"ASSESSMENT OF KAP ON THE NUTRITIONAL STATUS, PSYCHOLOGICAL BEHAVIOUR AND PHYSICAL ACTIVITY OF ELDERLY DURING CORONA VIRUS DISEASE PANDEMIC"

DISSERTATION SUBMITTED

In Partial Fulfillment of the Requirement for the Award of the Degree of

MASTER'S PROGRAMME

IN

CLINICAL NUTRITION AND DIETETICS

BY

PARVATHY S

(Register No: SM19MCN010)

DEPARTMENT OF CLINICAL NUTRITION AND DIETETICS

WOMEN'S STUDY CENTER

ST. TERESA'S COLLEGE (AUTONOMOUS)

ERNAKULAM

MARCH 2021

CERTIFIED AS BONAFIDE RESERCH WORK

"ASSESSMENT OF KAP ON THE NUTRITIONAL STATUS, PSYCHOLOGICAL BEHAVIOUR AND PHYSICAL ACTIVITY OF ELDERLY DURING CORONA VIRUS DISEASE PANDEMIC"

DISSERTATION SUBMITTED

In Partial Fulfillment of the Requirement for the Award of the Degree of

MASTER'S PROGRAMME

IN

CLINICAL NUTRITION AND DIETETICS

BY

PARVATHY S

(Register No: SM19MCN010)

DEPARTMENT OF CLINICAL NUTRITION AND DIETETICS

WOMEN'S STUDY CENTER

ST. TERESA'S COLLEGE (AUTONOMOUS)

ERNAKULAM

MARCH 2021

CERTIFIED AS BONAFIDE RESERCH WORK

Signature of HOD **Signature of Guide**

"ASSESSMENT OF KAP ON THE NUTRITIONAL STATUS, PSYCHOLOGICAL BEHAVIOUR AND PHYSICAL ACTIVITY OF ELDERLY DURING CORONA VIRUS DISEASE PANDEMIC"

DISSERTATION SUBMITTED

In Partial Fulfillment of the Requirement for the Award of the Degree of

MASTER'S PROGRAMME

IN

CLINICAL NUTRITION AND DIETETICS

BY

PARVATHY S

(Register No: SM19MCN010)

DEPARTMENT OF CLINICAL NUTRITION AND DIETETICS

WOMEN'S STUDY CENTER

ST. TERESA'S COLLEGE (AUTONOMOUS)

ERNAKULAM

MARCH 2021

CERTIFIED AS BONAFIDE RESERCH WORK

Signature of Internal **Signature of External**

DECLARATION

I hereby declare that the thesis entitled **"ASSESSMENT OF KAP ON THE NUTRITIONAL STATUS, PSYCHOLOGICAL BEHAVIOUR AND PHYSICAL ACTIVITY OF ELDERLY DURING CORONA VIRUS DISEASE PANDEMIC"**submitted in partial fulfillment of the requirement for the award of the Degree of **Master's programme in Clinical Nutrition and Dietetics** is a record of original research work done by me under the supervision and guidance of **Ms.L.R.RAJANI**, Assistant Professor, Department of Clinical Nutrition and Dietetics, Women's Study Centre, St. Teresa's College(Autonomous), Ernakulum and that the thesis has not previously formed on the basis for the award of any degree work has not been submitted in part or full or any other degree/diploma/fellowship or the similar titles to any candidate of any other University.

Place: PARVATHY S

Date:

CERTIFICATE

I hereby certify that the dissertation entitle **"ASSESSMENT OF KAP ON THE NUTRITIONAL STATUS, PSYCHOLOGICAL BEHAVIOUR AND PHYSICAL ACTIVITY OF ELDERLY DURING CORONA VIRUS DISEASE PANDEMIC"** submitted in partial fulfillment of the requirement for the award of the Degree of **Master's Programme in Clinical Nutrition and Dietetics** is a record of original research done by Ms PARVATHY S during the period of her study under my guidance and supervision.

Signature of the HOD

Signature of the Research Guide
Mrs. L.R.RAJANI
Assistant Professor
Department of Clinical Nutrition and Dietetics
Women's Study Centre
St. Teresa's College, Ernakulum

ACKNOWLEDGEMENT

First and Foremost, I praise the "God almighty" for providing all His grace, strength that sustained throughout the study. His benevolence has made me strong and successful in all my academic pursuits.

I express our profound gratitude to Rev Dr. Sr. Vinitha, Provincal Superior and manager and Dr.Lizzy Mathew, Principal, **St. Teresa's College , Ernakulum** for supporting me in my entire academic endeavor.

I take this opportunity to express gratitude to Ms. Lekha Sreenivas Centre coordinator, Women's Study Centre, St. Teresa's College, Ernakulam who had been with all necessary help, care and guidance.

I express my sincere thanks to Ms Nair Supriya Damodaran, Head of the Department of Fashion Designing, St. Teresa's College Ernakulum for her constant support.

It's my pleasure to express my sincere thanks to Mrs. Ani Thomas Thottan, Head of the Department of Clinical Nutrition and Dietetics, St. Teresa's College, Ernakulam for her valuable advice and support.

I am deeply indebted to express my deepest sense of reverence and indebtedness to my guide,Ms. L.R.RAJANI, Asst. Professor, Department of Clinical Nutrition and Dietetics, St. Teresa's College Ernakulam for giving me the opportunity to work

under her guidance. Her friendly guidance and expert advice have been invaluable throughout all stages of the work. She has constantly encouraged and inspired me throughout my thesis and without her guidance my thesis would not have been possible. Her detailed and constructive comments, ideas and concepts had a remarkable influence on my entire thesis work.

I extend my sincere gratitude to all of the Department faculty of Clinical Nutritionand Dietetics for their valuable guidance and warm encouragement.

I would like to express my deepest gratitude to the administration of Sree Ramakrishna Mission hospital,Trivandrum and the faculty members of dietetics department for all the facilities provided for completing my survey.

I owe my deepest gratitude to all the people of CRA Residential Association for their responses for my survey which help me to get realistic results for my thesis work.

It is a duty of mine to acknowledge my sincere gratitude to Mr. SandeepSanthosh for all guidance in completing statistical analysis work for my study.

I would like to express my special thanks of gratitude to my friend Tiji George for her support in preparing thesis brochure.

My heartfelt thanks to each and every individual who participated in the study with their whole hearted support and co-operation without which this work will not be realized.

I cannot end without thanking my family members especially my parents whose constant support, encouragement and love. I have relied throughout my thesis. Their infallible love and support has always been my strength.

I am forever grateful to my friends and all my well wishers for their timely help and unconditional support.

ABSTRACT

"ASSESSMENT OF KAP ON THE NUTRITIONAL STATUS, PSYCHOLOGICAL BEHAVIOUR AND PHYSICAL ACTIVITY OF ELDERLY DURING CORONA VIRUS DISEASE PANDEMIC''

Covid pandemics have significant psycho-social impact.Among them, the elderly are more vulnerable.The study was conducted among 99 subjects of elderly sedentary men and women of Trivandrum district .The main objectives of the study was to assess the KAP of nutrition and life style habits of elderly, to identifythe psychological problems of selected subjects during pandemic, to determine the physical activities of elderly,to identify the eating pattern among elderly, to determine underlying disease contributes to any psychological problems ,to provide intervention program to the selected subjects.The study also emphasized on nutritional assessment of the subjects and to conduct nutritional intervention through nutritional education tool. Initially the questionnaire developed by the investigator was used to collect information from the subjects regarding, socioeconomic status, knowledge, attitude, practice, Medical history, anthropometric measurements, biochemical reports, clinical data and dietary pattern.Avalidated questionnaire - Geriatric Depression Scale was used to assess the psychological behavior of elderly.As per the collected data, it was proved that the subjects were minimal aware of healthy lifestyle and foods. It was found that majority of subjects belong to mild depression category during the pandemic.The data was collected, tabulated and analyzed by SPSSsoftware and of data was interpreted. Awareness was conducted among the selected 99 subjects through inter personal communication. A brochure was circulated among the subjects

regarding covid precautions, importance of a balanced diet and benefits of immune rich nutrients.

CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDIX

INTRODUCTION

1. INTRODUCTION

Coronavirus disease (COVID-19) is an infectious disease caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), which was first detected in December 2019 in the city of Wuhan, China (Jones,2020). Early on, diabetes and hypertension comorbidities were identified as risk factors for severe infection (J. Clin. Virol.,2020) and higher age a primary risk factor for death caused by the SARS-CoV2 (Rothan HA et al.,2020) . Conceivably, this dramatic change in lifestyle, resulting from immobilization due to hospitalization and bed rest, quarantine, and physical inactivity can cause a second-wave attack on the health and wellbeing of the infected as well as general population (Gasmi et al.,2020). According to the WHO (2020), the elderly is considered a risk of contagion from COVID-19 due to vulnerability and death due to physiological fragility caused by the aging process. And physical exercise in this situation becomes an essential tool for the efficiency of immune function during aging (Bartlett et al., 2018; Schroeder et al., 2019) .According to the United Nations, there were 703 million people aged 65 years or older worldwide in 2019, which implies that about 10% of our world population is at higher risk for negative prognosis under COVID-19 infection. Physical exercise is seen as the main ally for health promotion, preventing and protecting the organism from several diseases (Garber et al., 2011) .Older adults rank in the most at-risk segment of the population because the basal functional resilience, meant as the ability to cope with physical trauma and psychological stressors, is fading (Cesari et al., 2017).

Aging is characterized by several changes, including exacerbated inflammatory responses mediated by the innate immune system with reduced capacity to protect

against infections, cancer and wound healing, leading to more severe consequences of bacterial and viral infections and reduced response to vaccination (Nikolich-Žugich.,2019). Aging is physiologically associated with cognitive decline and impaired stress response (Bishop et al., 2010), with the spinal circuitry degeneration leading to progressive alterations of motor performance (Borzuola et al., 2020). This reduced resilience and cognitive impairment intimately coexist in the rampant -definitely endemics- frailty syndrome (Ofori-Asenso et al., 2019), which is known to be associated with disability, traumatic falls, and hospital admission (Eeles et al., 2012).The easing of COVID-19 lockdown on the older population has possibly brought effects comparable to the hospital-associated deconditioning. The disability debt earned during the lockdown will require an augmented need for care for older individuals suffering from the abovementioned geriatric conditions -functional disability- and psychosocial disorders, mainly isolation. The surviving older individuals who have not been infected with SARS-CoV-2 are definitely more fragile, malnourished, and more ill than the pre-COVID-19 era (Ngai et al., 2010)

The WHO defines elder abuse as a single, or repeated act, or lack of appropriate action, occurring within any relationship where there is an expectation of trust, that causes harm or distress to an older person (WHO.,2002).This includes both acts of omission and commission. It can range from physical, psychological to financial abuse and even frank neglect. Since the time COVID-19 started, incidents of family violence and abuse have been increasing against the elderly, and public warnings have been issued related to the same by the American Bar Association (Brooke J,2020)

Early in 2020, the World Health Organization voiced concerns about the effects COVID-19 might have on psychological wellbeing (WHO.,2020). However, actual

evidence of the psychological impacts of the pandemic is only starting to emerge, with a growing number of studies suggesting increased anxiety and depression during stay-at-home orders.The uncertainty and low predictability of COVID-19 not only threaten people's physical health, but also affect people's mental health, especially in terms of emotions and cognition, as many theories indicate.

According to Behavioural Immune System (BIS) theory (John et al.,2013), people are likely to develop negative emotions e.g., aversion, anxiety, etc. (Schaller et al.,2008) and negative cognitive assessment (Mortensen et al.,2010) for self-protection. Faced with potential disease threat, people tend to develop avoidant behaviourse.g., avoid contact with people who have pneumonia-like symptoms (Houston et al.,1994) and obey social norms strictly e.g., conformity (Schaller, et al.,2015). According to stress theory (Norris et al.,2002) and perceived risk theory (Slovic.,1987), public health emergencies trigger more negative emotions and affect cognitive assessment as well. These negative emotions keep people away from potential pathogens when it refers to the disease. However, long-term negative emotions may reduce the immune function of people and destroy the balance of their normal physiological mechanisms (kiecolt-Glaser et al.,2002)

In India 50% of the elderly population is malnourished. Balanced nutrient is very important for overall wellbeing. It becomes still important in perspective of elderly masses due to physiological changes in the body. Immunity weakens with proceeding age which is influenced by lack of nutrients and differed dietary habits (Grubeck-Loebenstien et al., 2002). Elderly are more prone to several infections also (Gavazzi et al., 2002). As people age, adequate nutrition propels the maintenance of health, physical performance and psychological wellbeing (Bates et al., 2002 and Nijs et al.,

2006). Poor nutritional status refers to an inadequate or even excessive intake or utilisation of the nutrients to meet the body's requirements (Joshi,2010)

Prevention and management of both chronic diseases and infectious diseases, such as SARS-CoV-2, can be tackled through early dietary intervention and use of functional foods. Functional foods are "natural or processed foods that contain biologically-active compounds; which, in defined, effective, and non-toxic amounts, provide a clinically proven and documented health benefit utilizing specific biomarkers for the prevention, management, or treatment of chronic disease or its symptoms" (Gur J et al.,2018)

Nutrition and diet are found to affect susceptibility in two ways: (1) by leading to chronic diseases or comorbidities that weaken the body—as 89.8% of fatalities from the disease had at least one comorbidity—or (2) by directly affecting the body's immune system and ability to fight off viruses (New York State Department of Health). Since the elderly already have declining immunity, it is substantially more important for them to receive all essential nutrients in recommended quantities while also managing chronic conditions using lifestyle changes and pharmaceuticals (Polamarasetti et al.,2020)

Restrictions and lifestyle changes during lockdown have been associated with poorer psychological wellbeing. Reduced social contact, feelings of isolation, and fear of contracting or spreading dangerous viruses have been historically linked to poor wellbeing (Bai et al., 2004;). Time spent in quarantine during previous disease outbreaks has been shown to have negative psychological effects (Brooks et al., 2020). Psychological symptoms (stress, anxiety, depression) have been shown to rise in tandem with time spent in lockdown (Ozamiz-Etxebarria et al., 2020). López-

Bueno et al. (2020) proposed that poorer psychological wellbeing and mental health during COVID-19 lockdown is associated with health behaviors such as alcohol consumption, diet, sleep, and physical activity. Heightened life stress has been linked to unhealthy eating (Greeno and Wing., 1994), and stressed people are more likely to crave food high in energy, fats, and sugars (Steptoe et al., 1998). Thus, it was expected that stressful changes and restrictions to daily life would lead to less-healthy eating habits.

Stress has also been implicated in poor sleep quality and disrupted sleep (Sanford et al., 2014). The COVID-19 pandemic has been linked to poor sleep quality in China (Xiao et al., 2020) and Italy (Casagrande et al., 2020), with over half of Italian respondents experiencing poor sleep quality. However, in Spain, the quality of respondents' sleep seemed to improve as the lockdown progressed (López-Bueno et al., 2020). Critically, poor sleep quality has been linked to negative emotions and mood (Baglioni et al., 2010).Lower rates of physical activity have been associated with feelings of social isolation (Robbins et al., 2018; Werneck et al., 2019), which may already be exacerbated by other restrictions of lockdown. It has been well-documented (Landers and Arent, 2007) that physical activity is beneficial for mental health and wellbeing, and it would be assumed that any restrictions to physical activity would lead to poorer wellbeing.

Elderly are the worst affected among all during current lockdown situation due to the global COVID-19 pandemic.Aging is the leading risk factor for a variety of chronic diseases, including cancer, metabolic, cardiovascular, and neurodegenerative diseases, which result in a poor quality of life and an increase in morbidity and mortality. Among several other comorbidities, the aged population is more prone to suffer from coronavirus infection and the association of aging with a higher vulnerability to

COVID-19 infection is a subject of major importance(Esteve et al.,2020). The increasing proportion of people growing old, demands expanded knowledge of how people can experience successful aging. Having a good life while growing old is dependent on several factors such as nutrition, physical health, the ability to perform activities of daily living, lifestyle and psychological health. Furthermore, unhealthy food intake is found to be a modifiable risk factor for depression in elderly people. To promote elderly's health and wellbeing, the influence of nutrition, lifestyle, physical functioning, and social support on psychological distress needs exploring.

Thepurpose of the study was to investigate KAP toward the changes in the psychological behavior and physical activity of elderly and to assess the diet pattern during covid pandemic.

SIGNIFICANCE OF THE STUDY

Pandemics have significant psycho-social impact. Health anxiety, panic, adjustment disorders, depression, chronic stress and insomnia are the major offshoots. Among them, the elderly are especially vulnerable. Social distancing, though a major strategy to fight COVID-19 is also a major cause of loneliness, particularly in settings like nursing-care or old-age homes which is an independent risk factor for depression, anxiety disorders and other problems. The significance of the study is to investigate KAP towards the nutritional and lifestyle habit of elderly and to assess the mental health during covid pandemic.

Keeping all the points in my mind the focus of my study was on identifying the mental health, nutritional status and physical activity of the elderly during lockdown

and proper awareness was given through nutritional education. So the main objective of my study includes:

Objectives of the study

- To assess the KAP of nutritional and life style habits of elderly
- To identify the psychological problems of selected subjects during pandemic
- To determine the physical activities of elderly
- To assess the nutritional status of selected subjects
- To identify the eating pattern among elderly
- To determine underlying disease contributes to any psychological problems
- To provide intervention program to the selected subjects

REVIEW OF LITERATURE

2. REVIEW OF LITERATURE

The review of literature pertaining the study entitled **"ASSESSMENT OF KAP ON THE NUTRITIONAL STATUS, PSYCHOLOGICAL BEHAVIOUR AND PHYSICAL ACTIVITY OF ELDERLY DURING CORONA VIRUS DISEASE PANDEMIC"** are discussed under the following headings:

2.1. Prevalence of corona virus in elderly population

2.2. Corona virus disease and impact of elderly during lockdown

2.3. Aging and Health

2.4. Nutrition related problems of elderly

2.5. Clinical Manifestation of COVID-19 in Geriatric Population

2.6. Geriatric Risk Factors for COVID-19

2.7. Physical activity of elderly

2.8. Psychological problems faced by elderly

2.1. Prevalence of Corona virus in elderly population

(PadmshreeMudgal et al.,2020) reported that the elderly population in India has been the foremost vulnerable group in COVID-19 pandemic, contributing to 53% of the reported fatalities due to COVID-19. The SARS-CoV-2 virus interacts with angiotensin-converting enzyme 2 (ACE2) on the host cell surface with its S (spike)

glycoprotein then undergoes endocytosis. Inside the cell, the virus replicates and triggers the discharge of cytokines which may induce an inflammatory response. Chronic increase in systemic inflammation has been seen within the elderly, which is further aggravated on SARS-CoV-2 viral infection . Patients with chronic respiratory diseases have shown significant increase in ACE-2 expression which can increase viral load just in case of COVID-19 infection. COVID-19 patients also show elevation of cardiac (cTnI) which puts CVD predisposed patient at a better risk. The elderly in our country need extra care to be protected from diseases and proper disease management in case of disease manifestation. (Hoffmann M et al.,2020)

(Philip M et al.,2020) said that the elderly population is the most vulnerable group in the present COVID- 19 pandemic. According to US based National Bureau of Economic Research (NBER) July data, COVID-19 affects the older people more severely. The 'case fatality rate' or CFR which is the share of deaths in all confirmed cases is highest in the older age groups. The younger 74% of the population (up to 39 years old) account to only 10% of all COVID-19 related deaths, while the 60+ year's age group, making up just 9% of the population has an immensely large share of 53% of all deaths. The 60+ years people, amount to merely 15% of India's confirmed cases but 53% of deaths because of COVID-19.

(Liu Y et al.,2020) the patient's ability to control viral load will determine whether a patient will have mild or severe COVID-19 symptoms. To fight the virus, the immune system has to first recognize the viral infection, then effectively induce a response to destroy and eliminate SARS-CoV-2. Each of those mechanisms are known to be dysfunctional and increasingly heterogeneous in older people. (Mueller AL et al.,2020) state that during aging, there is a gradual decline in immune function called

immunosenescence, which hampers pathogen recognition, alert signaling and clearance. Aging and dysfunctional cells arrest their cell cycle and can become epigenetically locked into a proinflammatory state in which they secrete cytokines and chemokines. During aging there's also a chronic increase in systemic inflammation called inflammaging, which arises from an overactive, yet ineffective alert system. Immunosenescence of the innate and adaptive immune system in those over 60 years of age is a major determinant in severity of COVID-19.

According to (Weaver LK.,2017) a decline in neutrophil activity and migration, depletion of T cells, a condition known as lymphopenia, and less diverse and less responsive B cells are observed with aging. In older patients, the rapid and uncontrolled inflammatory signaling cascade which typically occurs in the later stages of infection, known as a "cytokine storm," triggers inflammation in major tissues such as the lungs, kidneys, heart, liver, blood vessels and brain. The vascular inflammation results in complement associated micro vascular injury and thrombosis in severe COVID-19 cases. All these factors together cause increased risk of bleeding (coagulopathy), hypoxia and finally multi-organ failure.

2.2. Corona virus disease and impact of elderly during lockdown

In December 2019, an epidemic of pneumonia of unknown cause was reported in Wuhan, Hubei Province, China. Pneumonia cases were epidemiologically connected to the Human Seafood Wholesale Market. According to World Health Organization, Corona virus disease (COVID-19) is an infectious disease which is caused by a newly discovered corona virus. Most people infected with the COVID-19 virus will experience mild to moderate respiratory illness and recover without requiring special treatment. Older people and other people with underlying medical problems like

disorder, diabetes, chronic respiratory disease , and cancer are more likely to develop serious illness.

The global epidemic of coronavirus disease 2019(COVID-19) has presented a serious threat to public health worldwide. COVID-19 is that the results of infection with severe acute respiratory syndrome corona virus 2 (SARS-CoV-2) that was first isolated and identified in patients who were exposed at a seafood market in Wuhan City, Hubei Province, China on December 2019 (Zhu N et al., 2020). As of March 15, 2020 SARS-CoV-2 has spread rapidly to 34 provinces and cities in China; infection has been reported in 144 countries across five continents (World Health Organization, 2020). The COVID-19 epidemic represents a substantial challenge for governments, individuals, and society as a whole (Shi et al.,2021).

(Zhu N et al.,2019) reported that patients infected with SARS-CoV-2 can present a wide range of symptoms ranging from mild to severe. Fever, cough, and shortness of breath are the most common symptoms reported in 83, 82, and 31% of patients.In those patients who develop pneumonia, multiple mottling and ground-glass opacity are described on chest X-ray. Patients that develop acute respiratory distress syndrome may worsen rapidly and die of multiple organ failure(Wang D et al.,2020). It has also been reported that about 2–10% of the patients with COVID-19 had gastrointestinal symptoms such as vomiting, diarrhoea, and abdominal pain.Diarrhoea and nausea preceded the development of fever and respiratory symptoms in 10% of patients (Han Y, et al., 2020)

This Virus is demonstrated as a respiratory disorder and its incubation period is 2 to 14 days (Lauer et al., 2020). Its symptoms are:

- Dry cough
- Fever
- Shortness of breath
- Runny nose
- Sore throat
- Muscle joint pains
- Diarrhoea
- Loss of senses like smell and taste in some cases.

The coronavirus is transmitted and spread within the following cases:

- Person getting into contact with the droplets or secretions of somebody sneezing or coughing and float down the tract.
- Physical contact with the virus through hands and taking it to the mouth

Therefore so as to decrease the danger of its spread it's advised to stay washing your hands and avoid touching your face so as to eliminate the danger just in case an individual is exposed there to accidently. According to (Krisinformation.,2020) adopting the hygienic habits usingthe alcoholic hand sanitizers can cause increased chance of staying safe from the virus.

According to (Dhama K et al., 2020), as the current Coronavirus Disease (COVID-19) pandemic spreads across the globe, the elderly population (60 years and above) become particularly vulnerable . Mortality data from different countries and various studies show that the elderly population is more susceptible compared to their younger counterparts . However, all elderly don't seem to be equally susceptible to COVID-19.

(Mohamadi M.,2020) reported that in the COVID-19 pandemic, elderly individuals (with the age of 65 years and above) are more vulnerable to the SARS-CoV-2 infection complications because of altered immune system response and therefore the higher rate of underlying comorbidities. A vast majority of mortalities are reported in elderly patients; thus, this study aimed to judge complications of COVID-19 in elderly patients. (Mueller AL et al.,2020) observed that the patient's ability to control viral load will determine whether a patient will have mild or severe COVID-19 symptoms. To fight the virus, the immune system has to first recognize the viral infection, then effectively induce a response to destroy and eliminate SARS-CoV-2. Each of those mechanisms are known to be dysfunctional and increasingly heterogeneous in older people.

(Singh A K et al.,2020) explained During aging, there is a gradual decline in immune function called immunosenescence, which hampers pathogen recognition, alert signaling and clearance. Aging and dysfunctional cells arrest their cell cycle and can become epigenetically locked into a proinflammatory state in which they secrete cytokines and chemokines. During aging there is also a chronic increase in systemic inflammation called inflammaging, which arises from an overactive, yet ineffective alert system. Immunosenescence of the innate and adaptive immune system in those over 60 years of age is a major determinant in severity of COVID-19. (Weaver L.K et al., 2017) explained that a decline in neutrophil activity and migration, depletion of T cells, a condition known as lymphopenia, and less diverse and less responsive B cells are observed with aging. In older patients, the rapid and uncontrolled inflammatory signaling cascade which typically occurs in the later stages of infection, known as a "cytokine storm," triggers inflammation in major tissues such as the lungs, kidneys, heart, liver, blood vessels and brain. The vascular inflammation results in complement associated microvascular injury and thrombosis in severe COVID-19 cases. All these

factors together cause increased risk of bleeding (coagulopathy), hypoxia and finally multi-organ failure.

(Bansal M,2020) found that the situation is further exacerbated in older adults with underlying medical conditions, such as hypertension, diabetes, cancer, kidney disease, cardiovascular disease (CVD) and chronic obstructive pulmonary disease (COPD). Such patients have been linked to more hospitalization and intensive care unit (ICU) admissions and have reported increased morbidity and mortality rates.

2.3. Aging and Health

(Campion EW., 1998) explained that various authors have distinguished two stages in aging. The primary stage is characterized by a gradual functional decline as a result of the traditional aging process. The second stage, against this, is caused by progressive illness or catastrophic events. Ideally, people would reach a complicated age while they're within the first stage, with a brief second stage of functional and cognitive impairment. According to (Haveman-Nies et al., 2003) healthy ageing is described by explaining according to health status. A healthy lifestyle at older ages is positively related to a reduced mortality risk and to a delay in the deterioration in health status. This postponement of the onset of major morbidity is likely to go together with a compressed cumulative morbidity. Therefore, health promotion at older ages can contribute to healthy ageing.

(Vellas et al.,1992) stated that two health patterns associated with ageing are distinguished by a gradual functional decline related to the traditional ageing process, and a comparatively rapid decline in functional status thanks to progressive illness or a catastrophic event, like Alzheimer's disease or a hip fracture. (Gerst-Emerson K et

al.,2015) said that the biggest problem faced by elderly today is Loneliness and anxiety. Cognition Impairment, hearing loss, and various disabilities make the elders more isolated and lonely.

(Mane A. B.,2016) found that aging brings along with it many health related issues and challenges. Aging itself is a disease which requires proper management and care. Very few people reach old age completely free of disease .With aging, there is a decline in the normal functioning of the body which results in poor mobility, hearing, vision, inability to eat and digest food properly, a decline in memory, the inability to control certain physiological functions and various other chronic health problems. Poor metabolism, low BMI, compounded by less physical activity leads to anorexia coupled malnutrition. Malnutrition leads to weight loss, reduced muscle mass, decreased immunity, frailty, deficiency of micro and macro nutrients causing anemia, osteoporosis, electrolyte imbalance and many other complications. The most common chronic diseases afflicting the elderly are: cardiovascular disease, adult onset diabetes, arthritis, kidney and bladder problems, dementia, Parkinson's disease, eye disease, osteoporosis, enlarged prostate, Alzheimer’s disease, and depression. The incidence of chronic diseases would also increase in the elderly with an increase in aging population . This would dramatically increase the disease burden and health care requirements. Cardiovascular diseases (CVD; coronary artery, cerebro-vascular, and peripheral vascular diseases) are a leading cause of mortality among the elderly in India. CVD accounts for one third of elder mortality, with 10–12% in urban areas and 4–5% in rural areas. It is well established that conventional risk factors such as, smoking, hypertension, diabetes mellitus, obesity, unhealthy diet, and reduced physical activity together account for more than 95% of risk factors for CVD in urban areas. Changing lifestyles in rural India, modern amenities, and less physical labor are increasing

cardiovascular risk factors among elderly in rural India with time. Adult onset, type 2 diabetes is a major health problem among the elderly and is on a rise in India. National data of 2004 and 2014 suggest notable increases in prevalence of diabetes among urban elderly (7%–11%), those above 75 years of age (3%–5%) and rural elderly(3%–9%). The number of reported cases and the heterogeneity in clinical presentations appeared to increase higher among the males than females (Kutty V. R et al.,2014) . Diabetes requires long-term medication and management hence puts increased economic burden on the family unit (Apicella M et al.,2020)

2.4. Nutrition related problems of elderly

According to (GregorVeninsek., 2016) explained that old age goes hand in hand with nutrition and metabolism problems. Food intake can be too high, too low or just inappropriate regarding individual's needs, which can change with time and disease. Adequate nutrition thus requires precisely matched short term needs and intake of energy and nutrients.Old age goes hand in hand with nutrition and metabolism problems. Food intake can be too high, too low or just inappropriate regarding individual's needs, which can change with time and disease. Adequate nutrition thus requires precisely matched short term needs and intake of energy and nutrients

(GregorVeninsek., 2016) reported that malnutrition represents an important problem; its extent depends on the population. It is estimated that more than one third of the USA population aged 65 years or more is obese. The share of obese people is growing with age but starts declining after 75 years. Well nourished are 8.5 – 62.4 %, at risk for malnutrition 31.9 – 53.4 % and malnourished 5.8 – 50.5 % of elderly people. Worst nourished are those included in rehabilitation and hospitalized, better off are those in nursing homes and best, as expected, those who live in the community.

