9. Galobardes, B., Lynch, J., & Davey Smith, G. (2007). Measuring socioeconomic position in health research. British Medical Bulletin, 81–82(1), 21–37. https://doi.org/10.1093/bmb/ldm001
10. George, A., Mathew, L., & Joseph, B. (2020). The impact of fast-food consumption among Indian adolescents. Indian Journal of Community Medicine, 45(3), 215–220. https://doi.org/10.4103/ijcm.IJCM_276_19
11. Kauret, R., Singh, M., & Dutta, R. (2023). Body image perception and its association with ultra-processed food consumption among college girls. Asian Journal of Health Sciences, 11(1), 33–41.
12. Kothari, C. R. (2004). Research methodology: Methods and techniques (2nd ed.). New Age International Publishers

13. Krieger, N., Williams, D. R., & Moss, N. E. (1997). Measuring social class in US public health research: Concepts, methodologies, and guidelines. Annual Review of Public Health, 18(1), 341–378. https://doi.org/10.1146/annurev.publhealth.18.1.341

14. Monteiro, C. A., Cannon, G., Lawrence, M., Louzada, M. L. C., & Machado, P. P. (2019). Ultra-processed foods, diet quality, and human health. Food and Agriculture Organization of the United Nations. https://www.fao.org/documents/card/en/c/ca5644en

15. Monteiro, C. A., Cannon, G., Levy, R. B., Moubarac, J. C., Jaime, P. C., Martins, A. P., Canella, D., Louzada, M. L. C., & Parra, D. (2019). Ultra-processed foods: What they are and how to identify them. Public Health Nutrition, 22(5), 936–941. https://doi.org/10.1017/S1368980018003762

16. Pagliai, G., Dinu, M., Madarena, M. P., Bonaccio, M., Iacoviello, L., & Sofi, F. (2021). Consumption of ultra-processed foods and health status: A systematic review and meta- analysis. British Journal of Nutrition, 125(3), 308–318. https://doi.org/10.1017/S0007114520002688

17. Patino, C. M., & Ferreira, J. C. (2018). Inclusion and exclusion criteria in research studies: Definitions and why they matter. Jornal Brasileiro de Pneumologia, 44(2), 84. https://doi.org/10.1590/S1806-37562018000000088

18. Pries, A. M., Huffman, S. L., Adhikary, I., Upreti, S. R., Dhungel, S., Champeny, M., & Zehner, E. (2023). Consumption of ultra-processed foods among urban Indian youth. Appetite, 180, 106330. https://doi.org/10.1016/j.appet.2022.106330

19. Verma, V. K., & Chaturvedi, S. (2014). Prevalence of obesity and overweight among university students in South India. Journal of Clinical and Diagnostic Research, 8(7), CC01–CC03. https://pubmed.ncbi.nlm.nih.gov/25434911

20. Wang, D., Li, Y., Hu, X., & Yang, Y. (2021). Early dietary patterns and their impact on long-term health outcomes in women. Maternal & Child Nutrition, 17(2), e13162. https://doi.org/10.1111/mcn.13162

21. World Health Organization. (2000). Obesity: Preventing and managing the global epidemic (WHO Technical Report Series 894). https://apps.who.int/iris/handle/10665/42330.

# APPENDIX-I

# INTERVIEW SCHEDULE TO ELICIT INFORMATION ON "PREVALENCE AND KNOWLEDGE, ATTITUDE AND PRACTICE (KAP) OF ULTRA PROCESSED FOODS CONSUMPTION AMONG FEMALE COLLEGE STUDENTS"

**I) Socio-Demographic Information**

1. Name (in initials like ABC):
2. Age:
3. Education:

a) UG ☐ b) PG ☐

4. Type of Residence:

a) Home ☐ b) College Hostel ☐ c) Off Campus Accommodation ☐

5. Socioeconomic information:

| **Education of head of family** | |
|---|---|
| Profession or honours | |
| Graduate | |
| Intermediate or diploma | |
| High school certification | |
| Middle school certification | |
| Primary school certification | |
| Illiterate | |
| **Occupation of head of family** | |
| Legislators, senior officials and managers | |
| Professionals | |
| Technicians and associate professionals | |
| Clerks | |
| Skilled workers and shop and market sales workers | |
| Skilled agricultural and fishery workers | |
| Craft and related trade workers | |
| Plant and machine operators and assemblers | |
| Elementary occupation | |

| | |
|---|---|
| Unemployed | |
| **Monthly family income** ( ₹ ) | |
| ₹ >2,13,814 | |
| ₹ 1,06,850 - ₹ 2,13,813 | |
| ₹ 80,110 - ₹ 1,06,849 | |
| ₹ 53,361 - ₹ 80,109 | |
| ₹ 31,978 - ₹ 53,360 | |
| ₹ 10,703 - ₹ 31,977 | |
| ₹ <10,702 | |