(Gregor Veninsek.,2016) is also explained that the goal of aging society is to keep their members in good health and autonomous. Age related changes in nutrition and age and disease related changes in metabolism can promote more or less expressed changes in the structure of tissues and organs that result in decreased function (mobility problems, falls), changes in body strength or form (fractures, deformation) and in changed cognitive function. To be successful, timely recognition of malnutrition and its causes, as well as timely recognition of metabolic changes is required for the appropriate planning and implementation of nutritional interventions.

(Weggemans et al., 2009) found that it must not be forgotten that malnourishment is not only about lack of energy and macro nutrients, as elderly are often vitamin D and vitamins B deficient.The combination of above mentioned factors can manifest itself as protein-energy malnutrition, cachexia or sarcopenia. There are nutrition and metabolic differences between these conditions, although there is also a considerable overlap and manifestation is independent of whether an individual is under, normal or overweight. There is interplay of differently expressed changes in hormone activity, energy intake, activity, neural loss, muscle atrophy and cytokine expression

(Groot et al.,2016) found that while most will be in good health, this population will be confronted with the potential impact of the ageing process which can result in a decreased quality of life, illness and disease. Research over the past number of decades has shown that adequate nutritional status can play a key role in preventing or delaying the progression of age-related diseases such as CVD, reduced cognitive function and osteoporosis. However, physiological and social changes such as decreased food intake, impaired sensory perception, malabsorption, declining activity and increased disability increase the risk of inadequate nutritional status.

2.5. Clinical Manifestation of COVID-19 in Geriatric Population

According to (WuZ et al.,2019) the clinical presentation of COVID-19 infection is variable and ranges from a lack of symptoms to symptoms that are mild, severe, and life-threatening. In addition to fever and cough, dry cough is an important and common clinical manifestation. Coughing is reported in 60–80% of COVID-19 patients. Other respiratory symptoms include like dyspnea, sore throat, and rhinorrhea .Clinical manifestations have included anorexia, myalgia, asthenia, headache, anosmia, diarrhea, and cardiovascular complications .The most common symptom of infection is fever. However, elderly patients frequently have a low intensity fever or no fever, even in severe cases . Among clinical presentations of COVID-19, presence can differ between elderly and young/middle-aged individuals.

(Wang L et al., 2020) found that Older adults also presented a large variety of symptoms including fatigue, with or without myalgia, gastrointestinal symptoms (diarrhea, nausea/vomiting, abdominal pain), anorexia, headache, dizziness, and others. (Wang L et al.2020) also found that presence of dyspnea, low lymphocyte count, or cardiovascular and lung comorbidities in the elderly population were all factors predictive of worse disease progression.(Neumann-Podczaska et al.,2020) said that the most common comorbidities amongst the elderly COVID-19 population were hypertension, cardiovascular disease, diabetes, chronic lung disease (such as COPD) and hypercholesterolemia. A high coherence was observed between studies, with data pertaining to over 2000 patients in total. Despite being the most commonly observed comorbidity.

(Schiffrin E L et al.,2020) explained that hypertension, and its associated therapeutic drugs (ACE inhibitors/ARBS), are yet to show an association with the SARS-CoV-2

infection . Moreover, in a recent study by (Mehra M R et al.,2020) it was shown that underlying cardiovascular disease, COPD, and current smoking were all associated with a higher mortality rate amongst hospitalized COVID-19 patients. Their findings also concluded that hypertension, hyperlipidemia, and diabetes were not factors independently predictive of death in this disease. Additionally, (Lippi G. Et al.,2020) estimated that patients with COPD were about five and a half times more likely to develop severe infection due to SARS-CoV-2 . Given that comorbidities in older individuals act as detrimental prognostic factors, careful attention to underlying disorders and their association with SARS-CoV-2 infection, through up-to-date scientific literature, is necessary to avoid worse prognosis

(Jin JM et al.,2020) is explained that SARS-CoV-2 infection reportedly involves elderly men more often than elderly women; however, infection in elderly patients is also reported in Middle East respiratory syndrome (MERS)-CoV . (Liu, K et al.,2020) found that age-specific detailed analysis of COVID-19 symptoms has not been performed. However, the possibility of non-specific and atypical clinical symptoms in elderly patients is highly expected, as is the case in other diseases. Moreover, higher frequency of severe disease and mortality is expected along with need for intensive care unit (ICU) hospitalization in elderly patients. The most frequent laboratory hematological finding in critically ill COVID-19 patients is severe lymphocytopenia (<800 cells/μL). This seems to be more pronounced in older patients .Compared to the people <60 years of age, those who are >60 years of age display higher levels of blood urea nitrogen, lactate dehydrogenase activity, and inflammatory indicators

2.6. Geriatric Risk Factors for COVID-19

(GarnierCrussard et al.,2020) found that COVID-19 appears to have a comparative pathogenic potential as SARS-CoV and MERS-CoV,6 more established grown-ups are probably going to be at expanded danger of serious diseases, course of intricacies, inability, and demise, as seen with flu and respiratory syncytial viral infections. The outcomes of potential pestilences in long-term care offices could be serious on a populace of more seasoned grown-ups who are by definition delicate and immunologically credulous towards this infection, regardless of whether the danger is obviously for the second principally hypothetical. Accordingly, it appears to be fundamental for limit the danger of spreading the infection in offices really focusing on more seasoned patients no matter what. This could mean extreme isolate measures for staff individuals who have remained in high-risk zones or have been in close contact with potential cases. In the event that any associated case with COVID-19 disease happens, move to a particular office straightaway is urgent since long-term care offices are not enough prepared to successfully oversee case regulation. While sitting tight for the exchange, setting the patient in a solitary room, wearing a veil (N95 or FFP2 respirators for medical services specialists), and cautious hand cleanliness utilizing alcohol-based hand rub (or cleanser and water when hands are apparently dirty) are the key avoidance measures to restrict spread of COVID-19. They should likewise be joined with eye insurance and deliberate utilization of dispensable pullovers and gloves to give the ideal degree of security.

(Wang D et al.,2020) explained that clinical management of COVID-19 should be guided by the World Health Organization and the Centers for Disease Control and Prevention. There is no specific recommendation for older adults. The Centers for

Disease Control and Prevention state that there is no specific antiviral treatment recommended, and patients should receive supportive care to help relieve symptoms. For severe cases, treatment should include care to support vital organ functions. Secondary prevention and care of general complications could also be a major issue in older patients. Indeed, in seasonal influenza, for example, a large proportion of deaths are related to decompensation of comorbidities and complications occurring after the infection. Particularly, reducing incidence of venous thromboembolism, catheter-related bloodstream infection, pressure ulcers, falls, and delirium is recommended. These measures should be adapted to comorbidities, polypharmacy, and frailty of older patients. We assume that they could also be crucial in case of COVID-19 in older adults.

2.7. Physical activity of elderly

According to (Ernstsen et al.,2019) said that physical fitness can also help reduce the risk of acute life threatening events . To maintain these effects sustained, optimally lifelong physical activity is required, since acute benefits are transient and dissipate over time, unless physical activity stimulus is repeated. However, knowledge about acute impact of single exercise bouts might facilitate the motivation and communication with patients to take up more activity now. The current crisis could potentially be a window of opportunity, a learning moment to initiate long-term activity.

(Oikawa et al.,2019) is explained that older people should be engaging in physical activity and exercise programs that reflect current evidence and are in line with current guidelines. Exercise programs should include a mix of strength, balance, and aerobic exercise.

(Hooker SP et al.,2008) explained that physical activity exerts a major influence on human metabolism. Physical activity acutely increases glucose uptake, thus lowering circulating blood glucose level. This uptake by contracting skeletal muscles takes place through insulin independent mechanisms. A single exercise bout also induces beneficial metabolic effects after exercise. Muscle insulin sensitivity is increased for up to 48 h after exercise in healthy individuals.

It is essential that health systems consider how best to support older people to remain physically active during this crisis. Recommendations from a health professional can increase the likelihood of people engaging in physical activity. It is, therefore, imperative that health professionals discuss the importance of remaining physically active with older people and support them to incorporate physical activity into their day. Consultation with or referral to specialists in exercise prescription such as physical therapists or exercise physiologists can be used to provide individualized advice about an exercise program tailored to an older person's health conditions, functional abilities, environment, and personal preferences and goals. (BAppScPhysio et al., 2020)

According to (Frances et al., 2020) older people and health professionals working with older people need to have ready access to trustworthy resources to support physical activity and exercise in the home environment. It will not always be practical for all older people to receive individualized plans from a health professional. Resources should, therefore, enable older people or their carers to identify the exercises that are most appropriate for them, promote safety, and provide guidance as to when specialist advice is required. Online resources are relatively easily and cheaply disseminated and can provide video demonstrations of exercises. It is, therefore, essential that physical

activity and exercise are key components of current and future pandemic plans, particularly for vulnerable groups.

(Rogerson M et al.,2020) mentioned that if leaving one's house is not permitted, staircases can be used for exercising the lower extremities. Depending on the speed, staircase walking can also function as a cardiovascular exercise. People with compromised balance should hold on to the rails, in this case use of gloves is recommended and washing hands obligatory. A large number of exercises for improving cardiovascular and muscular fitness, as well as balance can be performed even in very small spaces without devices. Walking in place or around the apartment, jumping and hopping are such options. Similarly to walking outside, volume and intensity should be increased only gradually. Muscle strengthening exercises can be carried out using elastic bands, if available. If not, exercises, such as sit up, push up, squats etc., all using nothing but one's own body weight, are a perfect option. All these exercises can be modified to accommodate for less well trained or elderly people

According to (Physical Activity Guidelines Advisory Committee.,2018) strong meta-analytic evidence demonstrates the anxiolytic effect of acute relatively short (20 to 30 min) activity bouts in adults and older adults. Physical activity, irrespective of intensity and time of day at which activity is performed, can acutely improve various sleep outcomes . Single short (10–20 min) physical activity bouts lead to improved cognition, with most consistent results for domains of executive function

2.8. Psychological problems faced by elderly

According to (Brooks SK et al.,2020) while quarantine and social distancing measures seem indispensable as of now, possible detrimental social, psychological, health and

economic consequences must also be considered. Psychological impact of quarantine can be wide-ranging, substantial and potentially sustained. Symptoms include emotional disturbance, depression, stress, low mood, irritability, insomnia, post-traumatic stress symptoms and anxiety .Little is known about the psychological effects of less rigorous, but prolonged measures of confinement.

(Banerjee et al., 2020) mentioned that the uncertainty and fear of the pandemic can have increased effect on the minds of the aged, as they are aware of their vulnerability. The fear of death stays lost in the existential fear of losing their loved ones and guilt of possibly being the carriers of the infection. This can lead to significant 'what after me' issues and self-neglect, which can in turn lead to non-compliance to the prescribed standards of precautions. Due to generation limitations and sensory and cognitive deficits, they may be unaware of the updates related to the COVID-19 situation making them easy targets of misinformation and inadequate precautionary measures are followed. The effects of the quarantine can be paramount leading to loneliness, physical distancing from their loved ones, grief, anxiety and chronic stress that can have long-standing psychological effects. Preliminary research so far has shown increased incidence of depressive disorders, complex post-traumatic stress (PTSD) and adjustment reactions in the elderly.

Furthermore, increased suicidal ideations and attempts consequent to stress, on the background of the already existing suicidality risk in the elderly, is an added concern. Any form of stress is associated with decrease in immunity that can compound the already weakened physiological defence-systems in the elderly.Also, under-reporting of the psychiatric symptoms has also been observed during the COVID-19 pandemic in a recent study done in elderly. (Armitage et al., 2020).

(Aylaz et al., 2012) explained this leads to under-detection of symptoms, faulty treatment and increased prevalence of them being asymptomatic carriers. All these factors can have an overall detrimental effect on public health, as the neglected elderly can serve as vulnerable 'hidden pockets' of viral load that can contribute to increased infection spread. Many of the seniors are living alone, where basic living amenities are a regular problem due to lack of travel options and scarce domestic help during the lockdown. Loneliness is a potent risk factor for depression and cognitive disorders, especially when chronic and associated with lack of physical activity.

METHODOLOGY

3. METHODOLOGY

This chapter deals with the methodology adopted for the study. Methodology in research is defined as the systematic method to resolve a research problem through data gathering using various techniques, providing an interpretation of data gathered and drawing conclusions about the research data. Essentially, a research methodology is the blueprint of a research or study (Murthy et al., 2009).

The procedures and methods followed during the study entitled **"ASSESSMENT OF KAP ON THE NUTRITIONAL STATUS, PSYCHOLOGICAL BEHAVIOUR AND PHYSICAL ACTIVITY OF ELDERLY DURING CORONA VIRUS DISEASE PANDEMIC"** are explained under the following headings:

3.1) Assessment of knowledge, Attitude, Practice of the selected subjects

3.1.1) Formulation of assessment tools

3.1.2) To assess the psychological behaviour of selected subjects

3.2) Selection of subjects

3.3) Selection of area

3.4) Collection of data

3.4.1) Anthropometric measurements

3.4.1.1) Height

3.4.1.2) Weight

3.4.1.3) Body Mass Index

3.4.2) Biochemical analysis

3.4.3) Dietary assessment

3.4.4)Geriatric Depression Scale for elderly

3.5)Development of an educational tool to create awareness among selected subjects

3.6) Analysis and interpretation of data

3.1) Assessment of Knowledge, Attitude, Practice of the selected subjects

A Knowledge, Attitude and Practices (KAP) survey is a quantitative method that provides access to quantitative and qualitative information. (Médicins du Monde 2011).

A self structured questionnaire was used to assess the knowledge, attitude, practice of the selected subjects regarding the nutritional and lifestyle habits of elderly.

3.1.1) Formulation of assessment tools

Questionnaire was used to collect the information required for the study. A questionnaire is simply a list of mimeographed or printed questions that is completed by or for a respondent to give his opinion (S Roopa et al., 2012). Appropriate data gathering tool is devised with the due reference to the objectives of the present study an interview schedule which is defined as an oral questionnaire that permits an exchange of ideas and information is used for data collection it is unique as it involves gathering data through direct verbal interaction between the interview and interview that be feels free to express himself fully and truthfully (Kothari 2004)

Various questions useful in the field of study were included in the schedule. Main areas covered were information gathering socioeconomic status, knowledge, attitude, practice,

Medical history, anthropometric measurements, biochemical reports, clinical data and dietary pattern.

3.1.2) To assess the psychological behaviour of selected subjects

To identify the psychological behaviour of selected elderly, rating is done using Geriatric Depression Scale. The Geriatric Depression Scale (GDS) is a screening test originally developed by J.A. Yesavage and colleagues in 1986 that is used to identify symptoms of depression in older adults. The Geriatric Depression Scale: Short Form is a 15-question screening tool for depression in older adults that takes five to seven minutes to complete and can be filled out by the patient or administered by a provider with minimal training in its use.

3.2) Selection of subjects

"Sampling as the process of selecting a sample from a population" (Kothari, 2004). A sample is a group of people, objects, or items that are taken from a larger population for measurement. The sample should be representative of the population to ensure that we can generalize the findings from the research sample to the population as whole (Kam.C.D,2013).

Technique of sampling for the survey used was purposive sampling method. Ninety nine elderly were selected as subjects with the age group of 60-80 years both male & female for this survey.

Inclusion criteria:

All elderly men and women without Covid

All elderly men and women with lifestyle diseases

Exclusion criteria:

All elderly men and women with covid

All elderly > 80 yrs excluded from the study

All elderly with multiple chronic conditions.

3.3) Selection of area

The area selected for the study was CRA residential Area, Trivandrum .This area was selected because it's easily convenient and the availability of subjects is more and lifestyle maintained by older adults having a sedentary lifestyle. The food habit and lifestyle pattern are highly influenced by increased availability of food. The data was also collected from Sree Ramakrishna Mission Hospital Trivandrum, this hospital is selected because it is nearby house.

3.4) Collection of data

Data was collected for the study through well-structured questionnaire. The sample was collected in two forms .One was by interview schedule in hospital and the other was by circulating google forms .

Data collected for the study includes;

- Background information of the selected subjects such as age, religion, domicile, family income, occupation, phone number was also together socio demographic collected.
- Data such as Knowledge, Attitude and Practice, medical history, physical activity were also collected.

- Geriatric Depression Scale was used to assess the psychological behaviour of selected subjects
- Anthropometric, Biochemical, Dietary assessments were also carried out among the selected subjects
- The details regarding dietary assessment and eating pattern were taken through food frequency table and 24-hour recall method.

3.4.1) Assessment of Anthropometric measurements

Anthropometric measurement is an essential part of nutritional assessment in geriatrics because it allows the determination of conditions of malnutrition, overweight and obesity, loss of muscle mass, gain or loss of fat mass, and the redistribution of adipose tissue(Sánchez-García et al.,2007).Common valuable parameters measured include height, weight and other measurements. The measurements used are given below:

3.4.1.1) Height

The length or height is a very reliable measure that reflects the total increase in size of the individual.(deonis et al., 1996)

The height is assessed using a stadiometer without shoes with the subject standing erect on a flat surface or on a platform of the weighing scale, with arms hanging naturally on the side. The head should be held erect. Height is measured in centimetres or inches. In this study height was measurement using stadiometer with nearst 0.5 cm from the selected subjects.

3.4.1.2) Weight

Body weight is the most widely used and simplest reproducible anthrometric measurements for the evaluation of nutritional status of an individual. The subject was

made to stand in a straight position on the weighing machine and recorded the correct reading in the weight balance.

Body weight is a sample measure of total body components and growth (deonis et al., 1996).The weight is measured using weighing machine from the selected 99 subjects.

3.4.1.3) Body Mass Index

BMI of each respondent was calculated by dividing weight (in kg) with height (in meter2). The ratio of weight in Kg and height in meter square is referred to as Body Mass Index (BMI). (WHO, 2004)

BMI, formerly called the Quenelles Index, is a measure for indicating nutritional status of an individual.

BMI= Weight (kg) /Height (m^2)

TABLE NO.3.1: Elderly's BMI can be classified based on the following criteria (Winter et al., 2014)

Category	**BMI(kg/m^2)**
Underweight	**<23**
Normal	**23 – 30**
Overweight	**>31**

3.4.2)Biochemical analysis

The biochemical assessment means checking various blood parameters in blood. An ideal biochemical test should be sensitive, easy to carry out, inexpensive, on-invasive and should reveal the information of the extent of the tissue and saturation rather than short term fluctuations in the diet, biochemical tests were conducted in blood (Shrivastava et al., 2013)

In this study bio chemical values of blood sugar, blood pressure, and cholesterol level are collected from medical form of selected 99 subjects.

3.4.3)Dietary assessment

Dietary assessment was done using 24 Hour Recall method and food frequency questionnaire.

24 hour recall

The 24-hour dietary recall (24HR) method provides quantitative information on individual diets. The international standard approach uses the multiple pass 24HR technique, in which the respondent recalls foods and beverages consumed and their quantities in the past 24 hours.

A single 24 hour provides an estimate of mean intake of foods and nutrients, while collecting a second 24 hour on a sub-sample of the population allows for an estimate of 'usual intake (Gibson et al., 2017).

24 hour recall was collected through interview schedule and contact them through phone call from the selected samples

Food frequency questionnaire

Food Frequency Questionnaires (FFQ) are a method for collecting dietary data and use a context-specific food list to estimate the usual diet and understand the relationship between consumption patterns and health outcomes (Thompson et al.,2013)

Data from FFQs are advantageous for measuring consumption of specific foods or specific nutrients consumed by a given population.

Because FFQs do not typically weigh foods or quantify using household utensils, they tend to not be as accurate as other quantitative dietary assessment methods (Coates et al., 2012).

Food Frequency Questionnaires was collected through google form and interview schedule.

3.4.4) Geriatric depression scale for elderly

The Geriatric Depression Scale: Short Form is a 15-question screening tool for depression in older adults was used to assess the psychological behaviour of elderly.

The Geriatric Depression Scale (GDS, 1986) is a screening test originally developed by J.A. Yesavage and colleagues in 1986 that is used to identify symptoms of depression in older adults. The Geriatric Depression Scale (GDS) is a self-report measure of depression in older adults. Users respond in a "Yes/No" format. The GDS was originally developed as a 30-item instrument. Since this version proved both time-consuming and difficult for some patients to complete, a 15-item version was developed. The shortened form (GDS-S) is comprised of 15 items chosen from the Geriatric Depression Scale-Long Form (GDS-L). These 15 items were chosen because of their high correlation with depressive symptoms in previous validation studies (Sheikh et al., 1986). Of the 15 items, 10 indicate the presence of depression when answered positively while the other 5 are indicative of depression when answered negatively. This form can be completed in approximately 5 to 7 minutes, making it ideal for people who are easily fatigued or are limited in their ability to concentrate for longer periods of time. The 30-item and 15-item versions are widely used in care giving research(Fauth et al., 2013)

3.5) Development of an intervention tool to create awareness among selected subjects

Awareness was conducted among the selected 99 subjects through inter personal communication. This imparted knowledge on causes, risk factors leading to corona virus. The selected subjects were explained about the management techniques through the practice of healthy food habits, increasing consumption of immune rich foods and the importance of physical exercise. A brochure was developed for elderly regarding the precautions to be taken to prevent covid, the importance of a balanced diet and immune rich nutrients were highlighted and distributed among the selected 99 subjects.

3.6) Analysis and interpretation of data

Collected data‘s were tabulated and percentage was calculated. The calculated data percentage was graphically represented. Statistical analysis was done for all the data and was tabulated.

RESULT AND DISCUSSION

4 . RESULT AND DISCUSSION

The result and discussion found out during the study entitled **"ASSESSMENT OF KAP ON THE NUTRITIONAL STATUS, PSYCHOLOGICAL BEHAVIOUR AND PHYSICAL ACTIVITY OF ELDERLY DURING CORONA VIRUS DISEASE PANDEMIC"** was tabulated and discussed under the following headings:

4.1. Socio - demographic profile of selected subjects

4.2. Assessment of nutritional status of selected subjects

4.2.1. Anthropometric assessment

4.2.2. Biochemical analysis

4.2.3. Dietary assessment

4.3. Assessment of any underlying disease of elderly

4.4. Knowledge attitude practice of selected subjects

4.5.1. Knowledge assessment of selected subjects

4.5.2. Attitude assessment of selected subjects

4.5.3. Practice assessment of selected subjects

4.5. Assess the depression of selected subjects

4.6. Development of an educational tool for conducting an awareness for selected samples.

4.6. Testing hypothesis

4.7.1. Correlation between consumption of immune boosting nutrients and BMI

4.7.2. Correlation between attitude towards calcium intake and frequency of calcium intake

4.7.3. Correlation between attitude towards balanced diet and practice among them

4.7.4. Comparison between knowledge of immune boosters and consumption of them.

4.7.5. Comparison between pattern of sleep and consumption of tea or coffee of elderly

4.7.6. Comparison between depression and consumption of tea and coffee of elderly

4.7.7. Comparison between depression and diabetic condition of elderly

4.7.8. Comparison between depression and cholesterol of elderly

4.7.9. Comparison between depression and elevated blood pressure of elderly

4.7.10. Comparison between gender difference in depression level

4.7.11. Correlation between food intake and physical activity

4.7.12. Correlation between food intake and depression

4.7.13. Comparison between depression and pattern of sleep of elderly

4.7.14. Comparison between depression and physical activity of elderly

4.7.15. Standard deviation of body mass index of selected subjects

4.7.16. Standard deviation of 24-hour recall of selected subjects

4.1. Socio - demographic profile of selected subjects

Socio-economic status provides the basic knowledge regarding the subject such as their gender, age, education, occupation, domicile, and income.

Table no: 1 Frequency and percentage distribution of demographic details of the subjects

Demographics	Variables	Frequency	Percent
Gender	Male	55	55.6
	Female	44	44.4
Age	Greater than 60	99	100
Marital status	Married	78	78.8
	Widow	21	21.2
Education	Diploma	12	12.1
	Graduate	19	19.2
	High school	29	29.3
	Higher secondary	18	18.2
	Illiterate	1	1
	Middle school	14	14.1
	Primary school	6	6.1
Occupation	Agriculture	5	5.1
	Business	5	5.1
	Employed	13	13.1
	Govt. Employee	1	1
	House wife	21	21.2
	None	31	31.3
	Retired	23	23.2
Domicile	Rural	39	39.4
	Urban	60	60.6
Income	10,000 - 20,000	51	51.5
	20,000-50,000	35	35.4
	Above 50,000	13	13.1

From table 1, it was found that 55.6% of the respondents are male and 44.4% of patients are female. The selected subjects of the study with age group of 60 to 80 years. It was found that 78% of respondents were married, whereas, 21% of the subjects were widowed.

The educational status of the subjects were 12.1% respondents were diploma, 19.2% were graduates, 29.3% had high school level education, 18.2% had higher secondary level education, 14.1% had middle school level education, 6.1% had primary level education and only 1% was illiterate. Thus majority of respondents had high school level education. It was observed that 5.1 % respondents were in the field of agriculture and 5.1 % were business accounted , 13.1% of respondents were employed, 1% were government employees, 21.2% were house wives, 31.3% were not working, and 23.2% were retired. About 39.4% of the selected respondents were from rural area and 60.6% of the respondents were from urban area. The majority of the selected respondents were from urban area and only few were from rural area. Regarding the economic status, majority of the respondents had family income between 10,000 and 20,000, 35.4% had family income between Rs. 20,000 to 50,000 and around 13.1% had an annual income above 50,000.

4.2. Assessment of Nutritional Status of Selected Subjects

4.2.1. Anthropometric assessment

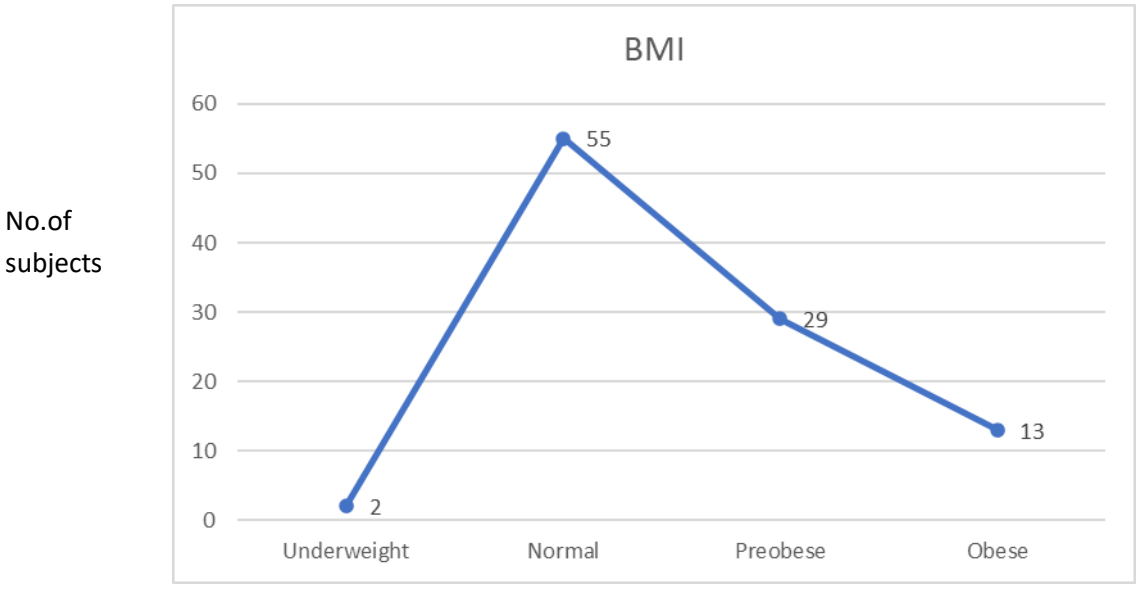
Nutritional anthropometry is the measurement of the human body at various ages and levels of nutritional status. Human body needs a proper nutrition through well balanced diet to fulfill body requirements and to maintain basic body physiology (A Bhattacharya, 2019) Common valuable parameters such as height, weight and BMI were taken in the study.

4.2.1.1. Classification of the subjects based on BMI

Table 2: Classification based on BMI

Weight status	BMI range	Frequency	Percent
Underweight	< 18.5	2	2.0
Normal	18.5 to 24.9	55	55.6
Preobese	25 to 29.9	29	29.3
Obese	>30	13	13.1

Figure no 1: Classification based on BMI



BMI

According to BMI, the respondents are grouped in to four categories as underweight, normal, pre obese, obese. Majority (55%) of respondents belong to normal category i.e., 18.5 to 24.9 kg/m^2, 29% belongs to the category pre obese i.e., 25 to 29.9 kg/m^2 and 13.1% of the respondents belongs to obese (>30) and rest of the respondents belongs to underweight (<18.5).

4.2.2. Biochemical analysis of selected subjects

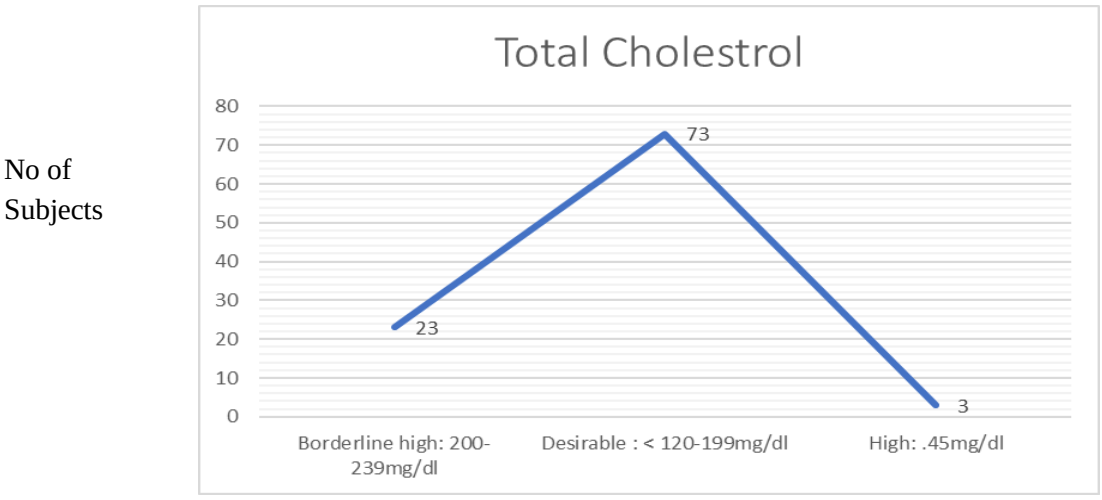
Biochemical assessment uses laboratory measurements of serum protein, serum micronutrient levels, serum lipids, and immunological parameters to assess general nutritional status and to identify specific nutritional deficiencies (Tamsin A et al., 2003). In this study biochemical parameters such as cholesterol, BP and blood sugar level are collected from selected elderly subjects(60-80years)

4.2.2.1. Total cholesterol level of subjects

Table no 3: Total cholesterol level of selected subjects

Variables	Frequency	Percent
Borderline high: 200-239mg/dl	23	23.2
Desirable :< 120-199mg/dl	73	73.7
High: .45mg/dl	3	3.0
Total	99	100.0

Figure no 2: Total cholesterol level of selected subjects



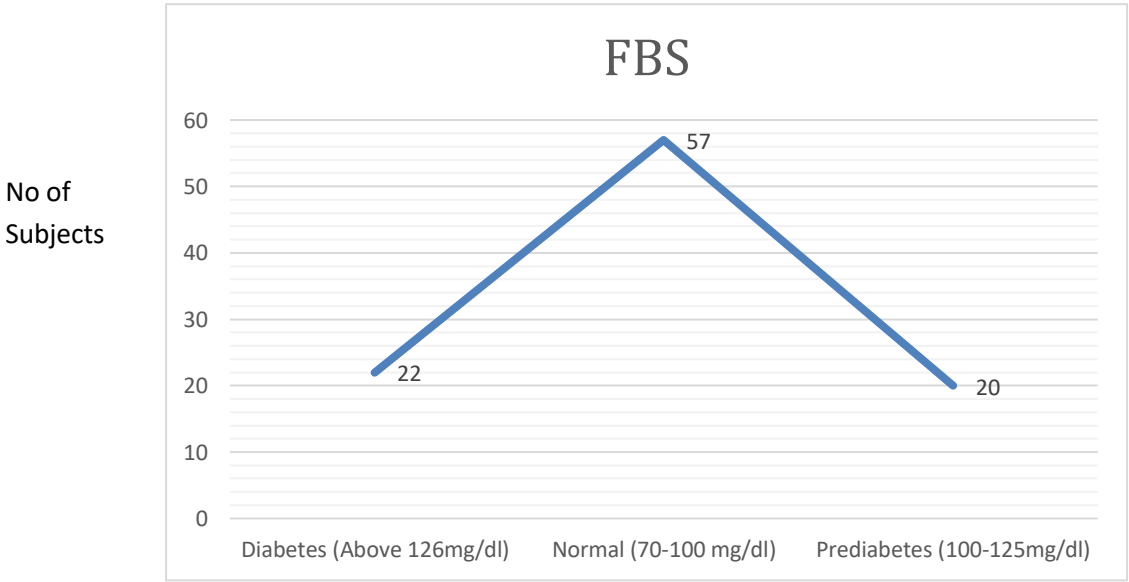
According to total cholesterol, the respondents were grouped in to three categories as borderline high, desirable, high. Majority (73.7%) of respondents belong to desirable category i.e., <120-199 mg/dl, 23% belongs to the category borderline high i.e., 200-239 mg/dl and rest of the respondents belongs to high (45 mg/dl).

4.2.2.1. Fasting blood glucose of subjects

Table no 4: Fasting blood glucose of selected subjects

Variables	Frequency	Percent
Diabetes (above 126mg/dl)	22	22.2
Normal (70-100 mg/dl)	57	57.6
Prediabetes (100-125mg/dl)	20	20.2
Total	99	100.0

Figure no 3: Fasting blood glucose level of selected subjects



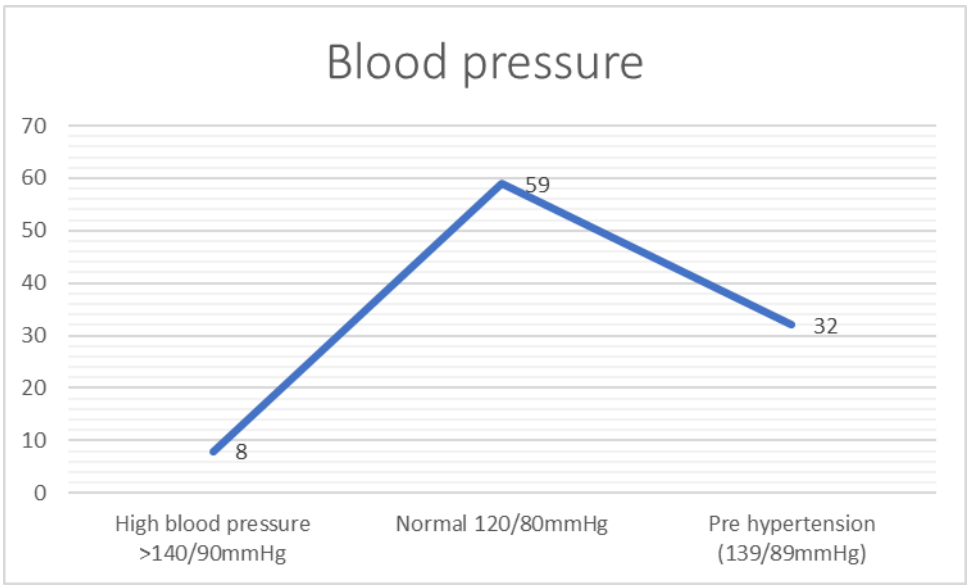
According to FBS, the respondents were grouped in to three category as diabetes, normal, pre diabetes. Majority (57.6%) of respondents belongs to normal category i.e., 70-100 mg/dl, 22.2% belongs to the category diabetes i.e., above 126 mg/dl and rest of the respondents belongs to pre diabetes (100-125 mg/dl).

4.2.2.3. Blood pressure of subjects

Table no 5: Blood pressure of selected subjects

Variables	Frequency	Percent
High blood pressure >140/90mmhg	8	8.1
Normal 120/80mmhg	59	59.6
Pre hypertension (139/89mmhg)	32	32.3
Total	99	100.0

Figure no 4: Blood pressure of selected subjects



According to blood pressure level, the respondents were grouped in to three category as high blood pressure, normal, pre hypertension. Majority (59.6%) of respondents belong to normal category i.e., 120/80 mmhg, 32.3% belongs to the category pre

hypertension i.e., 139/89 mmhg and rest of the respondents belongs to high blood pressure (>140/90 mmhg).

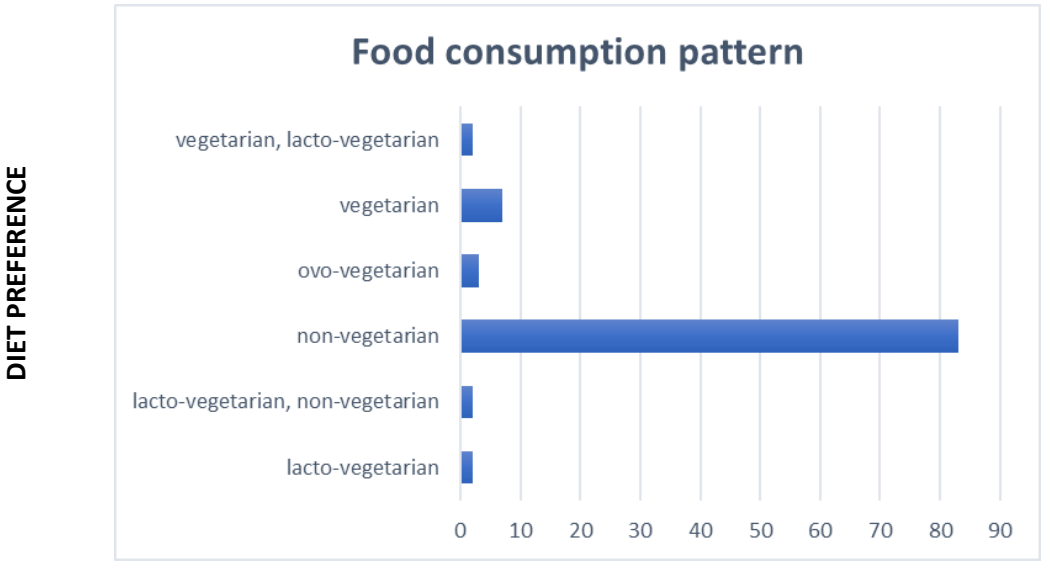
4.2.3. Dietary assessment of selected subjects

4.2.3.1. Dietary preference

Table no 6: Dietary preference of selected subjects

Variables	Frequency	Percent
Lacto-vegetarian	2	2.0
Lacto-vegetarian, non-vegetarian	2	2.0
Non-vegetarian	83	83.8
Ovo-vegetarian	3	3.0
Vegetarian	7	7.1
Vegetarian, lacto-vegetarian	2	2.0
Total	99	100.0

Figure no 5: Dietary preference of selected subjects



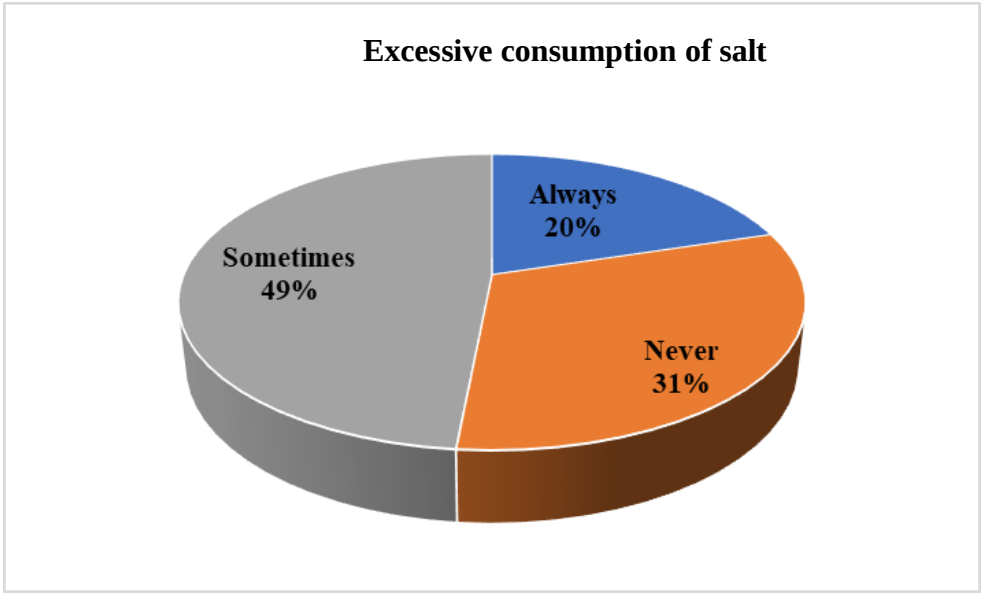
The above table no 6 and figure no 5 shows that majority of respondents (83.8%) were non-vegetarians, 7.1% were vegetarian, 3% were ovo-vegetarians, and each of the other categories constitute 2%.

4.2.3.3. Excessive consumption and use of salt during cooking

Table no 7: Excessive consumption of salt by the selected subjects

Variables	Frequency	Percent
Always	20	20
Never	31	31
Sometimes	48	48
Total	99	100.0

Figure no 6: Excessive consumption of salt by the selected subjects



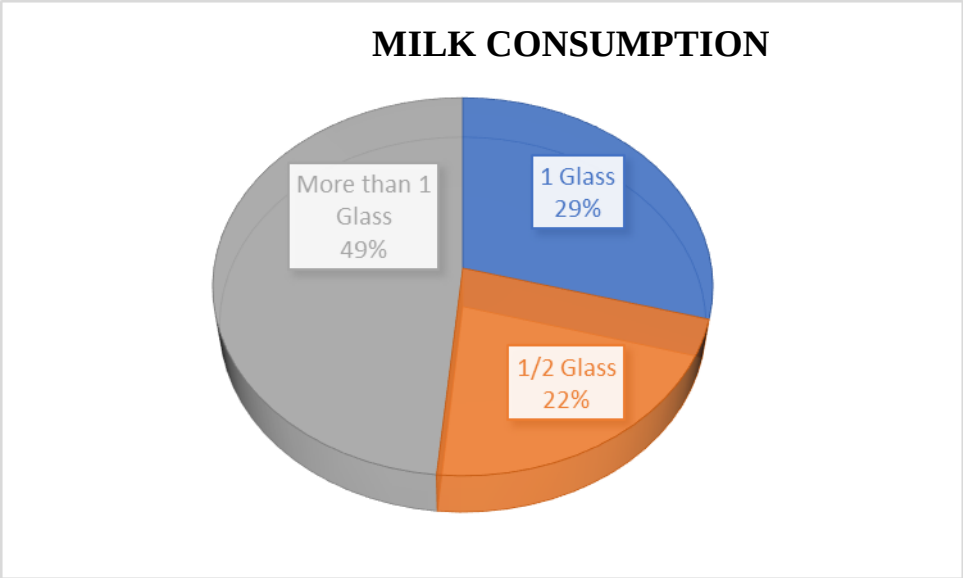
From the above table no 7 and figure no 6 it was found that majority of selected subjects (49%) sometimes use excessive salt. The 31% of subjects did not have excessive consumption of salt and the 20% subjects had always excessive consumption and use of salt during cooking.

4.3.3.4. Consumption of milk

Table no 8: consumption of milk by the subjects

Variables	Frequency	Percent
1 glass	29	29.3
1/2 glass	22	22.2
More than 1 glass	48	48.5
Total	99	100.0

Figure no 7: consumption of milk by the subjects



From the above table no 8 and figure no 7 it can be observed that majority of the respondents (48.5%) drinks more than 1 glasses of milk per day, 29.3% drinks only 1 glass of milk and 22.2% drinks half glass of milk per day.

4.2.3.5. Food frequency consumption

It is designed to obtain the information on overall dietary quality rather than nutrient composition and intake.

During the COVID-19 pandemic, the nutritional status of individuals has been used as a measure of resilience toward destabilization. In the current scenario, COVID-19 has imposed a new set of challenges for the individual to maintain a healthy diet. A balanced diet will guarantee a strong immune system that can help withstand any assault by the virus (Watts A et al.,2020).

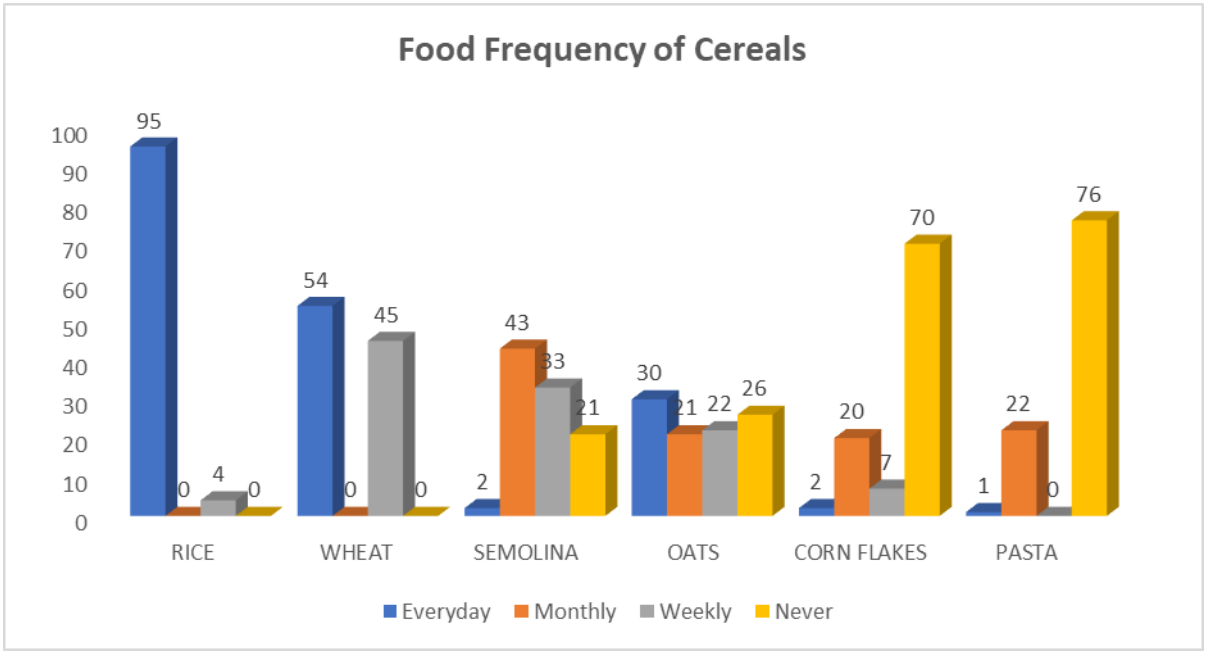
Table no 9: Food frequency consumption

Food groups	Food	Everyday		Weekly		Monthly		Never	
		Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
Cereal	Rice	95	96.0	4	4.0	0	0.0	0	0.0
	Wheat	54	54.5	45	45.5	0	0.0	0	0.0
	Semolina	2	2.0	33	33.3	43	43.4	21	21.2
	Oats	30	30.3	22	22.2	21	21.2	26	26.3
	Corn flakes	2	2.0	7	7.1	20	20.2	70	70.7
	Pasta	1	1.0	0	0.0	22	22.2	76	76.8
Pulses	Bengal gram	8	8.1	79	79.8	6	6.1	6	6.1
	Cowpeas	5	5.1	39	39.4	37	37.4	18	18.2
	Green gram	15	15.2	63	63.6	16	16.2	5	5.1
	Lentils	8	8.1	49	49.5	22	22.2	20	20.2
	Green peas	4	4.0	67	67.7	22	22.2	6	6.1
	Broad beans	6	6.1	50	50.5	29	29.3	14	14.1
Green leafy vegetables / other vegetables	Soya beans	2	2.0	26	26.3	42	42.4	29	29.3
	Spinach	10	10.1	74	74.7	14	14.1	1	1.0
	Drumstick leaves	10	10.1	67	67.7	22	22.2	0	0.0
	Beans	9	9.1	82	82.8	8	8.1	0	0.0
	Cabbage	6	6.1	59	59.6	30	30.3	4	4.0
	Cauliflower	3	3.0	29	29.3	57	57.6	10	10.1
	Tomato	45	45.5	50	50.5	3	3.0	1	1.0
	Papaya	4	4.0	60	60.6	33	33.3	2	2.0

Roots and tubers	Bittergourd	10	10.1	64	64.6	21	21.2	4	4.0
	Pumpkin	4	4.0	67	67.7	26	26.3	2	2.0
	Cucumber	28	28.3	61	61.6	9	9.1	1	1.0
	Tapioca	2	2.0	48	48.5	45	45.5	4	4.0
	Colocasia	2	2.0	19	19.2	48	48.5	30	30.3
	Yam	2	2.0	27	27.3	55	55.6	15	15.2
	Carrot	21	21.2	72	72.7	6	6.1	0	0.0
	Beetroot	7	7.1	79	79.8	13	13.1	0	0.0
	Potato	18	18.2	69	69.7	11	11.1	1	1.0
Fruits	Onion	73	73.7	24	24.2	2	2.0	0	0.0
	Others	8	8.1	25	25.3	53	53.5	13	13.1
	Apple	12	12.1	62	62.6	23	23.2	2	2.0
	Mango	5	5.1	51	51.5	41	41.4	2	2.0
	Orange	9	9.1	60	60.6	29	29.3	1	1.0
	Berries	1	1.0	16	16.2	38	38.4	44	44.4
	Pineapple	1	1.0	43	43.4	48	48.5	7	7.1
	Guava	4	4.0	47	47.5	41	41.4	7	7.1
Nuts and oil seeds	Grapes	8	8.1	52	52.5	36	36.4	3	3.0
	Jackfruit	3	3.0	30	30.3	63	63.6	3	3.0
	Passionfruit	1	1.0	12	12.1	60	60.6	26	26.3
	Peanut	14	14.1	44	44.4	26	26.3	15	15.2
	Almonds	14	14.1	26	26.3	29	29.3	30	30.3
	Cashewnuts	11	11.1	23	23.2	39	39.4	26	26.3
	Pista	4	4.0	9	9.1	43	43.4	43	43.4
	Groundnuts	8	8.1	23	23.2	32	32.3	36	36.4
	Others	3	3.0	13	13.1	27	27.3	56	56.6
Fats and oils Dried fruits and seeds	Coconut oil	86	86.9	10	10.1	3	3.0	0	0.0
	Vegetable oil	20	20.2	17	17.2	26	26.3	36	36.4
	Butter	2	2.0	20	20.2	31	31.3	46	46.5
	Ghee	12	12.1	26	26.3	34	34.3	27	27.3
	Others	2	2.0	10	10.1	28	28.3	59	59.6
	Apricots	1	1.0	6	6.1	26	26.3	66	66.7

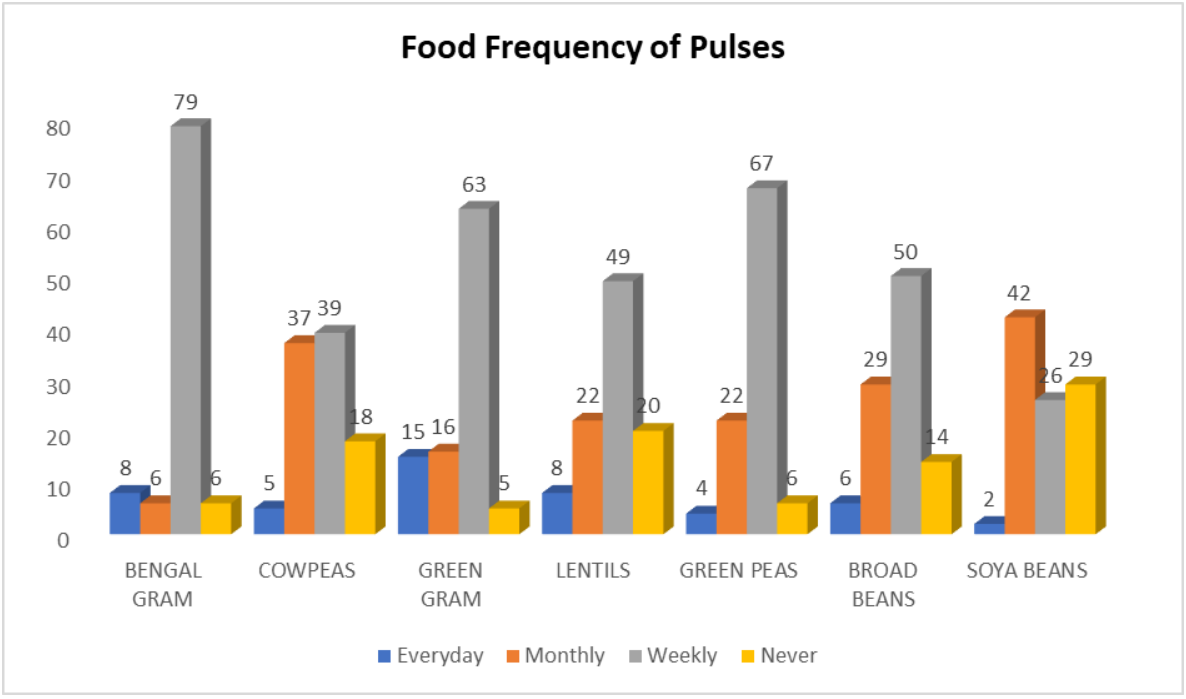
	Fig	1	1.0	5	5.1	28	28.3	65	65.7
	Flax seed	2	2.0	6	6.1	20	20.2	71	71.7
	Sesame	3	3.0	7	7.1	23	23.2	66	66.7
	Raisins	3	3.0	18	18.2	38	38.4	40	40.4
	Dates	7	7.1	25	25.3	40	40.4	27	27.3
Meat and meat products	Chicken	1	1.0	45	45.5	39	39.4	14	14.1
	Fish	51	51.5	34	34.3	3	3.0	11	11.1
	Egg	15	15.2	69	69.7	6	6.1	9	9.1
	Mutton	1	1.0	10	10.1	32	32.3	56	56.6
	Beef	1	1.0	12	12.1	40	40.4	46	46.5
	Pork	1	1.0	3	3.0	19	19.2	76	76.8
Milk and milk products Sugars	Others	2	2.0	3	3.0	21	21.2	73	73.7
	Milk	85	85.9	9	9.1	4	4.0	1	1.0
	Curd	40	40.4	50	50.5	6	6.1	3	3.0
	Cheese	2	2.0	7	7.1	32	32.3	58	58.6
	Buttermilk	17	17.2	30	30.3	16	16.2	36	36.4
	Others	4	4.0	7	7.1	29	29.3	59	59.6
	Sugar	65	65.7	11	11.1	6	6.1	17	17.2
Processed foods	Jaggery	5	5.1	20	20.2	48	48.5	26	26.3
	Honey	2	2.0	13	13.1	32	32.3	52	52.5
	Others	3	3.0	6	6.1	21	21.2	69	69.7
	Pickles	36	36.4	32	32.3	21	21.2	10	10.1
	Papad	14	14.1	47	47.5	34	34.3	4	4.0
	Sweets	5	5.1	19	19.2	55	55.6	20	20.2
	Jam	1	1.0	5	5.1	25	25.3	68	68.7