**II) Anthropometric Assessment**

6. Height (cm): 7. Weight (Kg): 8. BMI (Kg/$m^2$):

**III) Prevalence of Ultra Processed Food Consumption**

9. Do you consume ultra-processed foods (e.g., instant noodles, packaged snacks, soft drinks, ready-to-eat meals)?

a) Yes ☐ b) No ☐

10. How do you consume ultra-processed foods?

| **Food Items** | **Daily** | **1-2 times a week** | **3-5 times a week** | **1-2 times a month** | **Never** |
|---|---|---|---|---|---|
| Instant food (e.g., noodles, pasta, soups, breakfast cereals) | | | | | |
| Packaged snacks (e.g., chips, biscuits) | | | | | |
| Soft drinks/sugary beverages | | | | | |
| Fast food (e.g., burgers, fries) | | | | | |
| Frozen processed meals | | | | | |
| Bakery items (e.g., cakes, pastries) | | | | | |
| Processed meats (e.g., sausages, nuggets) | | | | | |

11. What is the main reason for consuming ultra-high processed foods?

a) Convenience ☐ b) Taste preference ☐ c) Price ☐

d) Peer pressure ☐ e) Social media influence ☐ f) Lack of time ☐

g) Lack of cooking skills ☐

12. Where do you usually buy ultra-processed foods?

a) Supermarket ☐ c) Online delivery ☐

b) Local shops ☐ d) College canteen ☐

13. At what time do you most frequently consume ultra-high processed foods?

a) Breakfast ☐ b) Lunch ☐ c) Evening snacks ☐

d) Dinner ☐ e) Late night cravings ☐

14. How much do you typically spend on ultra-processed foods weekly?

a) < ₹100 ☐ c) ₹300-₹500 ☐

b) ₹100-₹300 ☐ d) ₹500 ☐

**IV) Knowledge on Ultra High Processed Foods**

15. Are you familiar with the term "ultra-high processed foods"?

a) Yes ☐ b) No ☐

16. Are you aware of the NOVA food classification system that categorizes ultra-processed foods?

a) Yes ☐ b) No ☐

17. Which of the following do you consider health risks of consuming ultra-high processed foods? (Select all that apply)

a) Obesity ☐ c) Heart Diseases ☐ e) Cancer ☐

b) Diabetes ☐ d) High blood pressure ☐ f) Don't know ☐

18. Do you think ultra-high processed foods contain artificial additives, preservatives and high amount of sugar/salt?

a) Yes ☐ b) No ☐

19. Do you think consuming ultra-processed foods can lead to nutritional deficiencies?

a) Yes ☐ b) No ☐

**V) Attitude Toward Ultra-High Processed Foods**

20. Do you think ultra-processed foods should be avoided?

a) Strongly agree ☐ b) Agree ☐ c) Neutral ☐

d) Disagree ☐ f) Strongly disagree ☐

21. Do you believe that ultra-high processed food consumption negatively affects health?

a) Strongly agree ☐ b) Agree ☐ c) Neutral ☐

d) Disagree ☐ f) Strongly disagree ☐

22. Do you think ultra-high processed foods are addictive?

a) Yes ☐ b) No ☐ c) Not sure ☐

23. Do you think ultra processed foods should have warning labels like tobacco products?

a) Yes ☐ b) No ☐

24. Would you be willing to reduce your consumption of ultra-processed foods if provided with healthier options?

a) Yes ☐ b) No ☐ c) May be ☐

25. How much do you care about the long-term health impact of consuming ultra-processed foods?

a) A lot ☐ b) Somewhat ☐ c) Not at all ☐

**VI) Consumption Practices of Ultra-High Processed Food**

26. How frequently do you prepare home-cooked meals instead of consuming processed foods?

a) Daily ☐ b) 3-5 times a week ☐ c) 1-2 times a week ☐

d) Rarely ☐ e) Never ☐

27. Do you skip meals and consume ultra processed foods instead?

a) Always ☐ c) Sometimes ☐

b) Rarely ☐ d) Never ☐

28. Have you ever tried to replace ultra-high processed foods with healthier alternatives?

a) Yes, successfully ☐ b) Yes, but failed ☐ c) No ☐

29. When hungry, do you usually opt for quick, ready-to-eat ultra-processed snacks?

a) Yes ☐ b) No ☐

30. Do you read nutrition labels before purchasing packaged food products?

a) Always ☐ c) Sometimes ☐

b) Rarely ☐ d) Never ☐

# APPENDIX-II

# KUPPUSWAMY SOCIOECONOMIC STATUS SCALE 2024

| **Education of head of family** | **Score** |
|---|---|
| Profession or honours | 7 |
| Graduate | 6 |
| Intermediate or diploma | 5 |
| High school certification | 4 |
| Middle school certification | 3 |
| Primary school certification | 2 |
| Illiterate | 1 |
| **Occupation of head of family** | |
| Legislators, senior officials and managers | 10 |
| Professionals | 9 |
| Technicians and associate professionals | 8 |
| Clerks | 7 |
| Skilled workers and shop and market sales workers | 6 |
| Skilled agricultural and fishery workers | 5 |
| Craft and related trade workers | 4 |
| Plant and machine operators and assemblers | 3 |
| Elementary occupation | 2 |
| Unemployed | 1 |
| **Monthly family income** ( ₹ ) | |
| ₹ >2,13,814 | 12 |
| ₹ 1,06,850 - ₹ 2,13,813 | 10 |
| ₹ 80,110 - ₹ 1,06,849 | 6 |
| ₹ 53,361 - ₹ 80,109 | 4 |
| ₹ 31,978 - ₹ 53,360 | 3 |
| ₹ 10,703 - ₹ 31,977 | 2 |
| ₹ <10,702 | 1 |