Figure no 8: Food frequency of cereals



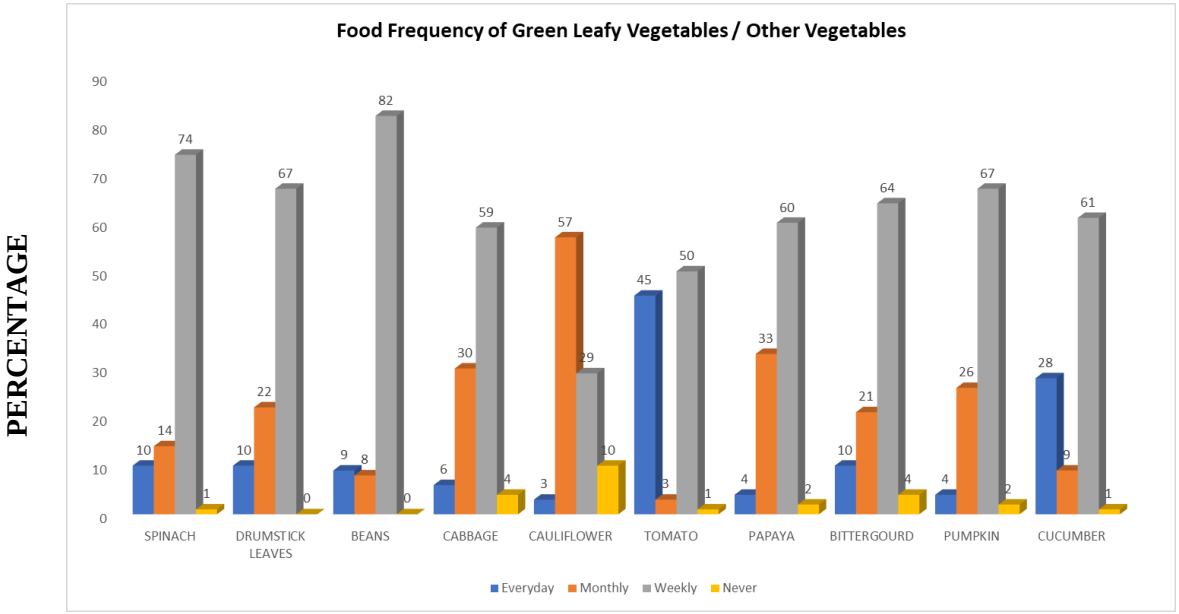
INTAKE OF CEREALS

Figure no 9: Food frequency of pulses



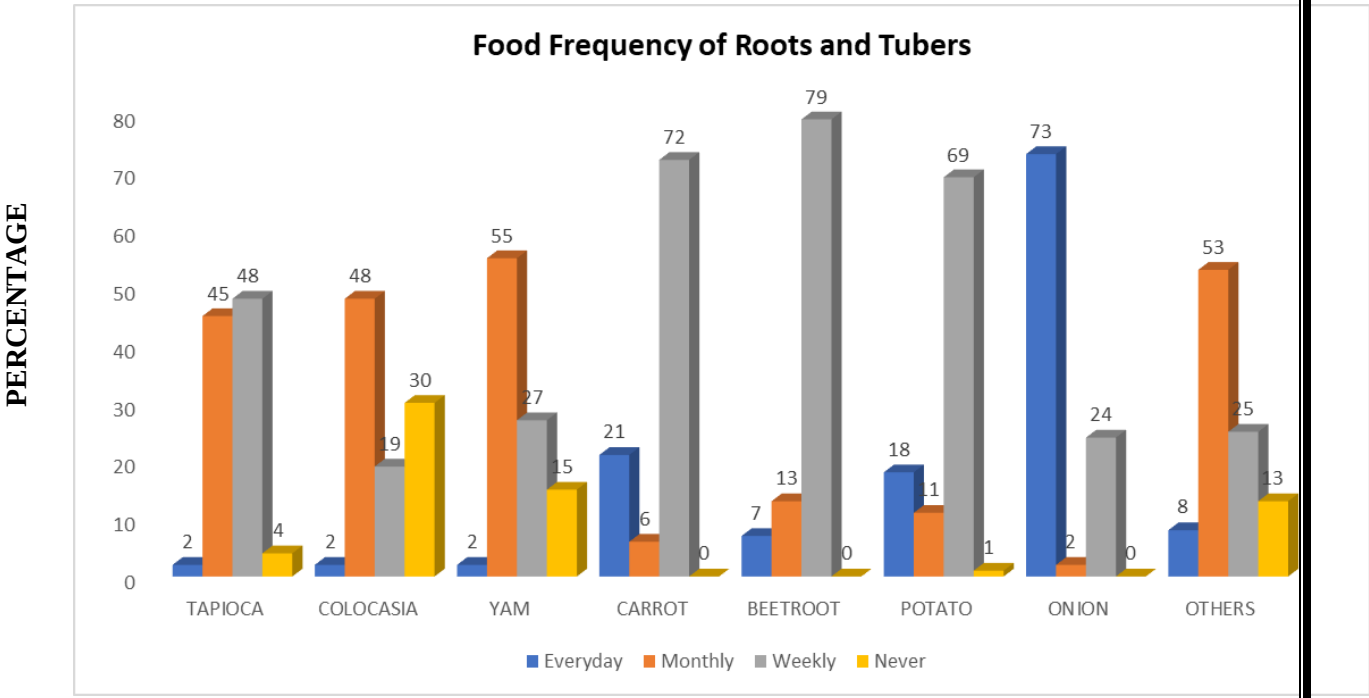
INTAKE OF PULSES

Figure no 10: Food frequency of green leafy vegetables & other vegetables



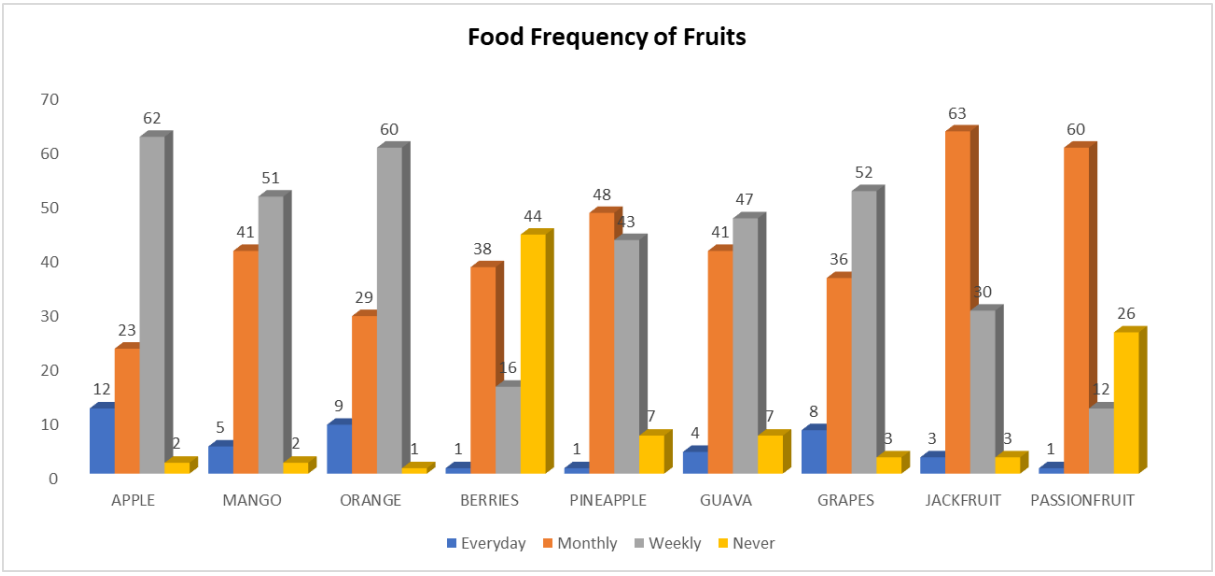
INTAKE OF REEN LEAFY VEGETABLES/OTHER VEGETABLES

Figure no 11 : Food frequency of roots and tubers



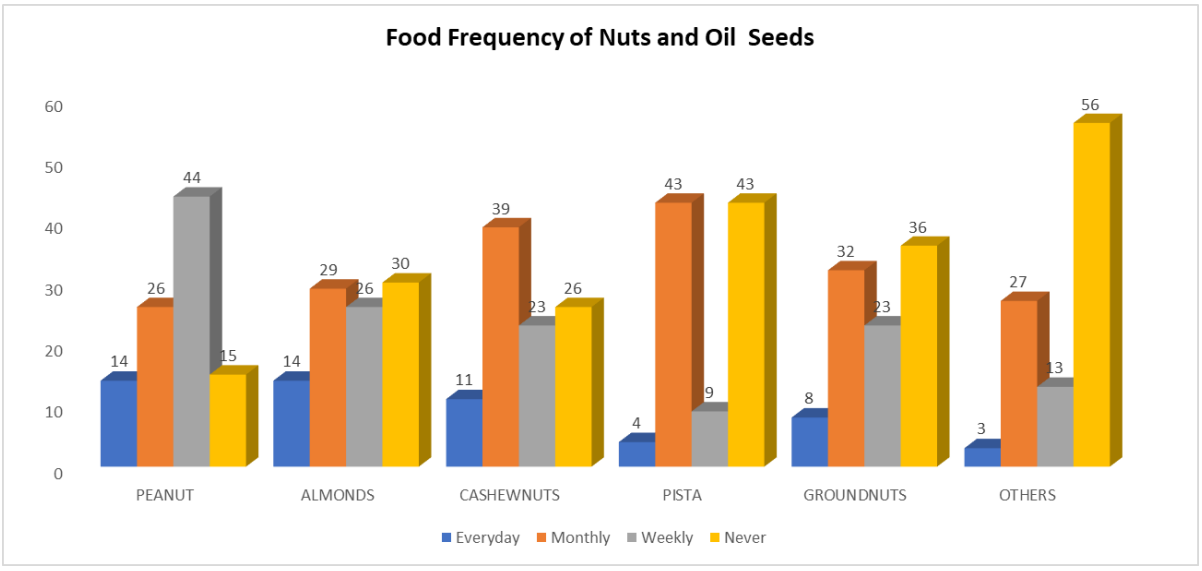
INTAKE OF ROOTS AD TUBERS

Figure no 12: Food frequency of fruits



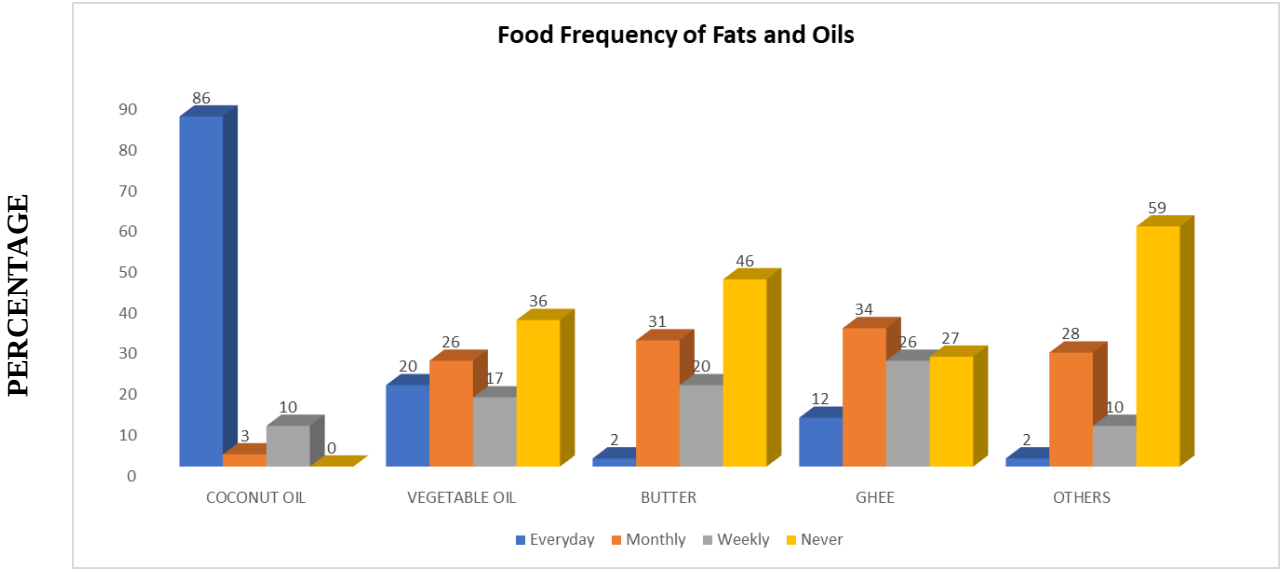
INTAKE OF FRUITS

Figure no 13: Food frequency of nuts and oil seeds



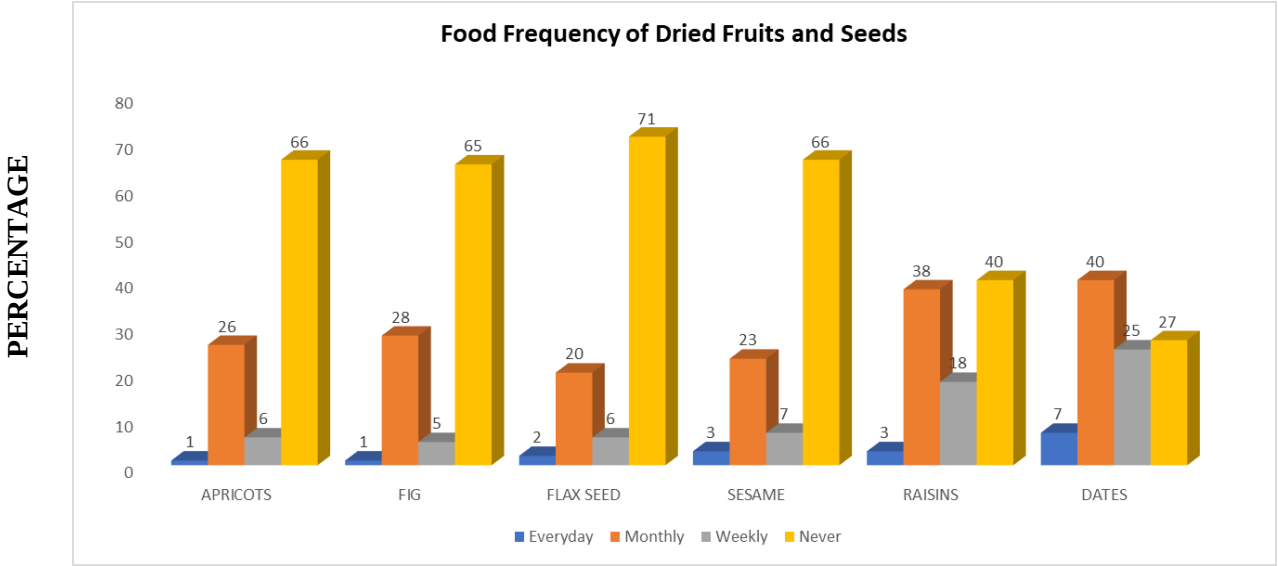
INTAKE OF NUTS AND OIL SEEDS

Figure no 14: Food frequency of fats and oils



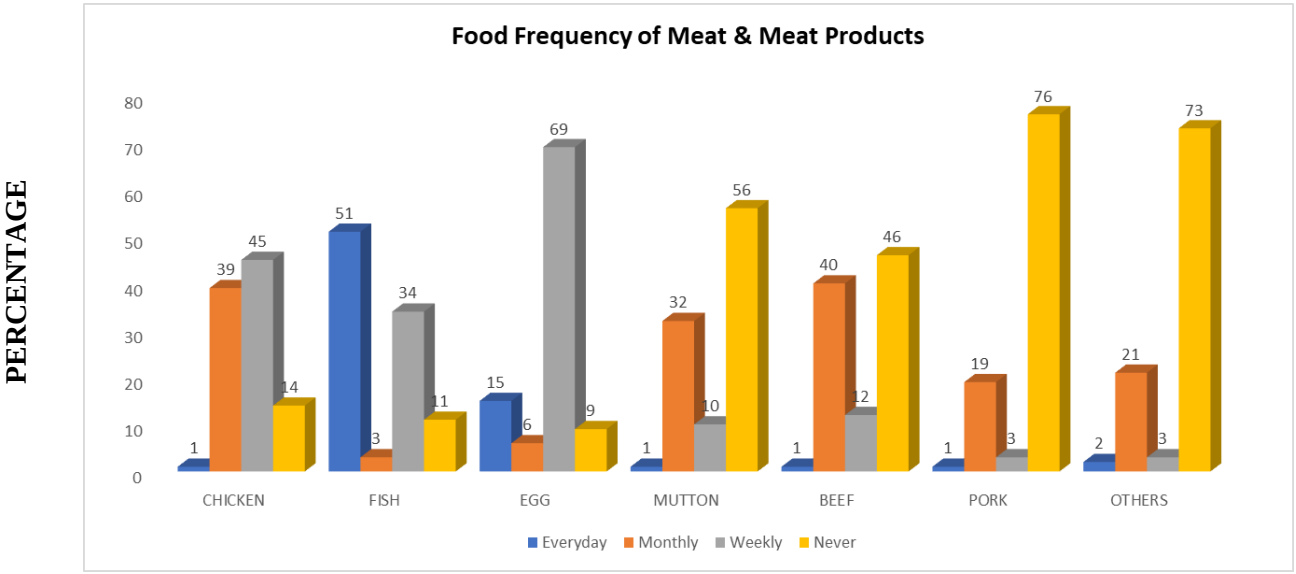
INTAKE OF FATS AND OILS

Figure no 15: Food frequency of dried fruits and seeds



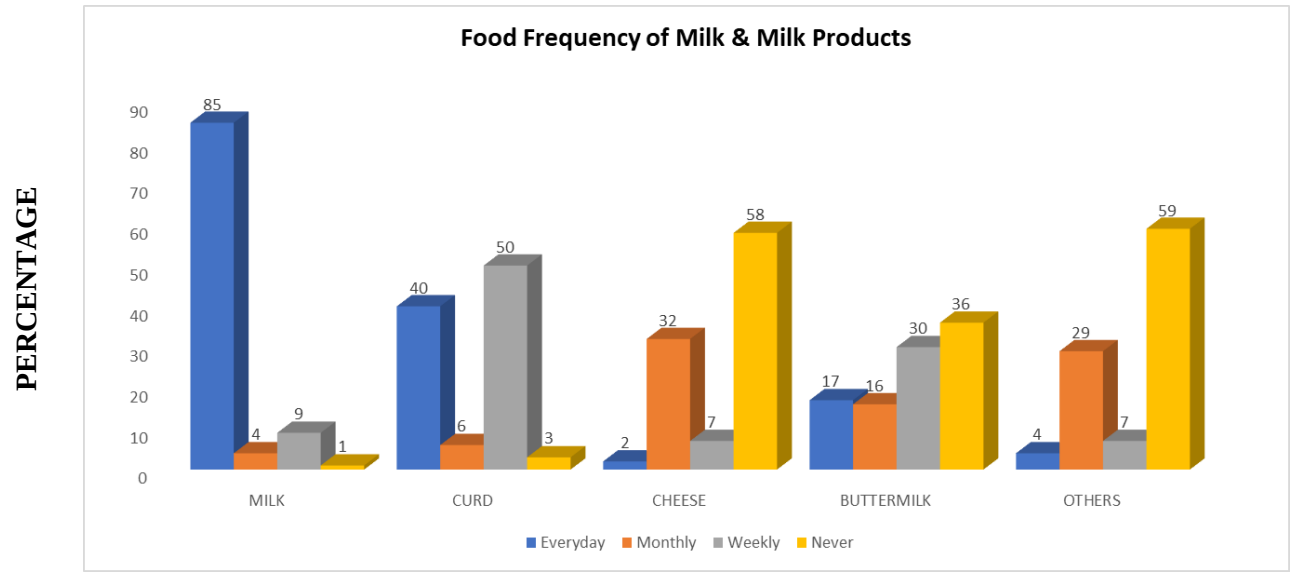
INTAKE OF DRIED FRUITS AND SEEDS

Figure no 16: Food frequency of meat &meat products



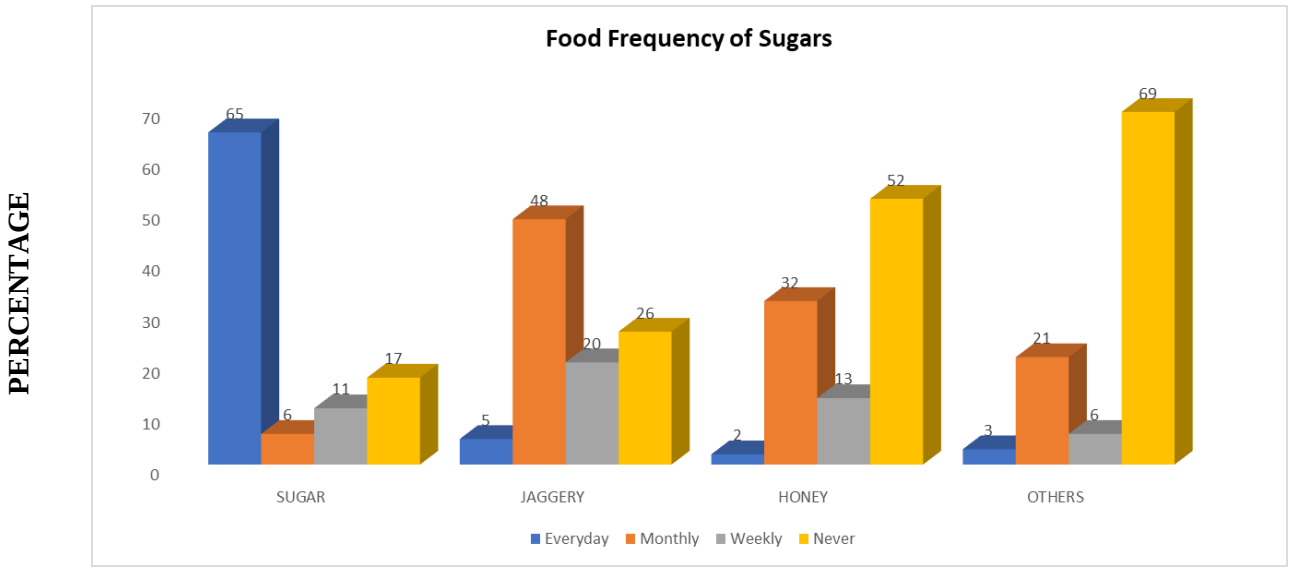
INTAKE OF MEAT AND MILK PRODUCTS

Figure no 17: Food frequency of milk &milk products



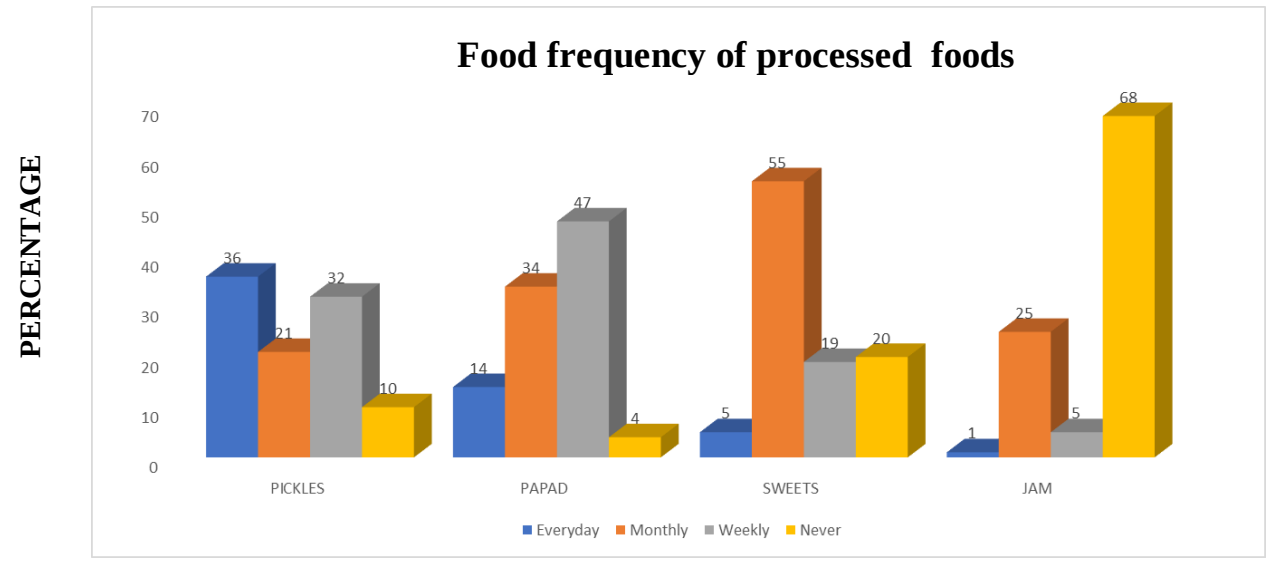
INTAKE OF MILK &MILK PRODUCTS

Figure no 18: Food frequency of sugar & sugar products



INTAKE OF SUGAR &SUGAR PRODUCTS

Figure no 19: Food frequency of processed foods



INTAKE OF PROCESSED FOODS

The food frequency method was used to assess the dietary intake of the subjects. The food items where grouped into 12 categories to know the frequency of consumption. While considering the cereal group rice was the most consumed cereal product with 96% and corn flakes and pasta was the least consumed cereal product with

22.2%.Regarding pulses, Pulses are consumed on weekly basis by the subjects ; bengal gram was the most consumed pulse with 79.8% and soya bean was least consumed with 42.4%. Regarding green leafy vegetables, spinach was the most consumed green leafy vegetable with 74.4% and drumstick leaves was the least consumed green leafy vegetable with 22.2% .regarding other vegetables beans was the most consumed vegetable with 82.5% and cauliflower was the least consumed with 57.6%. Regarding roots and tubers onion was the most consumed roots and tuber with 73.7% and yam was the least consumed with 55.6%. Regarding fruits, orange was the most consumed fruit with 60.6 % and passion fruit was the least consumed with .regarding flesh foods fish was the most consumed flesh food with 51.5% and pork was the least consumed with 19.2%.among nuts and oil pea nut was most consumed with 44.4% and pista was least consumed with 43.3%. Regarding dried fruits and seeds, dates was the most consumed with 25.4% and raisins was the least consumed with 38.4%. Among fats and oil coconut oil was the most consumed oil with 86.9% and vegetable oil was the least consumed with 26%.among milk and milk products milk was the most consumed with 85% and cheese was the least consumed with 32.3%.among sugars, sugar was the most consumed with 65% and honey was the least consumed with 32.3%. Among processed foods papad was the most consumed food with 47.5% and pickle and canned foods were the least consumed food with 25.3%.

4.3.3.6. 24 hour recall

24 hour recall method was designed to quantify the average dietary intake of a group of people, although it can be used to assess individual intake**.**

Macronutrient has a major role in supporting the immune system. Imbalance in the adequate proportion of macronutrients increases the risk of developing chronic diseases and may adversely affect the micronutrient profile. Macronutrient is define as chemical element or substance required in large quantities that provide the energy needed to maintain body functions and carry out the daily activities of life. Carbohydrate, protein, and fat are the three essential macronutrient for health maintenance, growth, reproduction, immunity, and healing. Deficits or excesses of any of these nutrients may compromise these processes, resulting in poor health outcomes, which vary depending on the life stage of the affected person (Nicolo M et al., 2016)

Micronutrient deficiencies probably have few direct effects on the functioning of immune cells. The main function have shown a reduction in cell mass that may indirectly affect immune cell function, where T helper cell numbers are reduced (Nicolo M et al., 2016)

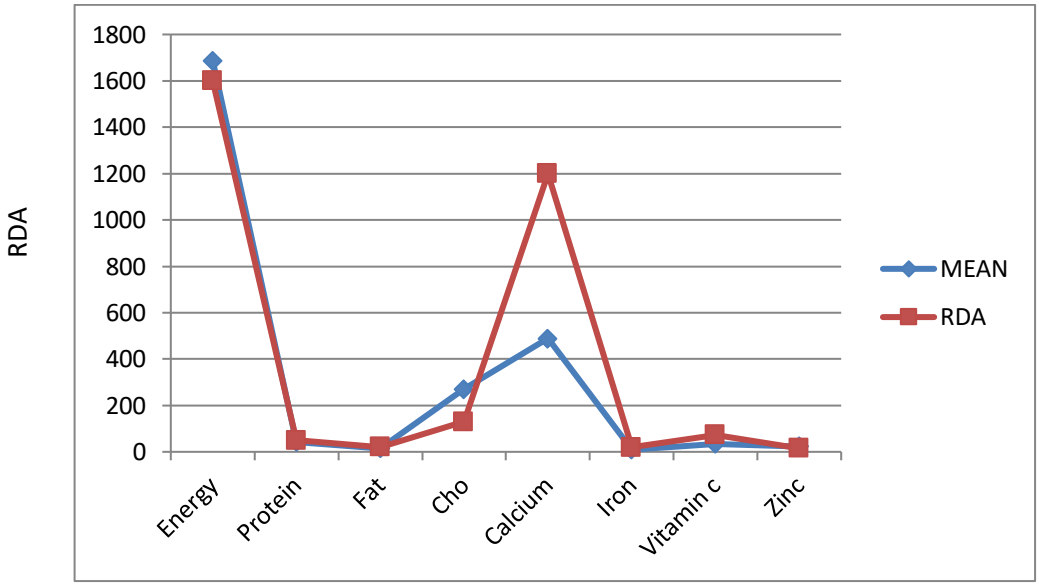
In the current situation, it is necessary to be aware of the specific types of food that can improve our immune system in order to combat COVID-19.Among all kinds of Vitamins, Vitamin C is one of the major constituents of water soluble vitamins which tends to make a strong immune system. Zinc is the another nutrient that helps your immune system and metabolism function (Khayyatzadeh SS, 2020)

Elderly populations often have high risk of calcium deficiency due to dietary habits. The elderly are at risk for multiple reasons including low calcium intake over time, medication interactions that may decrease dietary calcium absorption, and the underlying chronic disease osteoporosis which changes bone formation and strength (Choi YS et al.,2003)

Table no 10: 24 hour recall of the selected subjects

Nutritive value	Mean	RDA	Difference
Energy	1687.59	1600.00	87.59
Protein	42.96	50.00	-7.04
Fat	15.81	20.00	-4.19
Cho	270.29	130.00	140.29
Calcium	489.26	1200.00	-710.74
Iron	9.49	19.00	-9.51
Vitamin c	34.37	72.50	-38.13
Zinc	23.70	15.10	8.60

Figure no 20: 24 hour recall of selected subjects



While analysing the 24 hour recall it was found that the selected subjects have higher energy while considering the RDA value. In case of protein a 7.04 negative difference from the RDA can be observed which indicate that the subjects have lower protein level. More energy is observed in the subjects with a positive difference of 87.59. Carbohydrate is also observed higher in the subjects with a positive difference

of 140.29. Iron with a negative difference of 9.51, calcium with 710.74, and vitamin c with 38.13 negative difference, was also low compared to RDA was found. More fat with positive difference of 14.29 and zinc with 8.6 was also observed compared to RDA.

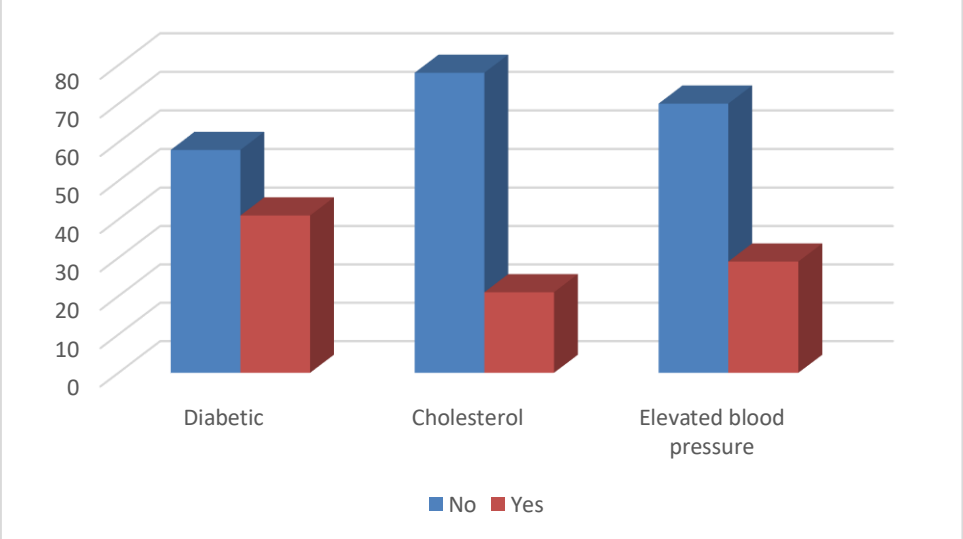
Hence it was understood that the consumption of immune rich nutrients mainly vitamin C, zinc are less among the selected samples. Calcium intake of subjects was less than their RDA.

4.3. Assessment of underlying diseases of selected subjects

Table no 11: Underlying diseases of selected subjects

Underlying diseases	No	Percent	Yes	Percent
Diabetic	58	58.6	41	41.4
Cholesterol	78	78.8	21	21.2
Elevated blood pressure	70	7.7	29	29.3

Figure no 21: Underlying diseases of selected subjects



From the table no 11 and figure no 21 it was observed that among the 99 subjects 59% of subjects were non –diabetic and 41% of subjects were diabetic. 79% of subjects had cholesterol and 21% subjects does not have cholesterol. 71% of subjects had normal blood pressure and 21% had elevated blood pressure.

4.4. Knowledge Attitude practice of selected subjects

4.4.1. Knowledge of selected subjects regarding nutritional and life style habits

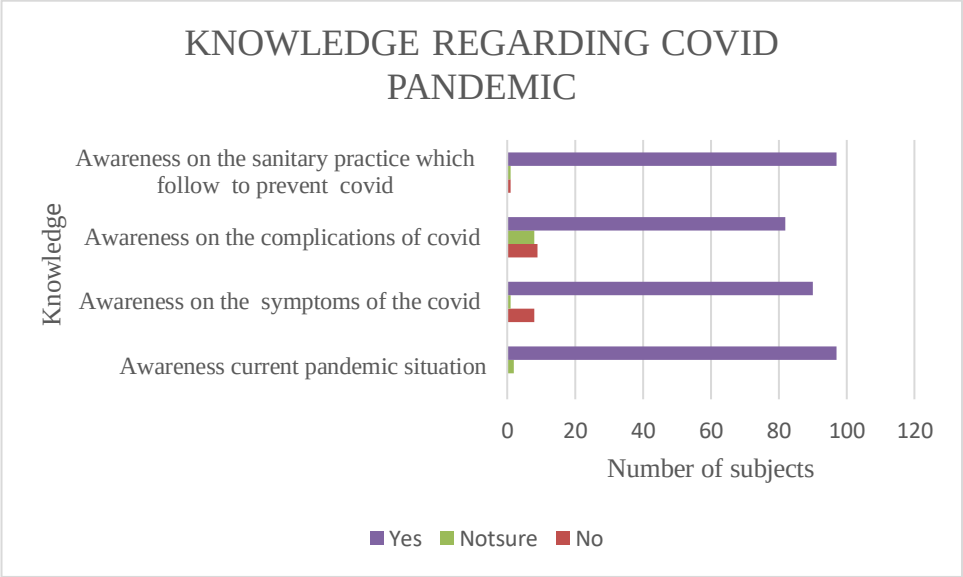
4.4.1.1. Knowledge regarding covid pandemic

(Gabrielle Martins Van Jaarsveld, 2020) explained that as the COVID-19 crisis evolves, the widespread effects of both the virus and the preventative measures being taken to protect the population are becoming clearer. However, the elderly population, who have historically faced a large inequality in access to, and ability to make use of technology, has not seen the same benefits as many other younger groups. The elderly population has been hit with some of the worst effects of the pandemic, with harsher lockdown measures, and increased risks of mental and physical health problems, and the digital divide has seen that the effects of these measures have not been minimized.

Table no 12: Knowledge regarding covid pandemic

Questions	No	Not sure	Yes
Awareness current pandemic situation	0	2	97
Awareness on the symptoms of the covid	8	1	90
Awareness on the complications of covid 19	9	8	82
Awareness on the sanitary practice which follow to prevent covid	1	1	97

Figure no 22: Knowledge regarding covid pandemic



From the table no 12 & figure no 22 it was understood that out of 99 respondents 97 were aware about the current pandemic situation, 90 of them know the symptoms of the covid-19, 82 respondents know the complications of covid-19, 97 were aware of sanitary practice which was followed to prevent the covid-19.

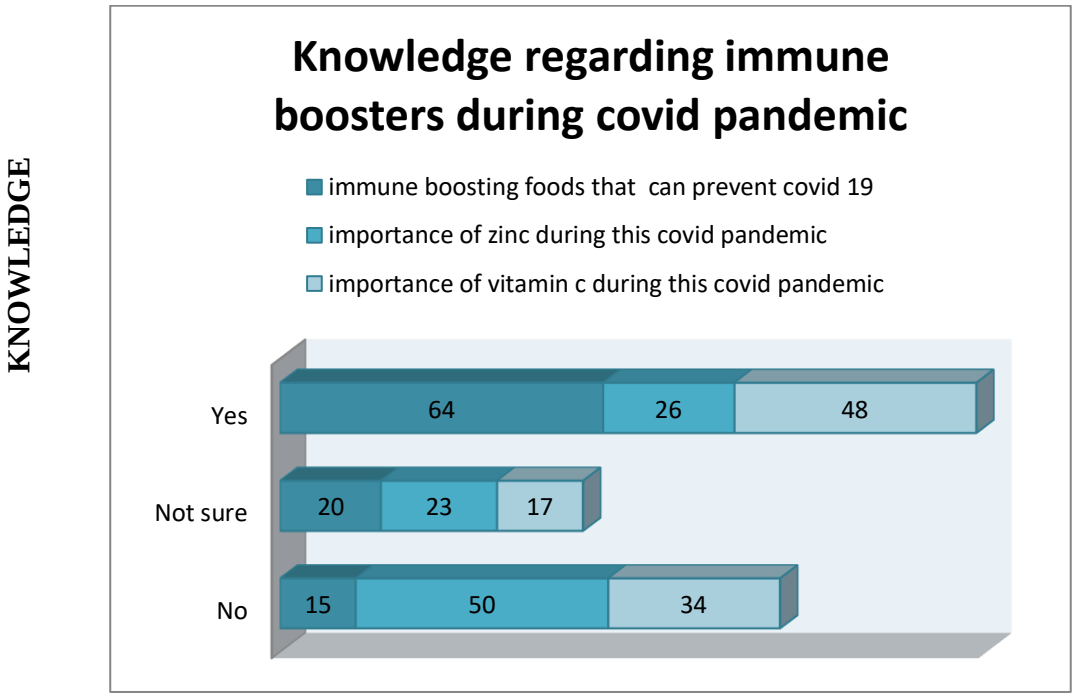
4.4.1.2. Knowledge regarding immune boosters during covid pandemic

In the wake of the COVID-19 pandemic, improving the immunity assumes a significant job in keeping up optimum health. While there is no medicine yet discovered for COVID-19, it will be acceptable to take preventive measures which help our immunity during circumstances such as the present. The food plays a key role in deciding generally health and immunity.(Sunita Mishra et al.,2020)

Table no 13: Knowledge regarding immune boosters during covid pandemic

Questions	No	Not sure	Yes
immune boosting foods that can prevent covid 19	15	20	64
importance of zinc during this covid pandemic	50	23	26
importance of vitamin c during this covid pandemic	34	17	48

Figure no 23: Knowledge regarding immune boosters during covid pandemic



From the table no 13 and figure no 23 it was observed that among the 99 subjects ; 64 subjects aware about immune boosting foods that can prevent covid-19 and only 26 respondents know the importance of zinc during this covid pandemic. Majority of subjects (73) were not aware of the importance of zinc during this pandemic. Out of 99 respondents 48 knows the importance of vitamin C during this pandemic. Out of 99; 51 respondents were not aware of the importance of vitamin C during pandemic. Hence it was found that majority of subjects were not aware about immune boosting foods .

4.4.1.3. Knowledge on importance of continuous sleep

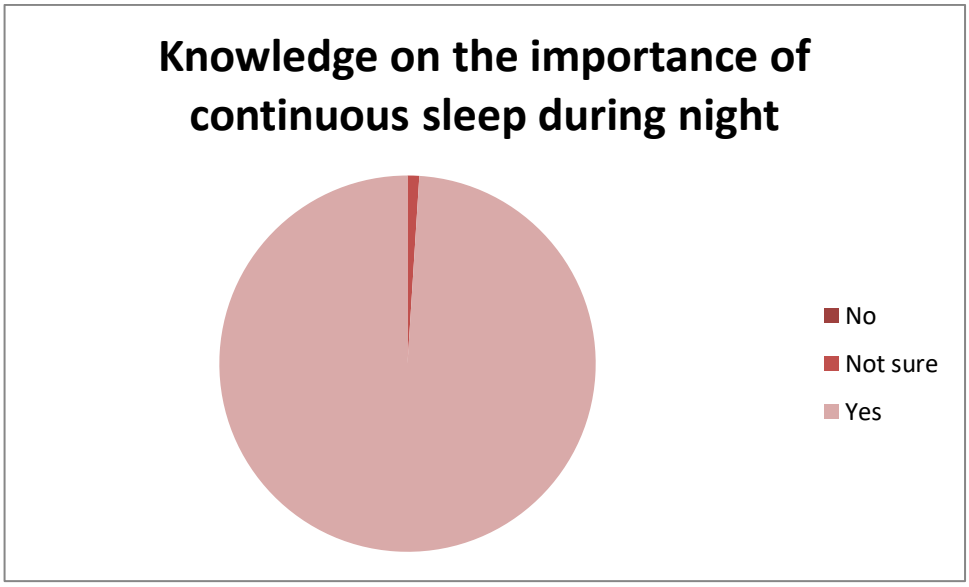
The idea voiced by Thomas Dekker that “Sleep is that golden chain that ties health and our bodies together” may ring especially true for older adults. Accordingly, the consequences of sleep impairments for brain health are many-fold, including short-

term cognitive impairment and longitudinal cognitive-decline (Ravyts et al., 2017). Beyond the impact on cognitive functioning, healthy sleep is a critical factor predicting better mental well-being, increased ability to perform activities of daily living, reduced fall risk, better self-reported health status, and reduced risk of hospitalization, among many, many, other outcomes (Kaufmann CN et al.,2013)

Table no 14: Knowledge regarding importance of continuous sleep

Questions	No	Not sure	Yes
Knowledge on the importance of continuous sleep during night	0	1	99

Figure no 24: Knowledge regarding importance of continuous sleep



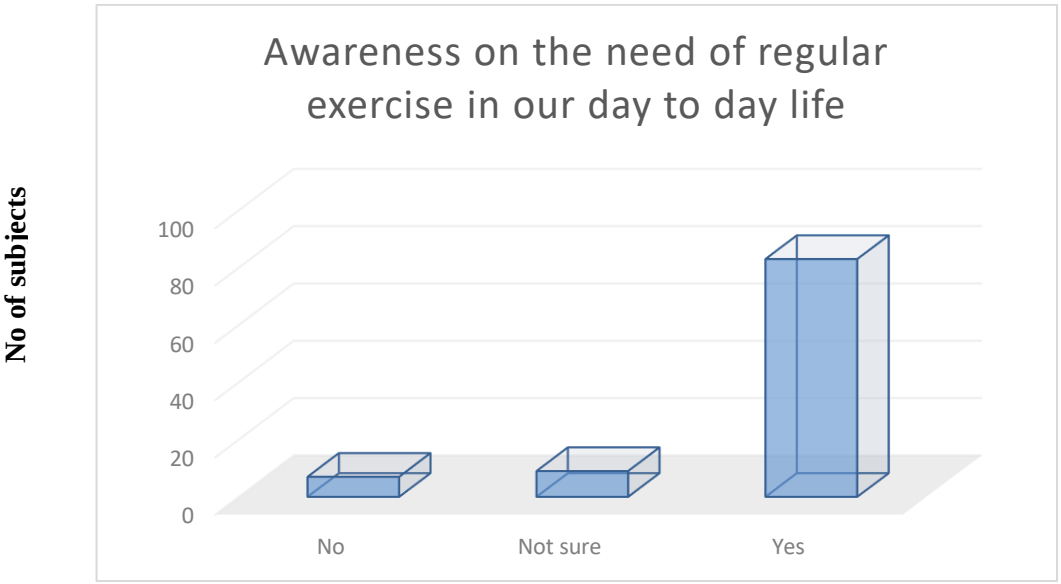
From the table no 14 & figure no 25 it was found that majority of subjects (99) know the importance of regular sleep during the night.

4.4.1.4. Knowledge regarding importance of exercise

Table no 15: Knowledge regarding importance of exercise

Questions	No	Not sure	Yes
Awareness on the need of regular exercise in our day to day life	7	9	83

Figure no 25: Knowledge regarding importance of exercise



RESPONSE

From the above table no 15 and figure no 25 it was understood that 83 subjects were aware about the need of regular exercise in our day to day life. Only 9 subjects were not sure about need of regular exercise.

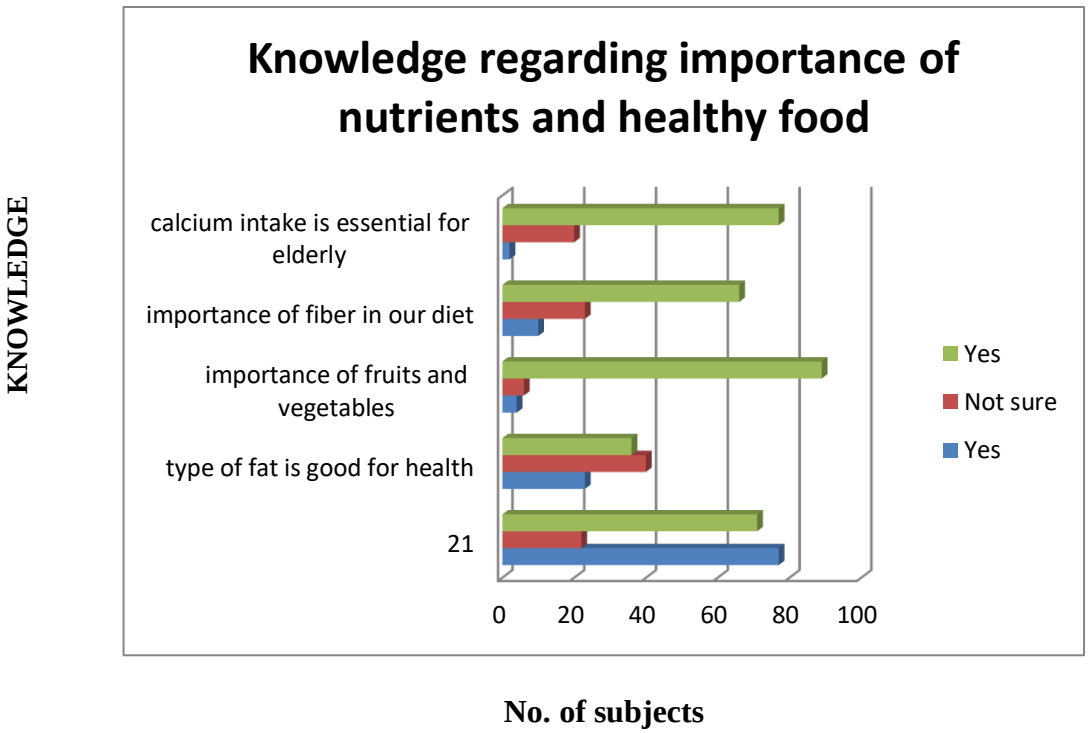
4.4.1.5. Knowledge regarding importance of nutrients and healthy foods

A healthy lifestyle can be attained by maintaining a balanced diet and keeping into consideration to meet all the essential nutrients required by the body. A proper meal plan helps to attain ideal body weight and reduce the risk of chronic diseases like diabetes, cardiovascular and other types of cancer (Parmeet Kau.,2019).

Table no 16: Knowledge regarding importance of nutrients and healthy food

Questions	No	Not sure	Yes
importance of vitamins in our diet	6	22	71
type of fat is good for health	23	40	36
importance of fruits and vegetables	4	6	89
importance of fiber in our diet	10	23	66
calcium intake is essential for elderly	2	20	77

Figure no 26: Knowledge regarding importance of nutrients and healthy food



From this table no 16 and figure no 26 ; the results shows 71 subjects are aware about the importance of vitamins in our diet and 22 subjects were not aware of importance of vitamins. About 89 respondents know the importance of fruits and vegetables in our diet, From the 99 subjects , 66 respondents know the importance of fibre in our diet and 23 subjects among them not sure about it. .Majority of the respondents (40) were not sure about the type of fat which is good for health

4.4.1.6. Knowledge regarding the intake of nutrients

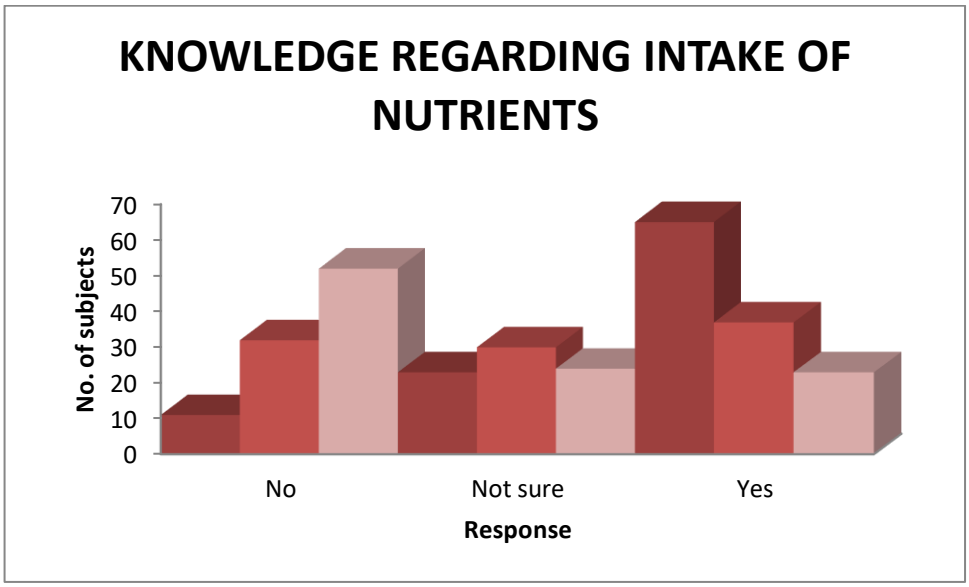
According to(Katherine Tucker, 2010) maintaining a nutrient-dense diet is critically important for older adults because of the impact of food intake on health. Nutrition for older adults is important for supporting cellular function throughout the body, strengthening the immune system, and warding off physical and mental illness.

Table no 17: Knowledge regarding the intake of nutrients

Questions	No	Not sure	Yes
Awareness on the benefits of nutrients in our daily diet	11	23	65
Awareness of any special nutrition should elderly follow	32	30	37
Knowledge regarding geriatric nutrition	52	24	23

From the table no 17 and figure no 27,it was found that 37 number of subjects knows that elderly should follow a special nutrition and 30 no of subjects were not sure about it ,32 subjects were not aware about a special nutrition should elderly follow, 65 subjects knows the benefit of nutrients in our daily diet and 23 subjects were not sure about it. Only 11 subjects were unaware of the benefits of nutrients. Majority of subjects (52) were not aware of geriatric nutrition. Only 23 subjects were aware about geriatric nutrition and 24 subjects were not sure about geriatric nutrition.

Figure no 27: Knowledge regarding the intake of nutrients.



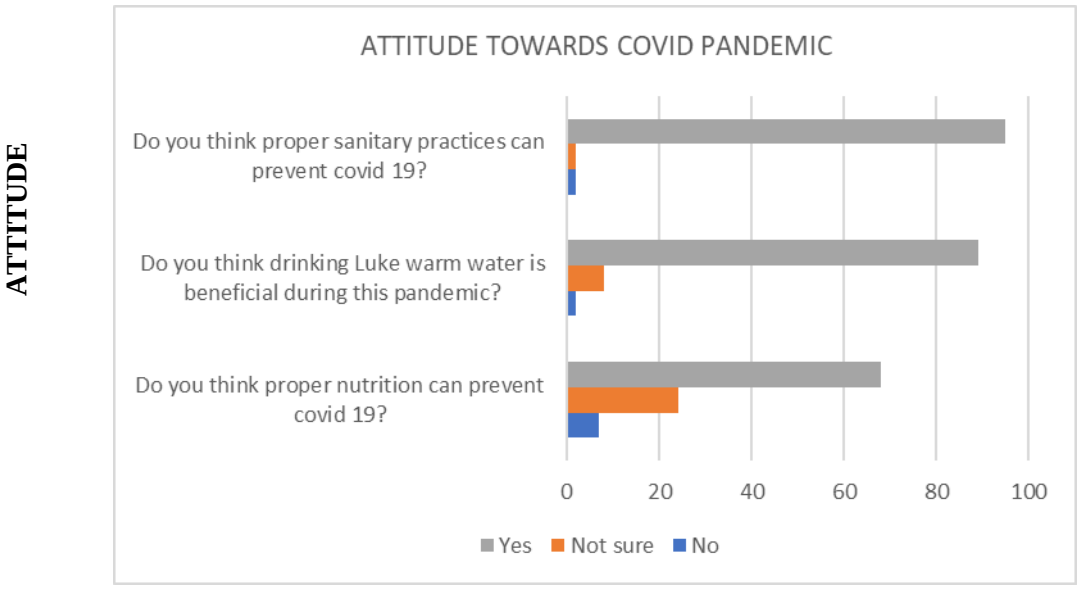
4.4.2. Attitude of selected subjects regarding nutritional and health style habits

4.4.2.1. Attitude towards the beneficial practices during covid pandemic

Table no 18: Attitude towards beneficial practices

Questions	No	Not sure	Yes
Attitude towards proper nutrition can prevent covid 19	7	24	68
Attitude towards drinking luke warm water is beneficial during this pandemic	2	8	89
Attitude towards proper sanitary practices can prevent covid 19	2	2	95

Figure no 28: Attitude towards beneficial practices



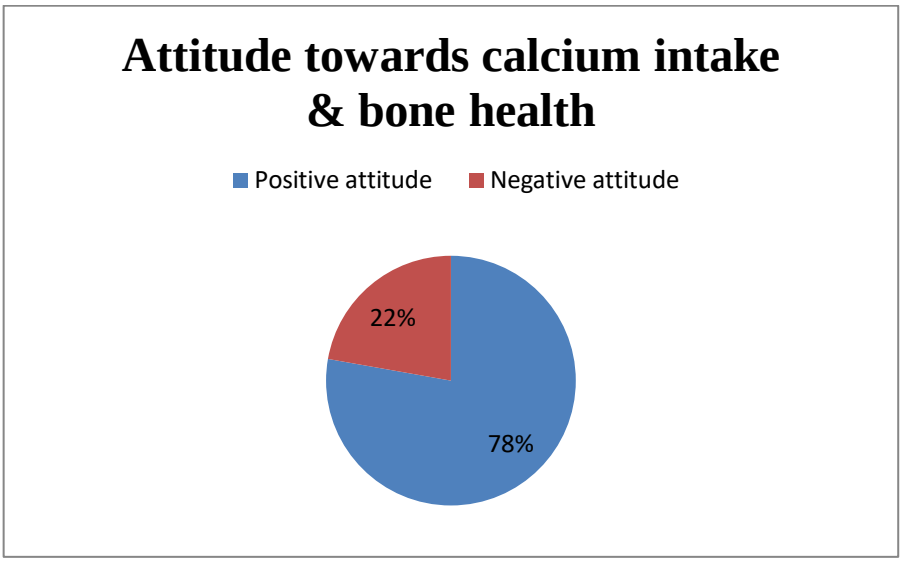
The above table no 19 and figure no 29 shows that, 68 respondents of the study agrees that proper nutrition can prevent covid-19, 89 subjects agrees drinking luke warm water is beneficial during this pandemic, majority of the respondents (95) says that proper sanitary practices can prevent covid-19.Hence from this it was found that majority of subjects had a positive attitude towards the beneficial practices of covid.

4.4.2.2. Attitude towards calcium intake & bone health of selected subjects

Table no 19: Attitude towards calcium intake & bone health

Calcium intake and bone health	% of subjects	No. of subjects
Positive attitude	76.23	77
Negative attitude	21.78	22

Figure no 29: Attitude towards calcium intake & bone health



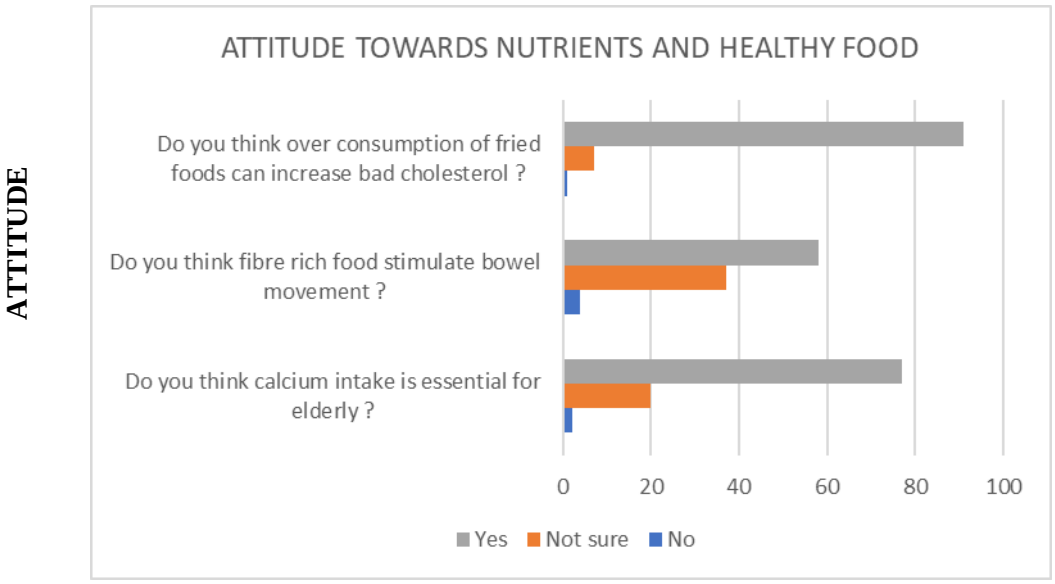
From the above table no 19 and figure no 29; it was found that 78% had a positive attitude towards calcium intake and bone health. And remaining 22% had a negative attitude .

4.4.2.3. Attitude towards nutrients and healthy food

Table no 20: Attitude towards nutrients and healthy food

Questions	No	Not sure	Yes
Calcium intake is essential for elderly	2	20	77
Fibre rich food stimulate bowel movement	4	37	58
Consumption of fried foods can increase bad cholesterol	1	7	91

Figure no 30: Attitude towards nutrients and healthy food



From table no 20 & figure no 30, it was found that majority of subjects had a good attitude towards the consumption of nutrients and healthy food. Among them 77 subjects had positive attitude to the consumption of calcium rich foods .Twenty one subjects not sure about calcium intake and 1 subjects had a negative attitude .Fifty eight subjects had a positive attitude towards fibre consumption and 21 subjects were not sure about fiber intake .Out of 99; 91 subjects had a good attitude towards the consumption of fried foods cause cholesterol.

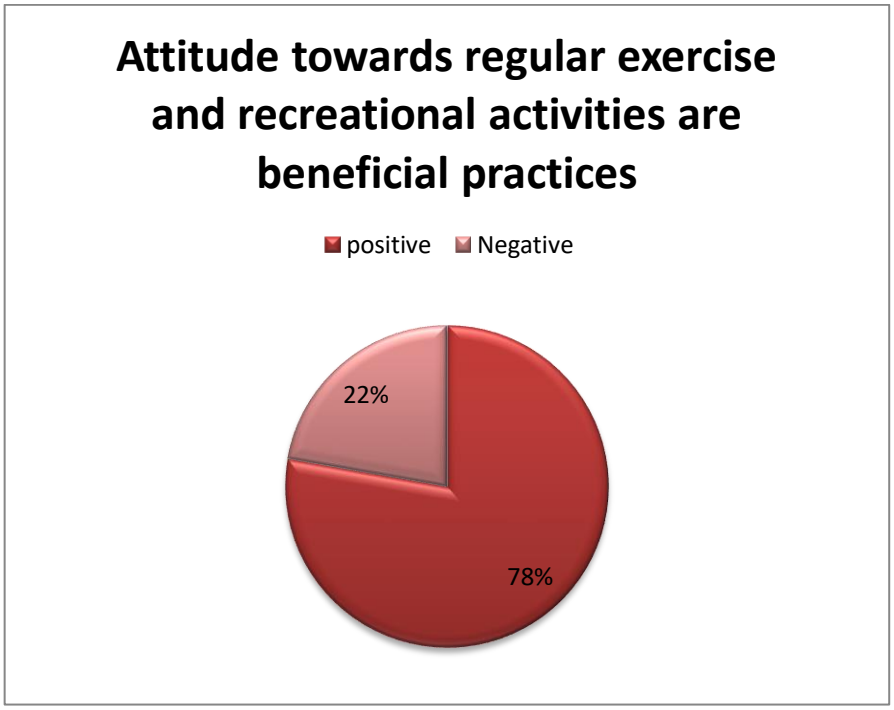
4.4.2.4. Attitude towards regular exercise and recreational activities

(Roberts C.E et al.,2019) said that one of the possible impacts of social distancing restrictions on older people is a reduction in physical activity. The physical activity and exercise restrictions may have deleterious effects on older persons because physical activity is linked to many health benefits in this population. There is strong evidence that physical activity is linked with functional abilities, including mobility and independence in personal and community activities of daily living, particularly in older people (Roberts C.E et al., 2017)

Table no 21: Attitude towards regular exercise and recreational activities

Question	positive	Negative
Attitude towards regular exercise and recreational activities are beneficial practices	77	22

Figure no 31: Attitude towards regular exercise and recreational activities



From table no 21 & figure no 31 it was found that majority of subjects (77) had a positive attitude towards regular exercise and recreational activities. The remaining 22 subjects had a negative attitude towards regular exercise and recreational activities**.**

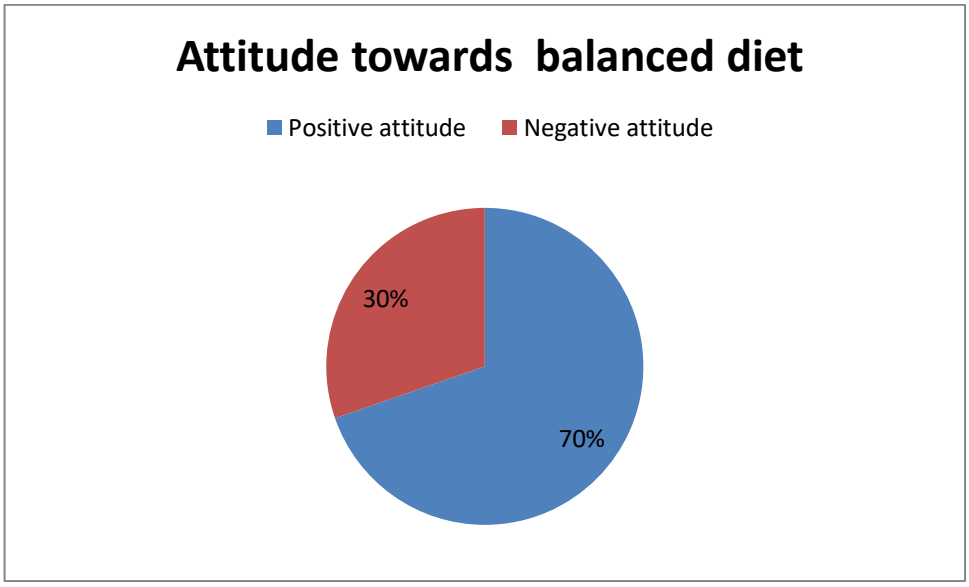
4.4.2.5. Attitude toward intake of balanced diet during covid pandemic situation

Eating a well-balanced diet is an important part of staying healthy as you age. It can help you maintain a healthy weight, stay energized, and get the nutrients you need. It also lowers your risk of developing chronic health conditions, such as heart disease and diabetes, cholesterol (Natalie Butler et al., 2019)

Table no 22: Attitude of selected subjects towards intake of balanced diet

Questions	Positive attitude	Negative attitude
Attitude towards balanced diet	69	30

Figure no 32: Attitude of selected subjects towards intake balanced diet



From table no 22 & figure no 32 ,it was observed that majority of subjects (69) had a positive attitude towards practice of balanced diet and 30 subjects had negative attitude.

4.4.3. Practice of selected subjects regarding nutritional and life style habits

4.4.3.1. Consumption of immune boosting foods

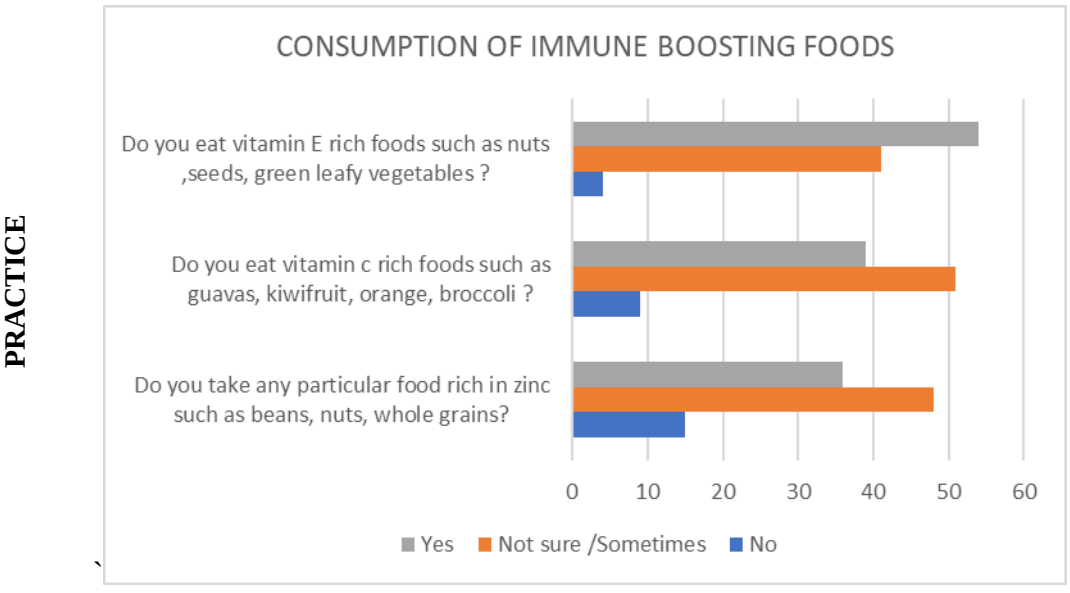
(Guillin OM et al.,2019) eating enough nutrients as part of a varied diet is required for the health and function of all cells, including immune cells. Certain dietary patterns may better prepare the body for microbial attacks and excess inflammation, but it is unlikely that individual foods offer special protection. Each stage of the body's

immune response relies on the presence of many micronutrients. Examples of nutrients that have been identified as critical for the growth and function of immune cells include vitamin C, vitamin D, zinc, selenium, iron, and protein (including the amino acid glutamine). They are found in a variety of plant and animal foods.

Table no 23: Consumption of immune boosting foods by selected subjects

Questions	No	Sometimes	Yes
Consumption of any particular food rich in zinc such as beans, nuts, whole grains	15	48	36
Consumption of vitamin C rich foods such as guavas, kiwifruit, orange, broccoli	9	51	39
Consumption of vitamin E rich foods such as nuts ,seeds, green leafy vegetables	4	41	54

Figure no 33: Consumption of immune boosting foods by selected subjects



From the above table no 23 and figure no 33 it was found that only 36 subjects consume zinc rich foods whereas ,48 samples was rarely consume zinc rich foods and

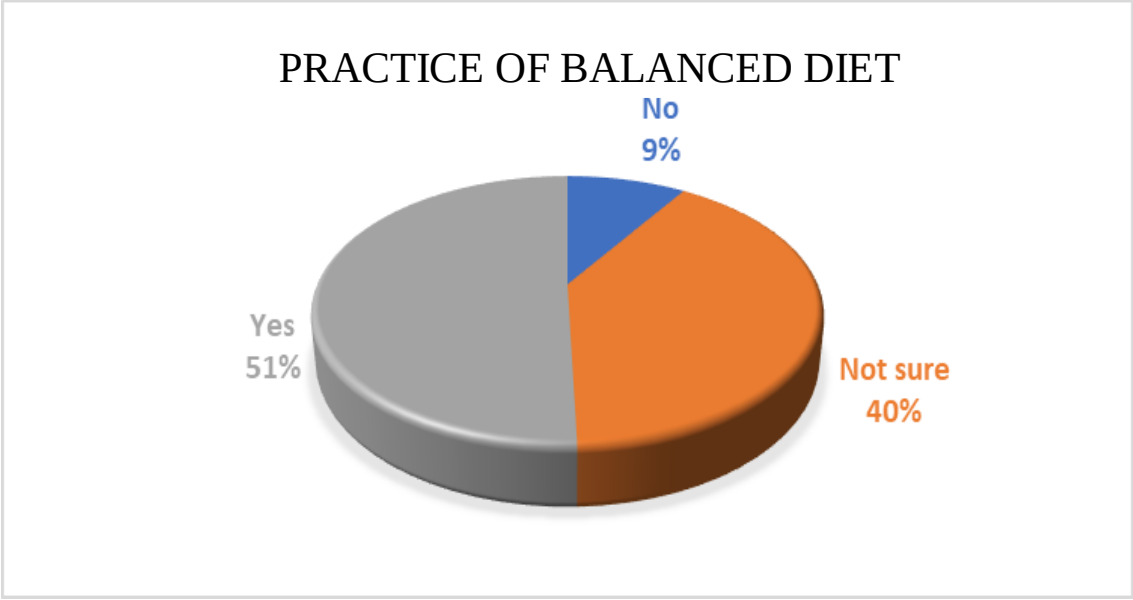
15 samples were not consuming any zinc rich foods. Regarding vitamin C rich foods, 39 subjects were consuming daily whereas 51 subjects used to consume sometimes and 9 subjects were not consuming any kind of vitamin C rich foods. Vitamin E rich foods had been consumed by 54 subjects, whereas 41 subjects used to consume them sometimes and 4 subjects were not consuming any kind of vitamin E rich foods. Therefore it was understood that the majority of subjects had poor intake of immune boosting foods.

4.4.3.2. Practice of intake balanced diet by selected subjects

Table no 24: Practice of intake balanced diet by selected subjects

Variables	Frequency	Percent
No	9	9.1
Not sure	40	40.4
Yes	50	50.5
Total	99	100.0

Figure no 34: Practice of balanced diet by selected subjects



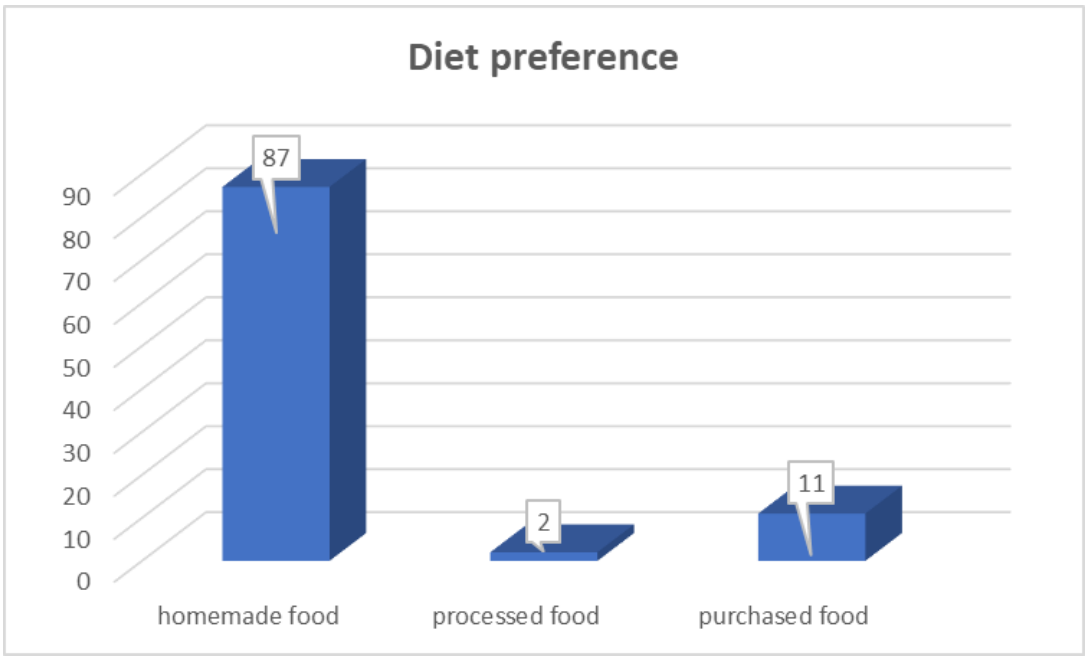
From table no 24 & figure no 34 , it was observed that majority of the respondents (50.5%) follow a balanced diet, 40.4% were not sure about the consumption of balanced diet, whereas, 9.1% do not follow balanced diet.

4.4.3.3. Diet preference of selected subjects

Table no 25: Diet preference of selected subjects

Variables	Frequency	Percent
Homemade food	87	87.9
Processed food	2	2.0
Purchased food	11	11.1

Figure no 35 :Diet preference of selected subjects



PRACTICE

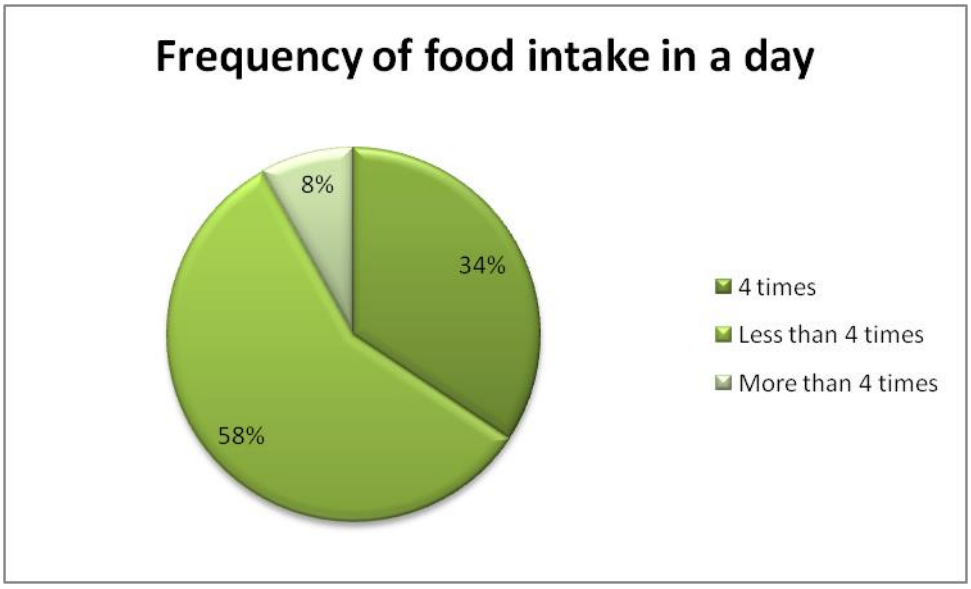
From table no 25 & figure no 35, it was clear that majority of the respondents(87.9%) prefer home-made food, 11.1% prefers purchased food and the remaining 2% respondents prefer processed food.

4.4.3.4. Food intake in a day of selected subjects

Table no 26: Food intake in a day of selected subjects

Variables	Frequency	Percent
4 times	34	34.3
Less than 4 times	57	57.6
More than 4 times	8	8.1
Total	99	100.0

Figure no 36: Food intake in a day of selected subjects



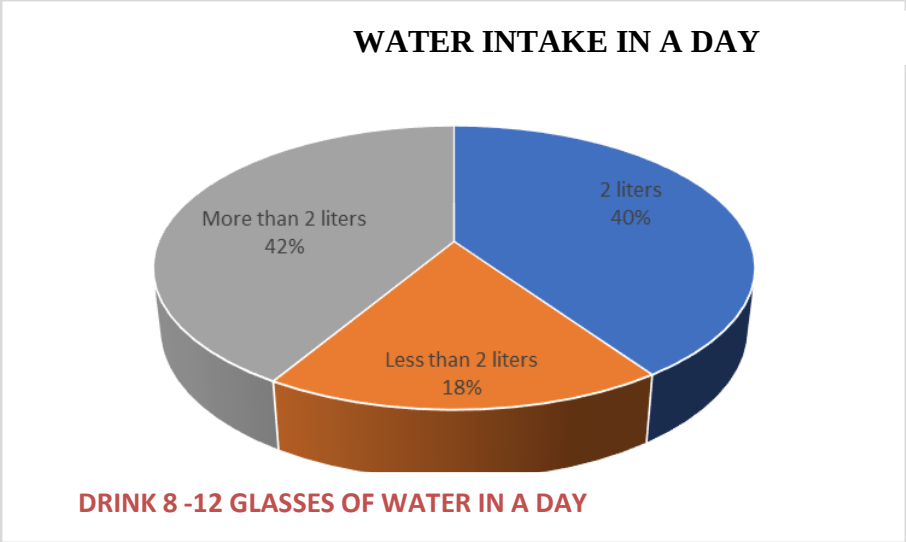
From table no 26 & figure no 36 the results shows that 57.6% of the respondents of the study had their meals less than 4 times a day, 34.3 % had their meals 4 times and 8.1% had their meals more than 4 times a day.

4.3.3.5. Water intake of selected subject

Table no 27: Water intake of selected subjects

Variables	Frequency	Percent
2 litres	40	40.4
Less than 2 litres	18	18.2
More than 2 litres	41	41.4
Total	99	100.0

Figure no 37: Water intake of selected subjects



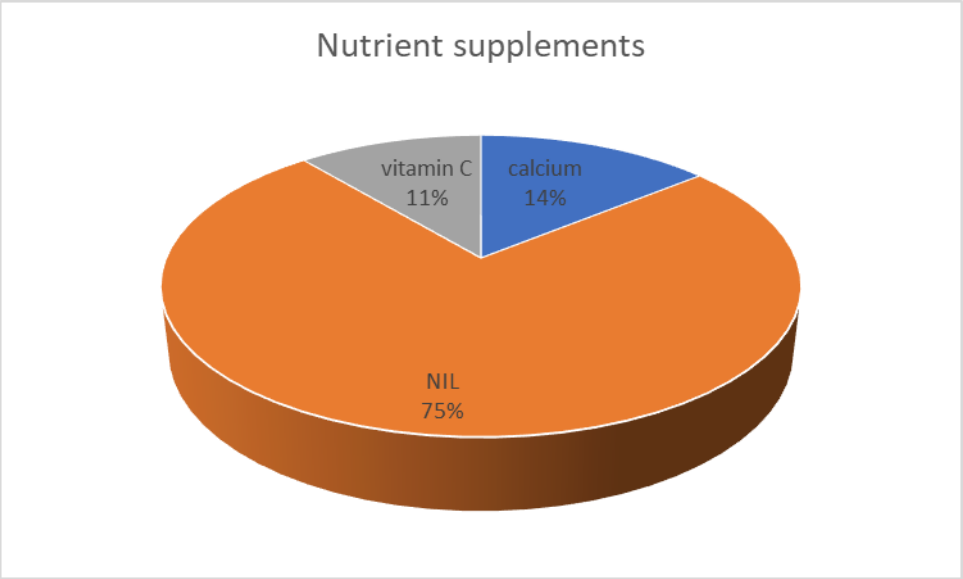
From the above table 27 and figure 37, it was observed that the majority of the respondents (41.4%) had more than 2 liters of water intake per day, 40.4% had only 2 liters of water intake and 18.2% had less than 2 liters of water intake per day.

4.4.3.6. Intake of nutrient supplements during covid pandemic

Table no 28: Intake of nutrient supplements by selected subjects

Variables	Frequency	Percent
Calcium	14	14.1
Nil	74	74.7
Vitamin C	11	11.1
Total	99	100.0

Figure no 38: Intake of nutrient supplements by selected subjects



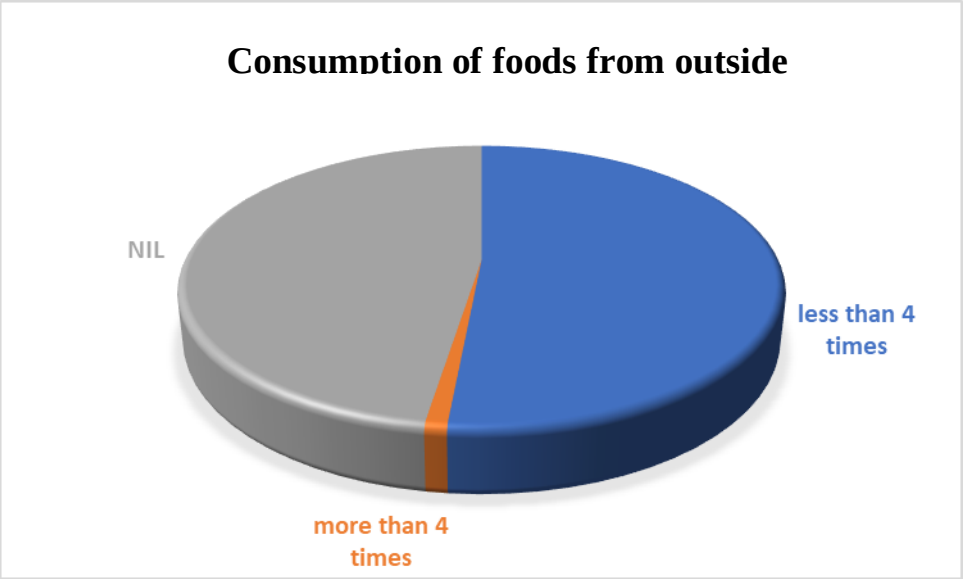
From the above table 28 and figure 38, it was observed that 14.1% of the respondents include calcium rich food in their diet, 74.7% does not include any nutrient supplements to their diet and 11.1% respondents consume food rich in vitamin C in their diet.

4.4.3.7. Consumption of outside foods by the subjects

Table no 29: Consumption of outside foods by the subjects

Variables	Frequency	Percent
Less than 4 times	51	51.5
More than 4 times	1	1.0
Nil	47	47.5
Total	99	100.0

Figure no 39: Consumption of outside foods by the subjects



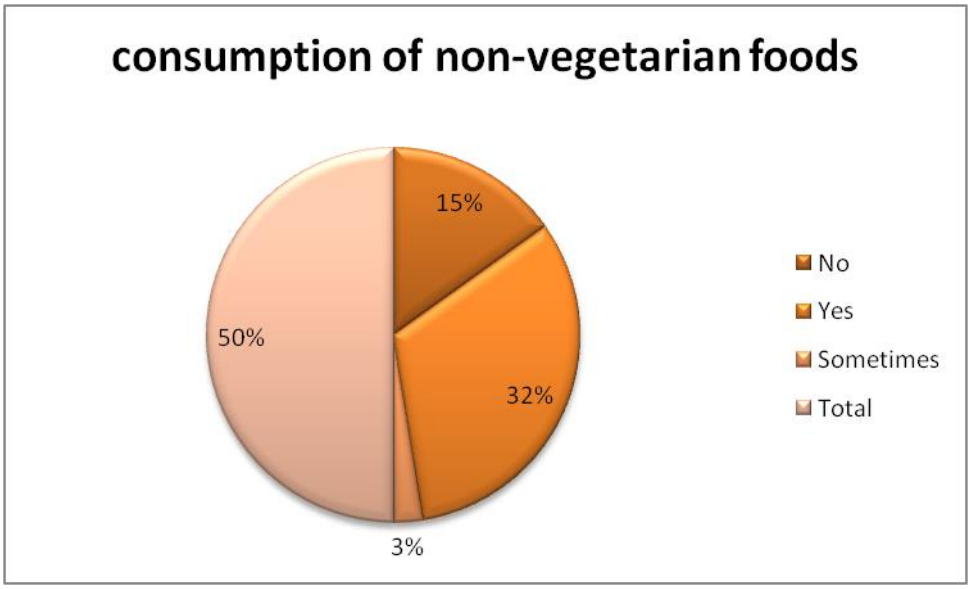
From table no 29 & figure no 39 ; while considering the consumption pattern of outside foods in selected respondents, majority of the respondents (51.5%) reported that they consumed outside foods less than 4 times a day, 47.5% of the respondents do not consume any outside food and remaining 1% consumes outside food more than 4 times per day.

4.4.3.8. Consumption of non-vegetarian foods by selected subjects

Table no 30: Consumption of non-vegetarian foods by selected subjects

Variables	Frequency	Percent
No	30	30.3
Yes	64	64.6
Sometimes	5	5.1
Total	99	100.0

Figure no 40: Consumption of non-vegetarian foods by selected subjects



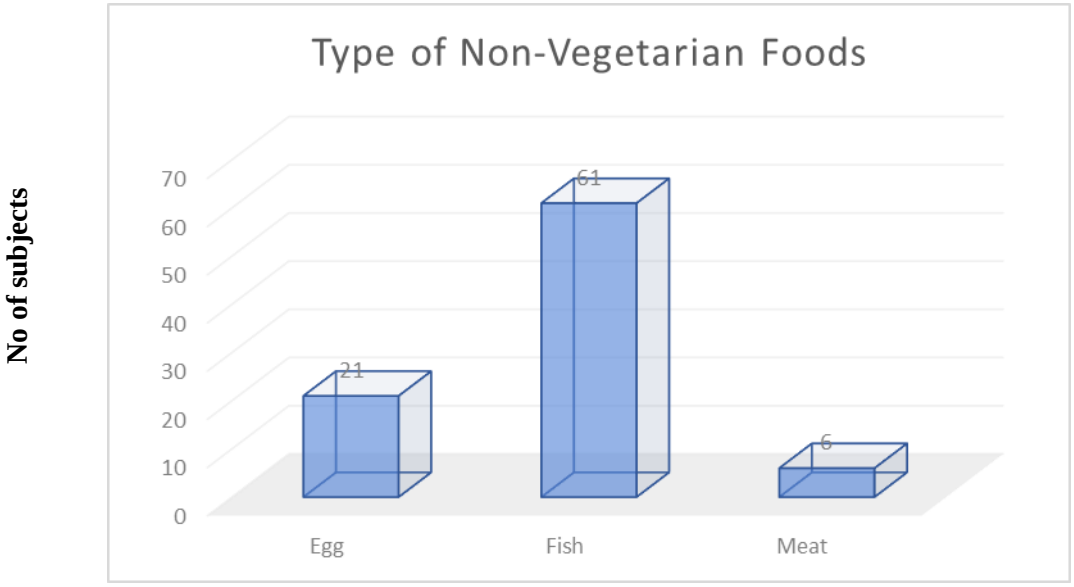
From table no 30 & figure no 40, it was found that the consumption pattern of non-vegetarian foods in selected respondents, majority of the respondents (64.6%) reported that they consumed non-vegetarian foods daily, 30.3% of the respondents do not consume any non-vegetarian food daily and remaining 5.1% sometimes consumes non-vegetarian food.

4.4.3.9. Type of non-vegetarian foods consumed by selected subjects

Table no 31: Type of non-vegetarian foods consumed by selected subjects

Variables	Frequency	Percent
Egg	21	21.2
Fish	61	61.6
Meat	6	6.1

Figure no 41: Type of non-vegetarian foods consumed by selected subjects



PRACTICE

From the above table no 31 and figure no 41, it can be seen that 21.2% of respondents consumes egg, 61.6% consumes fish and 6.1% consumes meat.

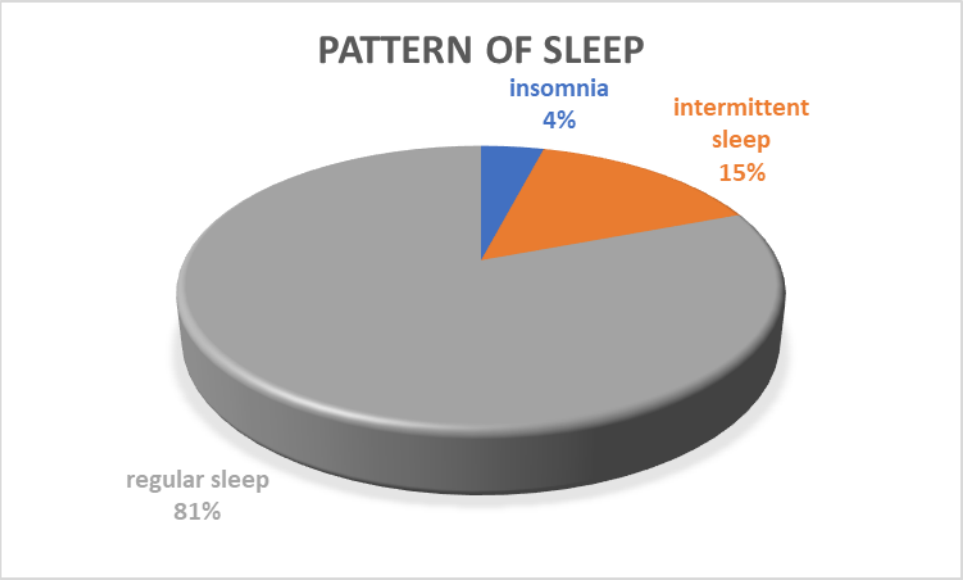
4.4.3.11. Pattern of sleep among selected subjects

According to (S De Pue, 2020) in response to stress, sleep quality can decline and increase the risk for depression. (Ben Salah A et al., 2020) found that social isolation was associated with poorer perceived sleep quality during the COVID-19 pandemic, and this relationship was mediated by depressed and anxious mood.

Table no 32: Pattern of sleep among selected subjects

Variables	Frequency	Percent
Insomnia	4	2.0
Intermittent sleep	15	15.2
Regular sleep	80	79.8
Total	99	100.0

Figure no 42: Pattern of sleep among selected subjects



From table no 32 & figure no 42 , regarding the sleeping pattern of the respondents, 2% suffers insomnia, 15.2% tooks intermittent sleep and 79.8% sleeps regularly.

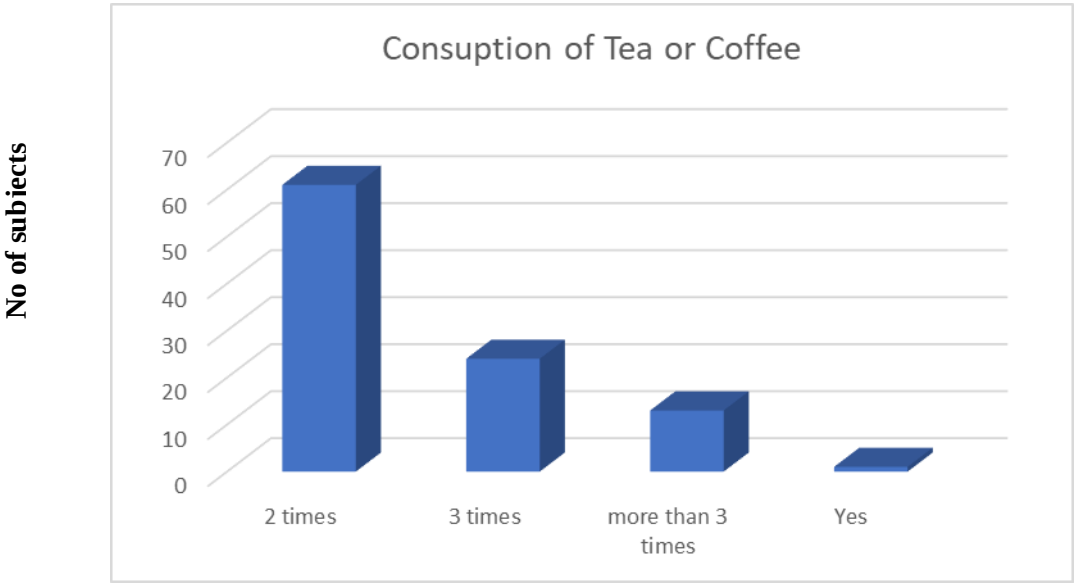
4.4.3.12. Consumption of tea or coffee among selected subjects

(K Shen ,2019) found that consistent and frequent tea consumption was associated with significantly less depressive symptoms for Chinese old individuals, even adjusting for their socioeconomic status, lifestyle, health status and social engagement.

Table no 33: Consumption of tea or coffee among selected subjects

Variables	Frequency	Percent
2 times	61	61.6
3 times	24	24.2
More than 3 times	13	13.1
Yes	1	1.0
Total	99	100.0

Figure no 43: Consumption of tea or coffee among selected subjects



PRACTICE

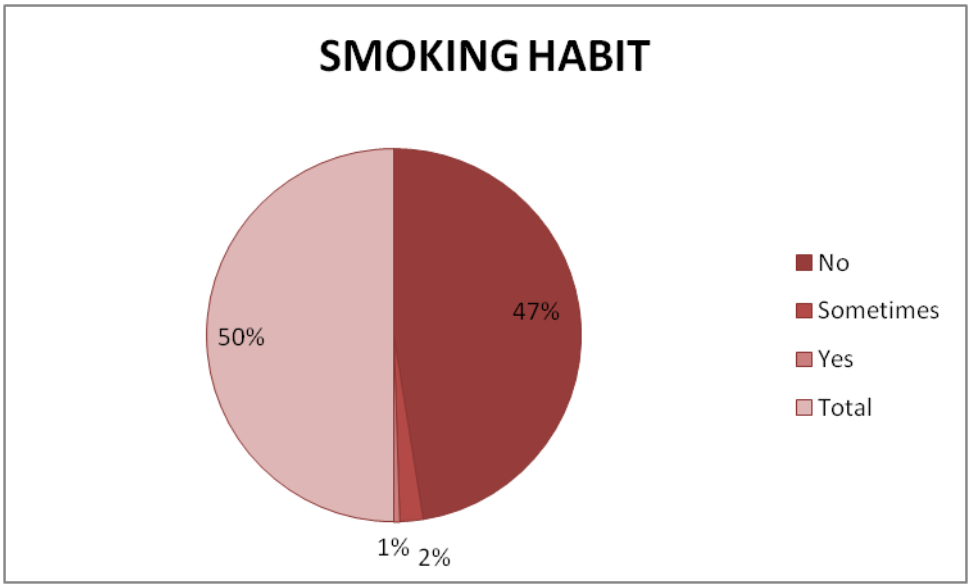
From table no 33 & figure no 43 it shows that majority (61.6%) of respondents, consumes tea or coffee 2 times per day, 24.2% of respondents consumes 3 times per day and 13.1% of respondents consumes tea or coffees more than 3 times per day.

4.4.3.13. Habit of smoking among selected subjects

Table no 34: Habit of smoking among selected subjects

Variables	Frequency	Percent
No	94	94.9
Sometimes	4	4.0
Yes	1	1.0
Total	99	100.0

Figure no 44: Habit of smoking among selected subjects



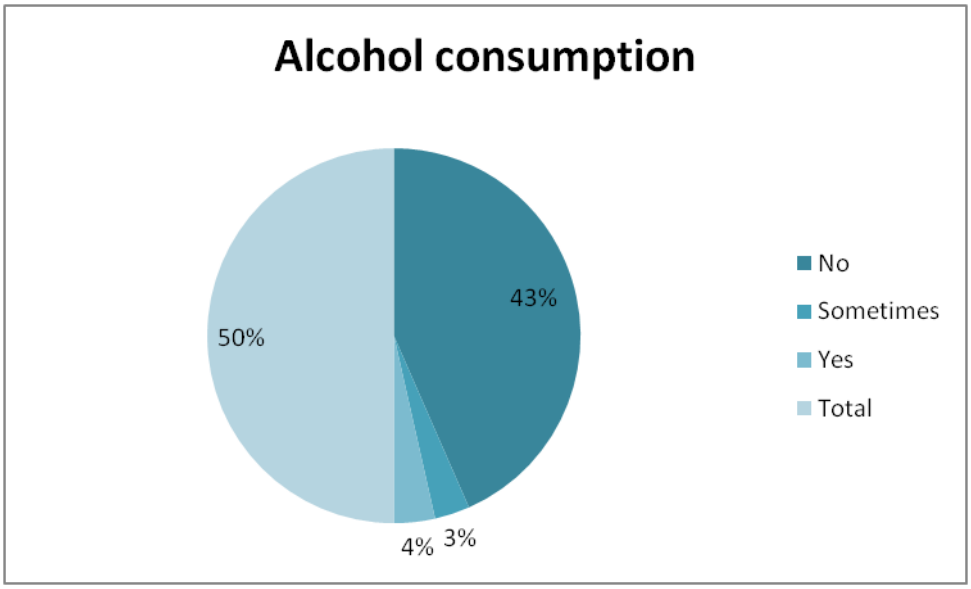
From table no 34 & figure no 44, it was understood that majority of the respondents of the study (94.9%) does not have the habit of smoking while 1% smokes usually. And 4% of respondents smoke sometimes.

4.4.3.14. Alcohol consumption of selected subjects

Table no 35: Alcohol consumption of selected subjects

Variables	Frequency	Percent
No	86	86.9
Sometimes	6	6.1
Yes	7	7.1
Total	99	100.0

Figure no 35: Alcohol consumption of selected subjects



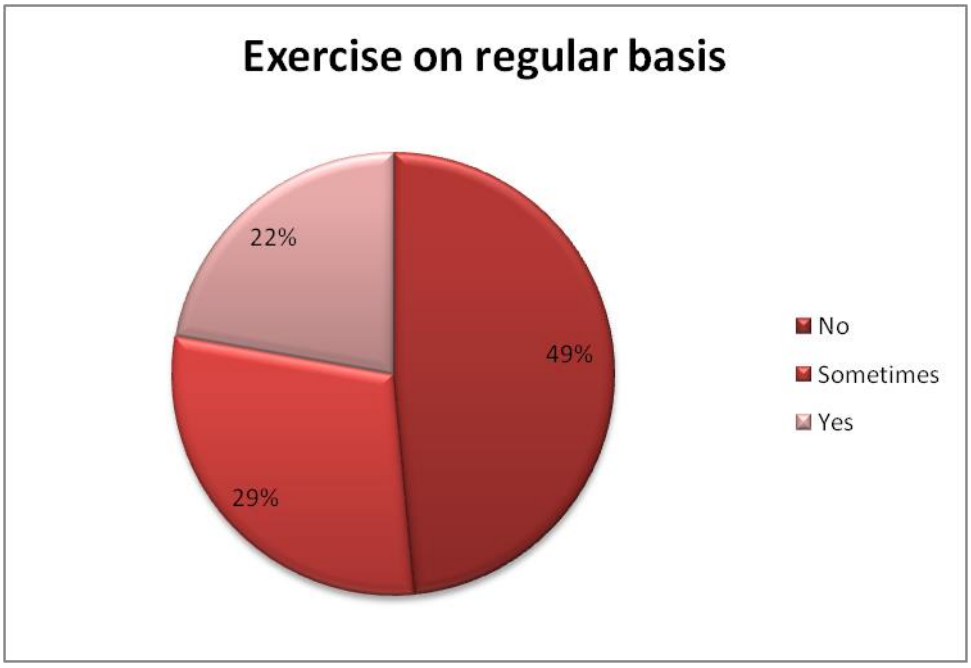
From table no 35 and figure no 45 shows that majority (86.9%) of respondents, does not consume alcohol and 7.1% of respondents were using alcohol. 6.1% of respondents sometimes consumes alcohol.

4.4.3.15. Practice of regular exercise among selected subjects

Table no 36: Practice of regular exercise among selected subjects

Variables	Frequency	Percent
No	48	48.5
Sometimes	29	29.3
Yes	22	22.2
Total	99	100.0

Figure no 46: Practice of regular exercise among selected subjects



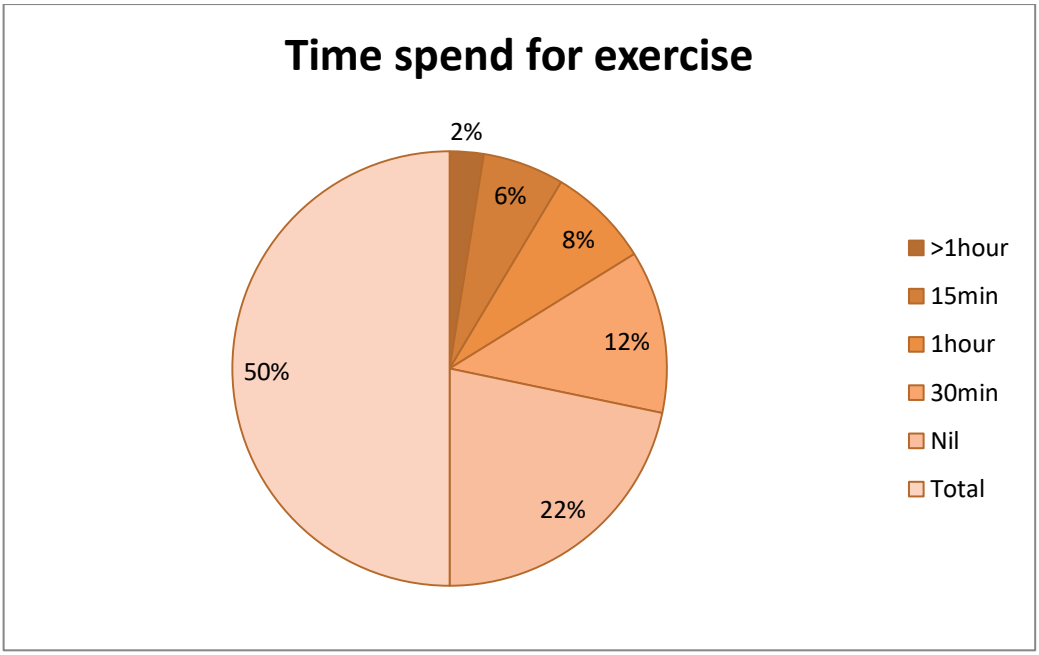
From table no 36 & figure no 46, it was found that the percentage of respondents who exercise on regular basis was 22.2, 48.5% of respondents do not exercise regularly and remaining 29% of subjects do exercise occasionally.

4.4.3.16. Duration of exercise by selected subjects

Table no 37: Duration of exercise by selected subjects

Variables	Frequency	Percent
>1hour	5	5.1
15min	12	12.1
1hour	15	15.2
30min	24	24.2
Nil	43	43.4
Total	99	100.0

Figure no 47: Duration of exercise by selected subjects



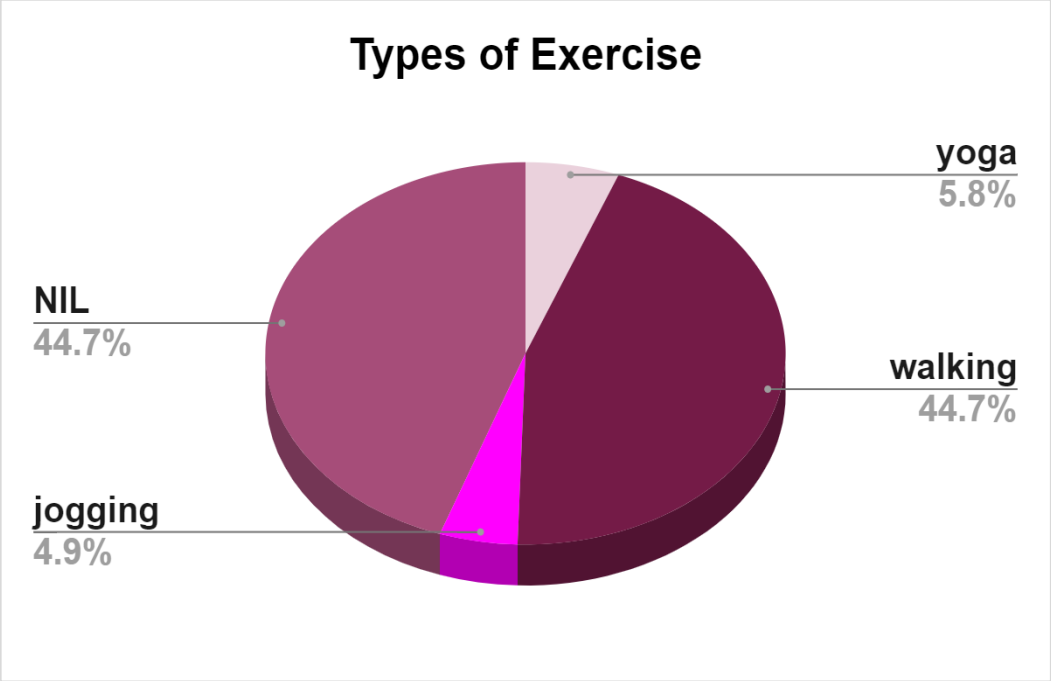
From table no 37 & figure no 47 it was found that the percentage of respondents who spend >1 hour for exercise was 5.1%, 15 min is 12.1%, 1hour was 15.2% and 30 min was 24.2% while 43.4% do not spend any time for exercise.

4.4.3.17. Types of exercise practiced among selected subjects

Table no 38: Types of exercise practiced among selected subjects

Variables	Frequency	Percent
Yoga	5	5.8
Walking	4	4.9
Jogging	44	44.7
Nil	44	44.7
Total	99	100.0

Figure no 48: Types of exercise practiced among selected subjects



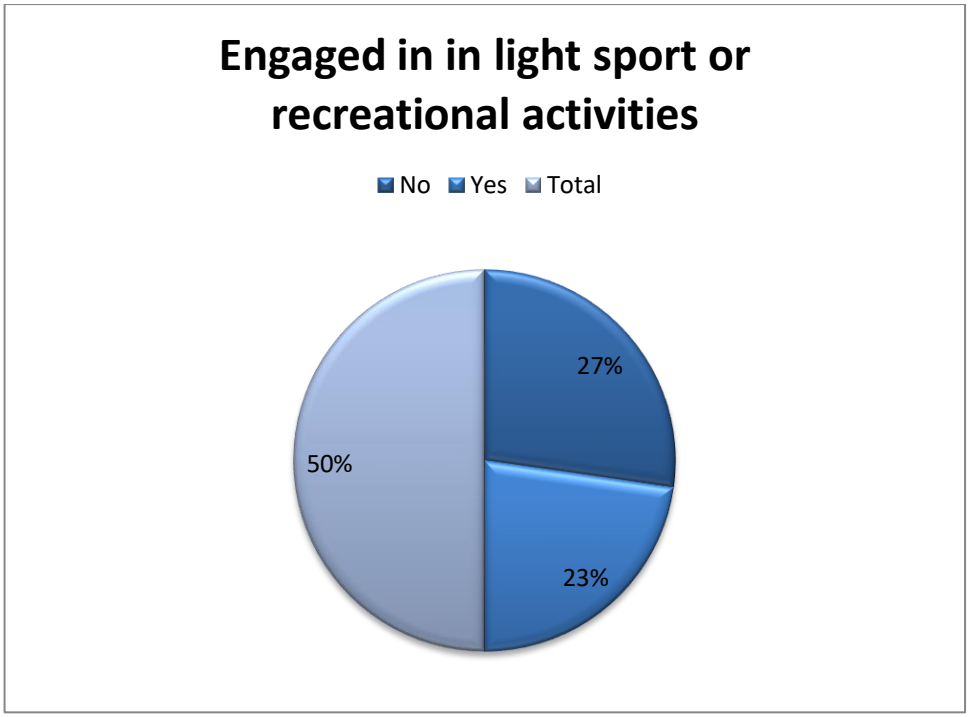
From the above table no 38 and figure no 48, it was found that 44.7% of subjects did walking on a regular basis as their exercise , 5.8% did yoga and 4.9% did jogging. 44.7% of subjects didn't do any type of exercise.

4.4.3.18. Practice of subjects in light sport or recreational activities

Table no 39: Practice of subjects in light sport or recreational activities

Variables	Frequency	Percent
No	54	54.5
Yes	45	45.5
Total	99	100.0

Figure no 49: Practice of subjects in light sport or recreational activities



From table no 39 & figure no 49 it was found that the percentage of respondents engaged in light sport or recreational activities was 45.5 while those who not engaged in light sport or recreational activities was 54.5.%.

4.4. Assess the depression of selected subjects

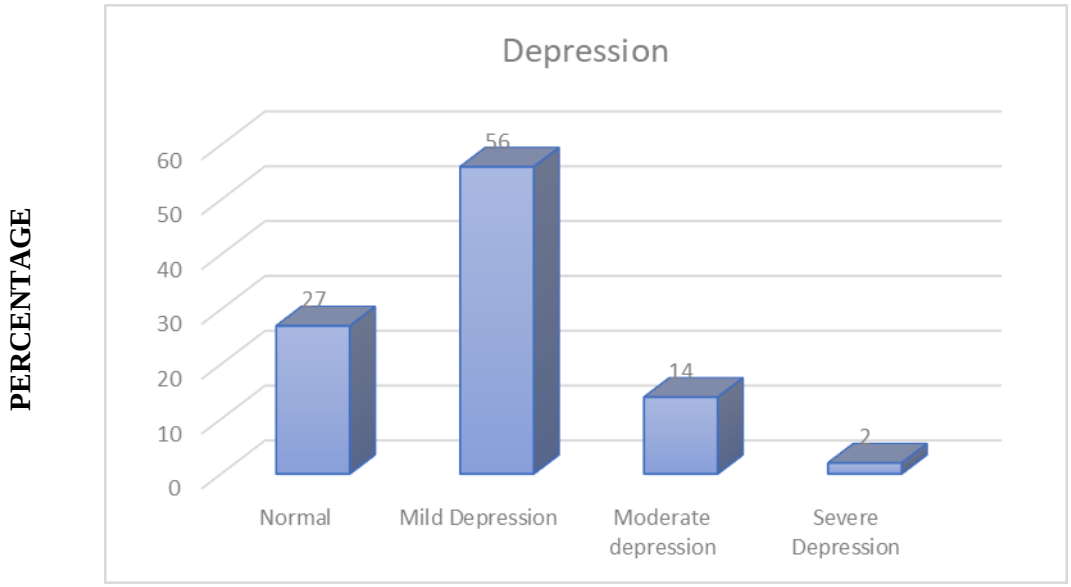
According to (De Pue et al., 2021), COVID-19 pandemic had a severe impact on the mental health of older adults. Older adults have been especially impacted by the corona virus pandemic, as they are at higher risk of serious illness. (Santini et al.,2020) demonstrated that social disconnection puts older adults at greater risk of depression and anxiety.

The severity of depression is assessed in the study using Geriatric depression scale. The Geriatric Depression Scale: Short Form is a 15-question screening tool for depression in older adults was used to assess the mental health of elderly. Of the 15 items, 10 indicate the presence of depression when answered positively while the other 5 are indicative of depression when answered negatively.

Table no 40: Percentage and frequency distribution of depression level.

Types of depression	Frequency	Percent
Normal	27	27.3
Mild depression	56	56.6
Moderate depression	14	14.1
Severe depression	2	2.0

Figure no 50: **Percentage and frequency distribution of depression level**

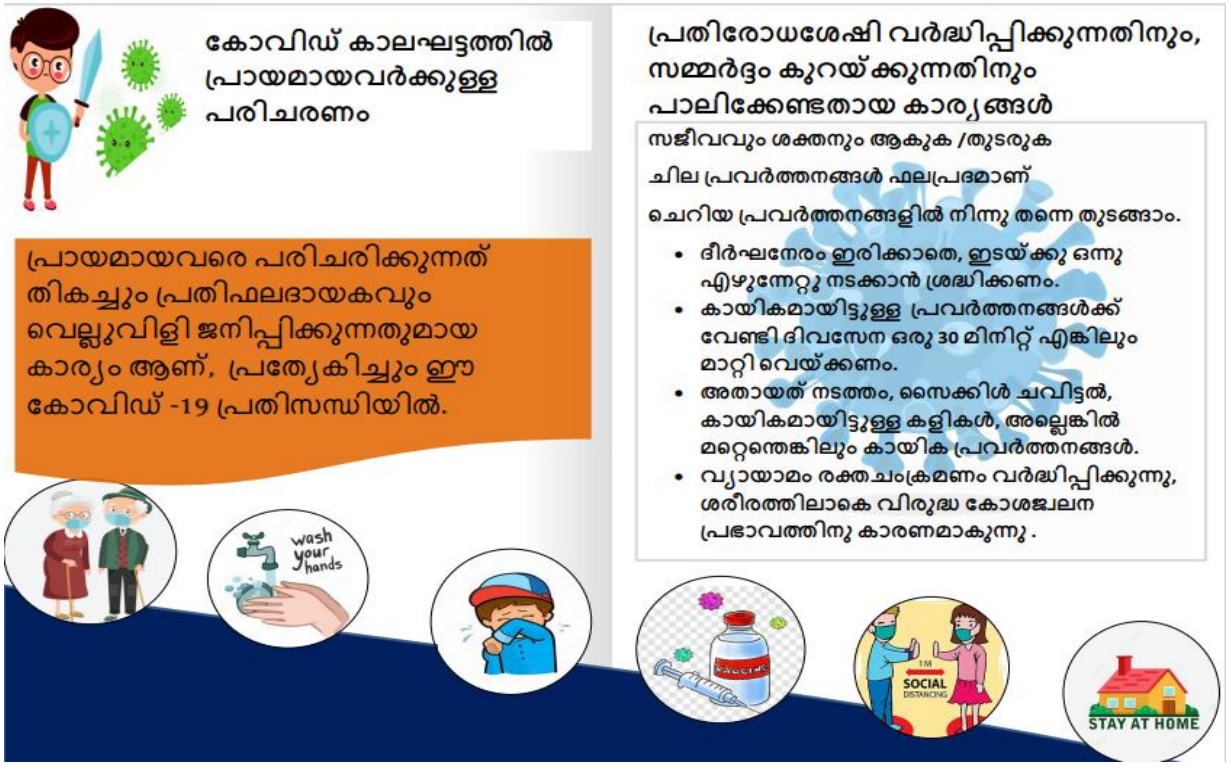


Depression level

According to depression level, the respondents were grouped in to four category as normal, mild depression, moderate depression and severe depression. From table no 41 & figure no 51, it was found that Majority (56.6%) of respondents belong to mild depression category, 27.3% belongs to the normal category, 14.1% belongs to moderate depression category and rest 2% of the respondents belongs to the category of severe depression level.

4.6. Development of an educational tool for conducting an awareness for selected samples.

Awareness was conducted among the selected 99 subjects through inter personal communication. This imparted knowledge on causes, risk factors leading to corona virus. The selected subjects were explained about the management techniques through the practice of healthy food habits, increasing consumption of immune rich foods and the importance of physical exercise. A brochure was developed for elderly regarding the precautions to be taken to prevent covid, the importance of a balanced diet and immune rich nutrients were highlighted and distributed among the selected 99 subjects.



4.7. Testing hypothesis

4.7.1. Correlation between consumption of immune boosting nutrients and Body mass index

For finding correlation between consumption of immune boosting foods and Body mass index of elderly, Pearson correlation coefficient was used. The null hypothesis states that "there is no correlation between consumption of immune boosting foods and Body mass index" and alternate hypothesis was "there is a correlation between consumption of immune boosting nutrients and Body mass index"

Table no 41: Correlation between consumption of immune boosting nutrients and Body mass index

Correlations

		BMI	Immune boosting
BMI	Pearson Correlation	1	.122
	Sig. (2-tailed)		.231
	N	99	99
Immune boosting	Pearson Correlation	.122	1
	Sig. (2-tailed)	.231	
	N	99	99

From the above table, P value is 0.231 which is greater than the significance level 0.05. By analyzing result there is no correlation between consumption of immune boosting foods and Body mass index. Hence, we accept null hypotheses at significant level 0.05 by rejecting alternate hypothesis.

4.7.2. Correlation between attitude toward calcium intake and frequency of calcium intake

For finding correlation between attitude toward calcium intake and frequency of calcium intake of elderly, Pearson correlation coefficient was used. The null hypothesis states that "there is no correlation between attitude toward calcium intake

and frequency of calcium intake." The alternate hypothesis was formulated as "there is a correlation between attitude toward calcium intake and frequency of calcium intake."

Table no 42: Correlation between attitude toward calcium intake and frequency of calcium intake

Correlations

		Frequency of Calcium	attitude toward calcium intake
Frequency of Calcium	Pearson Correlation	1	.085
	Sig. (2-tailed)		.401
	N	99	99
attitude toward calcium intake	Pearson Correlation	.085	1
	Sig. (2-tailed)	.401	
	N	99	99

From the above table, P value is 0.401 which is greater than the significance level 0.05. Hence, we accept null hypotheses at significant level 0.05. Hence, that there is no correlation between attitude toward calcium intake and frequency of calcium intake. Then the null hypothesis was rejected therby,they have an attitude but still they are not practicing.

4.7.3. Correlation between attitude towards intake of balanced diet and practice among them

For finding correlation between attitude towards balanced diet and practice among them, Pearson correlation coefficient was used. The null hypothesis states "that there is no correlation between attitude towards intake balanced diet and practice among them" and alternate hypothesis was "there is a correlation between attitude towards intake balanced diet and practice among them".

Table no 43: Correlation between attitude towards balanced diet and practice among them

Correlations

		Practice of balanced diet	attitude towards balanced diet
Practice of balanced diet	Pearson Correlation	1	.207*
	Sig. (2-tailed)		.040
	N	99	99
attitude towards balanced diet	Pearson Correlation	.207*	1
	Sig. (2-tailed)	.040	
	N	99	99

*. Correlation is significant at the 0.05 level (2-tailed).

From the above table, P value is 0.040 which is less than the significance level 0.05. By analyzing the result there is a positive correlation between attitude and practice towards intake of balanced diet. Then the null hypothesis was rejected by accepting the alternate hypothesis.

4.7.4. Comparison between knowledge of immune boosters and consumption of them.

For statistically interpreting data comparison of knowledge about immune boosters and consumption of immune boosters, chi square test was used. The null hypothesis states that "there is no association between knowledge about immune boosters and consumption of immune boosters" and alternate hypothesis was formulated "there is an association between knowledge about immune boosters and consumption of immune boosters"

Table no 44: Comparison between knowledge of immune boosters and consumption of them

Crosstab

		Consumption		
		No	Yes	Total
Aware about immune boosting foods	No	20	0	20
	Not sure	33	1	34
	Yes	31	14	45
Total		84	15	99

Chi-Square Tests

	Value	Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	16.430[a]	2	.001
Likelihood Ratio	19.393	2	.001
N of Valid Cases	99		

From the above table, P value is 0.001 which is less than the significance level 0.05. By analysing the result there is a significant correlation between knowledge of immune boosters and consumption of immune boosters. Then the null hypothesis was rejected by accepting the alternate hypothesis. From this it is clear that there is a relation between knowledge of immune boosters and consumption of immune boosters**.**

4.7.5. Comparison between pattern of sleep and consumption of tea or coffee of elderly

For statistically interpreting data comparison of pattern of sleep and consumption of tea or coffee of elderly, chi square test was used. The null hypothesis states that “there is no association between pattern of sleep and consumption of tea or coffee of elderly” alternate hypothesis was formulated “there is an association between pattern of sleep and consumption of tea or coffee of elderly.

Table no 45 : Comparison between pattern of sleep and consumption of tea or coffee

		Pattern of sleep			
		insomnia	intermittent sleep	regular sleep	Total
Consumption of tea /coffee	2 times	2	8	51	61
	3 times	2	2	20	24
	more than 3 times	0	4	9	13
	Yes	0	1	0	1
Total		4	15	80	99

Chi-Square Tests

	Value	Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	10.597[a]	6	.102
Likelihood Ratio	8.720	6	.190
N of Valid Cases	99		

From the above table, P value is 0.102 which is greater than the significance level 0.05. Thus, there is no association between pattern of sleep and consumption of tea or coffee of elderly. Hence, we accept null hypotheses by rejecting alternate hypothesis.

4.7.6. Comparison between depression and consumption of tea and coffee of elderly

For statistically interpreting data comparison of depression and consumption of tea and coffee of elderly, chi square test was used. The null hypothesis states that

"there is no association between depression and consumption of tea and coffee of elderly". The alternate hypothesis was that "there is an association between depression and consumption of tea and coffee of elderly"

Table no 46: Comparison between depression and consumption of tea and coffee of elderly

Crosstab

		Depression				
		Mild Depression	Moderate depression	Normal	Severe Depression	Total
Consumption of tea or coffee	2 times	40	11	8	2	61
	3 times	12	1	11	0	24
	more than 3 times	3	2	8	0	13
	Yes	1	0	0	0	1
Total		56	14	27	2	99

Chi-Square Tests

	Value	Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	21.097[a]	9	.012
Likelihood Ratio	22.526	9	.007
N of Valid Cases	99		

From the above table, P value is 0.012 which is less than the significance level 0.05.By analyzing result there is an association between depression and consumption of tea and coffee of elderly .Then, the null hypotheses was rejected by accepting alternate hypothesis. From this it is clear that there is an association between depression and consumption of tea and coffee of elderly

4.7.7. Comparison between depression and diabetic condition of elderly

For statistically interpreting data comparison of depression and diabetic condition of elderly, chi square test was used. The null hypothesis states that "there is no association between depression and diabetic condition of elderly" and alternate was "there is an association between depression and diabetic condition of elderly"

Table no 47: Comparison between depression and diabetic condition

Crosstab

		Depression				
		Mild Depression	Moderate depression	Normal	Severe Depression	Total
diabetic	No	30	5	21	2	58
	Yes	26	9	6	0	41
Total		56	14	27	2	99

Chi-Square Tests

	Value	Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	9.1114	3	0.02785
N of Valid Cases	99		

From the above table, P value is 0.02785which is less than the significance level 0.05. By analyzing result there is an association between depression and diabetic condition of elderly. Hence, we reject null hypotheses at significance level 0.05 by accepting alternate hypothesis.

4.7.8. Comparison between depression and cholesterol of elderly

For statistically interpreting data comparison of depression and cholesterol of elderly, chi square test was used. The null hypothesis states that "there is no

association between depression and cholesterol level of elderly" and alternate hypothesis was "there is an association between depression and cholesterol level of elderly".

Table no 48: Comparison between depression and cholesterol of elderly

Crosstab

		Depression				
		Mild Depression	Moderate depression	Normal	Severe Depression	Total
Do you have cholesterol	No	46	6	25	1	78
	Yes	10	8	2	1	21
Total		56	14	27	2	99

Chi-Square Tests

	Value	Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	15.262[a]	3	.002
Likelihood Ratio	13.612	3	.003
N of Valid Cases	99		

From the above table, P value is 0.002 which is less than the significance level 0.05. By analyzing result there is an association between depression and cholesterol of elderly. Hence, we reject null hypotheses by accepting alternate hypothesis.

4.7.9. Comparison between depression and elevated blood pressure of elderly

For statistically interpreting data comparison of depression and elevated blood pressure of elderly, chi square test was used. The null hypothesis states that "there is

no association between depression and elevated blood pressure of elderly" and alternate hypothesis was "there is an association between depression and elevated blood pressure of elderly"

Table no 49: Comparison between depression and elevated blood pressure

Crosstab

		Depression				
		Mild Depression	Moderate depression	Normal	Severe Depression	Total
Do you suffer from elevated blood pressure	No	36	7	20	1	70
	Yes	10	7	7	1	29
Total		56	14	27	2	99

Chi-Square Tests

	Value	Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	12.174	3	0.001989
N of Valid Cases	99		

From the above table, P value is 0.006811 which is less than the significance level 0.05. Thus, there is an association between depression and elevated blood pressure of elderly. Hence, we reject null hypotheses at significance level 0.05 and accepting the alternate hypothesis .Thus, there is an association between depression and elevated blood pressure of elderly.

From the above tables no 47,48 &49 it was proved that underlying diseases contribute to depression.

4.7.10. Comparison between Gender differences in depression level

For statistically interpreting data gender difference in depression level, independent sample t test was used. The null hypothesis states that "there is no significant gender difference in depression level" and alternate hypothesis was that "there is a significant gender difference in depression level"

Table no 50: Comparison between Gender differences in depression level

Group Statistics

	SEX	N	Mean	Std. Deviation	Std. Error Mean
Depression scale	Male	44	5.20	2.119	.320
	Female	55	6.62	2.361	.318

Independent Samples Test

	t-test for Equality of Means				
	t	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Depression scale	-3.097	97	.003	-1.414	.457

From the above table, P value is 0.457 which is greater than the significance level 0.05. Thus, there is no significant gender difference in depression level. Hence, we accept null hypotheses at significance level 0.05.

4.7.11. Correlation between food intake and physical activity

For finding correlation between food intake and physical activity of elderly, Pearson correlation coefficient was used. The null hypothesis states that "there is no

correlation between food intake and physical activity" and alternate hypothesis was formulated "there is a correlation between food intake and physical activity"

Table no 51: Correlation between food intake and physical activity

Correlations

		Food Intake	Physical Activity
Food Intake	Pearson Correlation	1	.335
	Sig. (2-tailed)		.024
	N	99	99
Physical Activity	Pearson Correlation	.335	1
	Sig. (2-tailed)	.024	
	N	99	99

From the above table, P value is 0.0245 which is less than the significance level 0.05. By analyzing the result there is a positive correlation between food intake and physical activity. Then, we reject null hypotheses by accepting alternate hypothesis.

4.7.12. Correlation between food intake and depression

For finding correlation between food intake and depression of elderly, Pearson correlation coefficient was used. The null hypothesis states that "there is no correlation between food intake and depression" and alternate hypothesis was "there is a correlation between food intake and depression"

Table no 52: Correlation between food intake and depression

Correlations

		Food Intake	Depression scale
Food Intake	Pearson Correlation	1	-.204
	Sig. (2-tailed)		.005
	N	99	99
Depression scale	Pearson Correlation	-.204	1
	Sig. (2-tailed)	.005	
	N	99	99

From the above table, P value is 0.005 which is less than the significance level 0.05. Hence, we reject null hypotheses at significant level 0.05. By analyzing the result there is significant negative correlation between food intake and depression. Then the null hypothesis was rejected by accepting alternate hypothesis .

4.7.13. Comparison between depression and pattern of sleep of elderly

For statistically interpreting data comparison of depression and pattern of sleep, chi square test was used. The null hypothesis states that “there is no association between depression and pattern of sleep of elderly”. The alternate hypothesis was formulated that “there is an association between depression and pattern of sleep of elderly”

Table no 53: Comparison between depression and pattern of sleep of elderly

Crosstab

		Depression				
		Mild Depression	Moderate depression	Normal	Severe Depression	Total
Pattern of sleep	Insomnia	1	3	0	0	4
	intermittent sleep	6	3	6	0	15
	regular sleep	49	8	21	2	80
Total		56	14	27	2	99

Chi-Square Tests

	Value	Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	16.041[a]	6	.014
N of Valid Cases	99		

From the above table, P value is 0.014 which is less than the significance level 0.05. Thus, there is an association between depression and pattern of sleep of elderly. Hence, we reject null hypotheses at significance level 0.05 by accepting the alternate hypothesis.

4.7.14. Comparison between depression and physical activity of elderly

For statistically interpreting data comparison of depression and physical activity of elderly, chi square test was used. The null hypothesis states that "there is no association between depression and physical activity of elderly" and alternate hypothesis was formulated "there is an association between depression and physical activity of elderly"

Table no 54: Comparison between depression and physical activity of elderly

Crosstab

		Depression				
		Mild Depression	Moderate depression	Normal	Severe Depression	Total
Physical activity	No	37	9	7	1	54
	Yes	19	5	20	1	45
Total		56	14	27	2	99

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	12.473[a]	3	.006
Likelihood Ratio	12.756	3	.005
N of Valid Cases	99		

From the above table, P value is 0.006 which is less than the significance level 0.05. Thus, there is an association between depression and physical activity of elderly. Hence, we reject null hypotheses at significance level 0.05 by accepting alternate hypothesis.

4.7.15. Standard deviation of body mass index of selected subjects

Table no 55: Standard deviation of body mass index

Report

BMI.	Mean	N	Std. Deviation
Normal	22.578	55	1.7273
Obese	33.223	13	1.6488
Preobese	26.759	29	1.4364
Underweight	16.550	2	1.0607
Total	25.079	99	4.1480

While statistically analysing the body mass index of the elderly using standard deviation it stated that 4.1480 is the standard deviation.

4.7.16. Standard deviation of 24-hour recall of selected subjects

Table no 56: Standard deviation of 24-hour recall

Nutritive Value	Mean	RDA	Mean ± Std. Deviation		
ENERGY	1687.59	1600.00	1643.80	±	281.94
PROTEIN	42.96	50.00	46.48	±	8.19
FAT	15.81	20.00	17.90	±	3.90
CHO	270.29	130.00	200.14	±	34.67
CALCIUM	489.26	1200.00	844.63	±	85.01
IRON	9.49	19.00	14.24	±	2.38
VITAMIN C	34.37	72.50	53.44	±	3.62
ZINC	23.70	15.10	19.40	±	3.19

Standard deviation of the 24 hour recall was calculated and it was found that the mean of energy (1643.80±281.94) was found higher than the RDA recommended value (1600kcal) for elderly. Regarding protein level the mean of protein (46.48±8.19) was lower when compared to RDA (50g) for elderly. In case of fat mean of fat (17.90 ± 3.90) was less than the RDA (20g) recommendedfor elderly. In case of Cholesterol mean of Cholesterol (200.14 ± 34.67) was greater than the RDA (130g) recommended for elderly. In case of calcium mean of calcium (844.63 ± 85.01) was less than the RDA (1200g) recommended for elderly. In case of iron (14.24 ±2.38) was the mean iron which indicates a lower level of when comparing with RDA (19g) for elderly. In case of zinc, 19.40 ± 3.19 was the mean zinc which was lower when compared to RDA recommended (15.10). Mean vitamin C (53.44 ± 3.62) was found to be lower when compared with RDA recommendation (72.50).

SUMMARY AND CONCLUSION

5. SUMMARY AND CONCLUSION

Corona virus disease (COVID-19) is an infectious disease caused by the severe acute respiratory syndrome corona virus 2 (SARS-CoV-2), which was first detected in December 2019 in the city of Wuhan, China. According to the WHO (2020), the elderly is considered a risk of contagion from COVID-19 due to vulnerability and death due to physiological fragility caused by the aging process.

The study entitled "ASSESSMENT OF KAP ON THE NUTRITIONAL STATUS , PSYCHOLOGICAL BEHAVIOUR AND PHYSICAL ACTIVITY OF ELDERLY DURING CORONA VIRUS DISEASE PANDEMIC" was done with following objectives : to assess the KAP of nutritional and life style habits of elderly, to identify the psychological problems of selected subjects during pandemic , to determine the physical activities of elderly , to assess the nutritional status of selected subjects , to identify the eating pattern among elderly ,to determine underlying disease contributes to any psychological problems ,to provide intervention program to the selected subjects.

The subjects were chosen from Trivandrum .Totally 99 subjects (60-80 years) of elderly were taken for the study. Data regarding to the present study was consolidated, analysed statistically and conclusion drawn from the results were summarized below:

1. Out of 99 selected subjects majority of the selected respondents were from urban area and minority of people from rural area.

2. The socio-economic status reveals that 55.6% of the respondents are male and 44.4% of patients are female. Regarding their educational qualification, majority of respondents have high school level education. Classify the subjects on the basis of occupation, 5.1% subjects were in the field of agriculture and 5.1% were business accounted. Only 13.1% of respondents were employed, 1% was government employee, 21.2% were house wives, 31.3% were not working, and 23.2% were retired.

3. Anthropometric measurement such as height, weight and BMI were taken and the data collected was analyzed and tabulated. From the data it was found that 29% of subjects were pre obese, 13.1% of the subjects were obese and 2% of the subjects belong to underweight.

4. By analyzing biochemical parameters (blood sugar, cholesterol, BP) of the selected subjects and it reveals that 42% subjects were found to be diabetic, 22% subjects suffer from cholesterol and 30.6% subjects suffer from elevated blood pressure.

5. Food frequency consumption of selected subjects was collected in order to check the food frequency consumption of various food groups. While considering the cereal group rice was the most consumed cereal product. Regarding pulses, Pulses were consumed on weekly basis by the subjects ; among them bengal gram was the most consumed pulse with 79.8% and soya bean was least consumed with 42.4%.

6. Regarding green leafy vegetables, spinach was the most consumed green leafy vegetable . Orange was the most consumed fruit with 60.6 % and passion fruit was the least consumed. Coconut oil was the most consumed oil and papad was the most consumed processed food

7. While analyzing the 24 hour recall it was found that the mean intake of energy (1687.59Kcal) which is higher than RDA. In case of protein (42.96g) lower RDA can be observed which indicate that the subjects have lower protein level. The mean intake of Iron (9.49g) , calcium (489.26) , vitamin C(34.37) and zinc (23.70g) was found to be lower than the standard value

8. Regarding the knowledge Attitude Practice of the selected subjects, Majority of subjects had a good knowledge and positive attitude regarding covid pandemic. While considering knowledge of immune boosting foods, majority of subjects were unaware and majority of them are not consuming immune boosting foods in their diet.

9. Regarding the knowledge of healthy eating pattern of selected elderly , 37 respondents are aware about the specific nutrients that elders should follow, Only 45 subjects are aware about immune boosting foods i.e. majority of them are not aware of immune boosting foods. Seventy one subjects of them are aware about the importance of vitamins in our diet.

10. Majority of the subjects (i.e. 52) are not aware about geriatric nutrition. Eighty nine subjects know the importance of fruits and vegetables in our diet, 66 respondents know the importance of fibre in our diet, and majority of the respondents (i.e. 40) are not sure about the type of fat which is good for health.

11. About 78% had a positive attitude towards calcium intake and bone health. And remaining 22% had a negative attitude.

12. Among the 99 samples 69 subjects had a positive attitude towards practice of balanced diet and 30 subjects had negative attitude.

13. Regarding practice of balanced diet, it was found that majority of the respondents i.e. 50.5% follow balanced diet, 40.4% are not sure about the balanced diet, whereas, 9.1% do not follow balanced diet.

14. Regarding the food preference of the subjects 87.9% prefer home-made food, 11.1% prefers purchased food and the remaining 2% respondents prefer processed food.

15. About their food intake in a day 57.6% of the respondents of the study have their meals less than 4 times a day, 34.3 % have their meals 4 times and 8.1% have their meals more than 4 times a day.

16. Regarding water intake it was observed that the majority of the respondents (41.4%) had more than 2 liters of water intake per day, 40.4% had only 2 liters of water intake and 18.2% had less than 2 liters of water intake per day. It was observed that 14.1% of the respondents include calcium rich food in their diet, 74.7% does not include any nutrient supplements to their diet and 11.1% respondents include food containing vitamin C in their diet.

17. Regarding the consumption pattern of Non-Vegetarian foods daily in selected respondents, majority of the respondents (64.6%) reported that they consumed Non-Vegetarian foods daily, 30.3% of the respondents do not consume any Non-Vegetarian food and remaining 5.1% sometimes consumes Non-Vegetarian food. Among them 21.2% of respondents consumes egg, 61.6% consumes fish and 6.1% consumes meat.

18. Regarding the sleeping pattern of the respondents, 2% suffers insomnia, 15.2% takes intermittent sleep and 79.8% sleeps regularly.

19. Regarding the consumption of tea/coffee that majority 61.6% of respondents consumes tea or coffee 2 times per day, 24.2% of respondents consumes 3 times per day and 13.1% of respondents consumes tea or coffees more than 3 times per day.

20. Regarding the physical activity only 22.2% of elderly exercised daily , 48.5% of respondents do not exercise regularly and rest of the respondents 49% doing exercise sometimes but not regularly. Since most of the selected elderly have reduced physical activity. Also majority of selected subjects are not engaged in any recreational activities.

21. Out of 99 samples 56.6% of subjects belong to mild depression category, 14.1% belongs to moderate depression category and rest 2% of the respondents belongs to the category of severe depression level which was measured using standard questionnaire of Geriatric Depression Scale

22. Different statistical comparison with different parameters such as depression and pattern of sleep, consumption of tea /coffee and pattern of sleep, food intake and physical activity and knowledge of immune boosting foods and consumption of them reveals that these parameters have significant association.

CONCLUSION

The present study was conducted to assess the Knowledge, Attitude and Practices of nutritional and lifestyle habits among elderly. The main findings of the study indicate that the majority of subjects minimal aware of healthy life style and balanced diet .It was also found that the selected elderly had poor consumption of vitamin C and zinc when compared with the RDA recommendation. Most of them are not engaged in any recreational activities and the subjects belong to mild depression category are high.

The main mental and physical outcomes reported were, depression, poor sleep quality and physical inactivity during the pandemic. The present study concluded that mental and physical health of elderly people during current pandemic are negatively affected to the food intake and nutritional status. It is important to keep elderly people mentally and physically healthy for their overall health and well being.

LIMITATIONS

- Direct nutritional awareness among the patients was difficult due to the limitations of covid pandemic.

•Most of the data are self reported, one has to believe what other say without evidences

BIBLIOGRAPHY

BIBLIOGRAPHY

1. Apicella M, Campopiano MC, Mantuano M, Mazoni L, Coppelli A, Del Prato S. COVID-19 in people with diabetes: understanding the reasons for worse outcomes. Lancet Diabetes Endocrinol. 2020 Sep;8(9):782-792. doi: 10.1016/S2213-8587(20)30238-2. Epub 2020 Jul 17. Erratum in: Lancet Diabetes Endocrinol. 2020 Oct;8(10):e5. Erratum in: Lancet Diabetes Endocrinol. 2020 Nov;8(11):e6. PMID: 32687793; PMCID: PMC7367664.
2. Armitage, R., & Nellums, L. B. (2020). COVID-19 and the consequences of isolating the elderly. *The Lancet. Public health*, *5*(5), e256. https://doi.org/10.1016/S2468-2667(20)30061-X

3. Baglioni, C., Spiegelhelder, K., Lombardo, C., and Riemann, D. (2010). Sleep and emotions: a focus on insomnia. Sleep Med. Rev. 14, 227–238. doi: 10.1016/j.smrv.2009.10.007

4. Bai, Y., Lin, C. C., Lin, C. Y., Chen, J. Y., Chue, C. M., & Chou, P. (2004). Survey of stress reactions among health care workers involved with the SARS outbreak. *Psychiatric Services*, *55*(9), 1055-1057.

5. Banerjee D. 'Age and ageism in COVID-19': (2020) .Elderly mental health-care vulnerabilities and needs

6. Bansal M. (2020). Cardiovascular disease and COVID-19. *Diabetes & metabolic syndrome, 14*(3), 247–250. https://doi.org/10.1016/j.dsx.2020.03.013

7. Bartlett, D. B., Willis, L. H., Slentz, C. A., Hoselton, A., Kelly, L., Huebner, J. L., et al. (2018). Ten weeks of high-intensity interval walk training is associated with reduced disease activity and improved innate immune function in older adults with rheumatoid arthritis: a pilot study. Arthritis Res. Ther. 20:127. doi: 10.1186/s13075-018-1624-x

8. BMC Public Health. (2015); 15: 249. Published online 2015 Mar 14. doi: 10.1186/s12889-015-1562-3

9. Borzuola, R., Giombini, A., Torre, G., Campi, S., Albo, E., Bravi, M., Borrione, P., Fossati, C., & Macaluso, A. (2020). Central and Peripheral Neuromuscular Adaptations to Ageing. *Journal of clinical medicine*, *9*(3), 741. https://doi.org/10.3390/jcm9030741

10. Bray GA: (1993), Fat distribution and body weight. Obesity Research. 202-205

11. Brooke, J., & Jackson, D. (2020). Older people and COVID-19: Isolation, risk and ageism. *Journal of clinical nursing*, *29*(13-14), 2044–2046. https://doi.org/10.1111/jocn.15274

12. Brooks, S. K., Webster, R. K., Smith, L. E., Woodland, L., Wessely, S., Greenberg, N., et al. (2020). The psychological impact of quarantine and how to reduce it: rapid review of the evidence. Lancet 395, 912–920. doi: 10.1016/S0140-6736(20)30460-8

13. Butler, M. J., & Barrientos, R. M. (2020). The impact of nutrition on COVID-19 susceptibility and long-term consequences. Brain, behavior, and immunity.

14. Campion E. W. (1998). Aging better. *The New England journal of medicine*, *338*(15), 1064–1066. https://doi.org/10.1056/NEJM199804093381512

15. Casagrande, M., Favieri, F., Tambelli, R., and Forte, G. (2020). The enemy who sealed the world: effects quarantine due to the COVID-19 on sleep quality, anxiety, and psychological distress in the Italian population. Sleep Med. [Preprint]. doi: 10.1016/j.sleep.2020.05.011

16. Cesari, M., Calvani, R., & Marzetti, E. (2017). Frailty in Older Persons. *Clinics in geriatric medicine*, *33*(3), 293–303. https://doi.org/10.1016/j.cger.2017.02.002

17. chneider, C., Hanakam, F., Wiewelhove, T., Döweling, A., Kellmann, M., Meyer, T., et al. (2018). Heart rate monitoring in team sports a conceptual framework for contextualizing heart rate measures for training and recovery prescriptions. Front. Physiol. 9:639. doi: 10.3389/fphys.2018.00639

18. De Groot, L. (2016). Nutritional issues for older adults: Addressing degenerative ageing with long-term studies. *Proceedings of the Nutrition Society*, *75*(2), 169-173. doi:10.1017/S0029665116000033

19. Dhama, K., Patel, S. K., Kumar, R., Rana, J., Yatoo, M. I., Kumar, A., Tiwari, R., Dhama, J., Natesan, S., Singh, R., & Harapan, H. (2020). Geriatric Population During the COVID-19 Pandemic: Problems, Considerations, Exigencies, and Beyond. *Frontiers in public health*, *8*, 574198. https://doi.org/10.3389/fpubh.2020.574198

20. Di Renzo, L., Gualtieri, P., Pivari, F., Soldati, L., Attinà, A., Cinelli, G., et al. (2020). Eating habits and lifestyle changes during COVID-19 lockdown: an Italian Survey. J. Transl. Med. 18:229. doi: 10.1186/s12967-020-02399-5

21. DiPietro, L., Buchner, D. M., Marquez, D. X., Pate, R. R., Pescatello, L. S., & Whitt-Glover, M. C. (2019). New scientific basis for the 2018 U.S. Physical Activity Guidelines. *Journal of sport and health science*, *8*(3), 197–200. https://doi.org/10.1016/j.jshs.2019.03.007

22. Eckert, K. G., & Lange, M. A. (2015). Comparison of physical activity questionnaires for the elderly with the International Classification of Functioning, Disability and Health (ICF)–an analysis of content. *BMC public health*, *15*(1), 1-11.

23. Esteve, A., Permanyer, I., Boertien, D., & Vaupel, J. W. (2020). National age and coresidence patterns shape COVID-19 vulnerability. *Proceedings of the National Academy of Sciences of the United States of America*, *117*(28), 16118–16120. https://doi.org/10.1073/pnas.2008764117

24. Ferrucci, L., Guralnik, J. M., Pahor, M., Corti, M. C., & Havlik, R. J. (1997). Hospital diagnoses, Medicare charges, and nursing home admissions in the year when older persons become severely disabled. *JAMA*, *277*(9), 728–734.

25. Fillenbaum GG, Pieper CF, Cohen HJ, et al. (2020). Comorbidity of five chronic health conditions in elderly community residents: determinants and impact on mortality. *J Gerontol A Biol Sci Med Sci*, 55(2): M84-M89.

26. Garber, C. E., Blissmer, B., Deschenes, M. R., Franklin, B. A., Lamonte, M. J., Lee, I. -M., et al. (2011). Quantity and quality of exercise for developing and maintaining cardiorespiratory, musculoskeletal, and neuromotor fitness in apparently healthy adults. Med. Sci. Sports Exerc. 43, 1334–1359. doi: 10.1249/MSS.0b013e318213fefb

27. Garnier-Crussard, A., Forestier, E., Gilbert, T., & Krolak-Salmon, P. (2020). Novel coronavirus (COVID-19) epidemic: What are the risks for older patients?. Journal of the American Geriatrics Society, 68(5), 939-940.

28. Garrow, J. S., & Webster, J. (1985). Quetelet's index (W/H2) as a measure of fatness. *International journal of obesity*, *9*(2), 147–153.

29. Gasmi, A., Noor, S., Tippairote, T., Dadar, M., Menzel, A., & Bjørklund, G. (2020). Individual risk management strategy and potential therapeutic options for the COVID-19 pandemic. *Clinical immunology (Orlando, Fla.)*, *215*, 108409. https://doi.org/10.1016/j.clim.2020.108409

30. Gavazzi, G.and Krause, K.H. (2004). Ageing and infection. Lancet Infectious Diseases, 2: 659.

31. Gerst-Emerson K, Jayawardhana J. Loneliness as a public health issue: the impact of loneliness on health care utilization among older adults. Am J Public Health. 2015; 105(5): 1013-1019. Available from: https://doi.org/10.2105/ AJPH.2014.302427

32. Greeno, C., and Wing, R. (1994). Stress-induced eating. Psychol. Bull. 115, 444–464. doi: 10.1037/0033-2909.115.3.444

33. Grubeck-Loebenstein, B., Berger, P., Saurwein-Teissl, M., Zisterer, K. and Wick, G. (1998). No immunity for the elderly. Nature Medicine, 4: 870.

34. Gur, J., Mawuntu, M., & Martirosyan, D. (2018). FFC's advancement of functional food definition. *Functional Foods in Health and Disease*, *8*(7), 385-397.

35. Haveman-Nies, A., de Groot, L. C. P., Burema, J., Cruz, J. A. A., Osler, M., & van Staveren, W. A. (2002). Dietary quality and lifestyle factors in relation to 10-year mortality in older Europeans: the SENECA study. *American journal of epidemiology*, *156*(10), 962-968.

36. Hooker, S. P., Sui, X., Colabianchi, N., Vena, J., Laditka, J., LaMonte, M. J., & Blair, S. N. (2008). Cardiorespiratory fitness as a predictor of fatal and nonfatal stroke in asymptomatic women and men. *Stroke*, *39*(11), 2950–2957. https://doi.org/10.1161/STROKEAHA.107.495275

37. Houston, V., & Bull, R. (1994). *European Journal of Social Psychology*, *24*(2), 279-284.

38. Ingram, J., Maciejewski, G., & Hand, C. J. (2020). Changes in Diet, Sleep, and Physical Activity Are Associated With Differences in Negative Mood During COVID-19 Lockdown. *Frontiers in psychology*, *11*, 588604. https://doi.org/10.3389/fpsyg.2020.588604

39. Jin, J. M., Bai, P., He, W., Wu, F., Liu, X. F., Han, D. M., ... & Yang, J. K. (2020). Gender differences in patients with COVID-19: focus on severity and mortality. *Frontiers in public health*, *8*, 152.

40. Jones, D. S. (2020). History in a crisis—lessons for Covid-19. *New England Journal of Medicine*, *382*(18), 1681-1683.

41. Khademi, F., Moayedi, S., & Golitaleb, M. (2020). The COVID-19 pandemic and death anxiety in the elderly. *International Journal of Mental Health Nursing*.

42. Kiecolt-Glaser, J. K., McGuire, L., Robles, T. F., & Glaser, R. (2002). Emotions, morbidity, and mortality: New perspectives from psychoneuroimmunology. *Annual review of psychology*, *53*(1), 83-107.

43. Klein E., Lin G., Tseng K., Schueller E., Kapoor G., Laxminarayan R. COVID-19 Modeling with IndiaSIM. [(accessed on 30 March 2020)];2020

44. Korsman, S., van Zyl, G. U., Nutt, L., Andersson, M. I., & Preiser, W. (2012). Human coronaviruses. *Virology*, 94–95. https://doi.org/10.1016/B978-0-443-07367-0.00040-9

45. Kutty, V. R., Dilip, T. R., Archana, A. R., Gopinathan, S., & Ramanathan, M. (2018). Shifting pattern of diabetes among the elderly in India: Evidence from the national sample survey organization's data, 2004–2014. *International Journal of Noncommunicable Diseases*, *3*(2), 67.

46. Landers, D. M., and Arent, S. M. (2007). "Physical activity and mental health," in Handbook of Sport Psychology, eds G. Tenenbaum and R. C. Eklund (New York, NY: John Wiley and Sons Inc), 469–491.

47. Leffler, C. T., & Hogan, M. C. (2020). Age-dependence of mortality from novel coronavirus disease (COVID-19) in highly exposed populations: New York transit workers and residents and Diamond Princess passengers. *MedRxiv*.

48. Lippi G, Henry BM (2020). Chronic obstructive pulmonary disease is associated with severe coronavirus disease 2019 (COVID-19). *Respir Med*, 167:105941.

49. Liu, K., Chen, Y., Lin, R., & Han, K. (2020). Clinical features of COVID-19 in elderly patients: A comparison with young and middle-aged patients. *Journal of Infection*, *80*(6), e14-e18.

50. López-Bueno, R., Calatayud, J., Casaña, J., Casajús, J. A., Smith, L., Tully, M. A., et al. (2020). COVID-19 Confinement and health risk behaviors in Spain. Front. Psychol. 11:1426. doi: 10.3389/fpsyg.2020.01426

51. Magleby, R., Westblade, L. F., Trzebucki, A., Simon, M. S., Rajan, M., Park, J. & Satlin, M. J. (2020). Impact of SARS-CoV-2 viral load on risk of intubation and mortality among hospitalized patients with coronavirus disease 2019. *Clinical infectious diseases*.

52. Mane, A. B. (2016). Ageing in India: some social challenges to elderly care. *J Gerontol Geriatr Res*, *5*(2), e136.

53. Mathur, P., & Mascarenhas, L. (2019). LIFESTYLE DISEASES: Keeping fit for a better tomorrow. *The Indian journal of medical research*, *149*(Suppl 1), S129.

54. McDonald, L. T. (2020). Healing after Covid-19: Are Survivors at Risk for Development of Pulmonary Fibrosis?. *American Journal of Physiology-Lung Cellular and Molecular Physiology*.

55. Mehra MR, Desai SS, Kuy S, et al. (2020). Cardiovascular disease, drug therapy, and mortality in COVID-19. *N Engl J Med*, 382: e102.

56. Ministry of Health and Family Welfare . In: *Coronavirus Disease 2019 (COVID-19): Standard Operating Procedure (SOP) for Transporting a Suspect/Confirmed Case of COVID-19*. Ministry of Health and Family Welfare, editor. Government of India; New Delhi, India: 2020

57. Mohamadi, M., Goodarzi, A., Aryannejad, A., Fattahi, N., Alizadeh-Khoei, M., Miri, S. & Bodaghabadi, M. (2020). Geriatric challenges in the new coronavirus disease-19 (COVID-19) pandemic: A systematic review. *Medical Journal of the Islamic Republic of Iran*, *34*, 123.

58. Mudgal, P., & Wardhan, R. (2020) The Increased Risk of Elderly Population in India in COVID-19 Pandemic.

59. Mueller, A. L., McNamara, M. S., & Sinclair, D. A. (2020). Why does COVID-19 disproportionately affect older people?. *Aging*, *12*(10), 9959–9981. https://doi.org/10.18632/aging.103344

60. Müller, M. J. (2016). Ideal body weight or BMI: so, what's it to be?

61. Neumann-Podczaska, A., Al-Saad, S. R., Karbowski, L. M., Chojnicki, M., Tobis, S., & Wieczorowska-Tobis, K. (2020). COVID 19 - Clinical Picture in the Elderly Population: A Qualitative Systematic Review. *Aging and disease*, *11*(4), 988–1008. https://doi.org/10.14336/AD.2020.0620

62. Ngai, J. C., Ko, F. W., Ng, S. S., To, K. W., Tong, M., & Hui, D. S. (2010). The long-term impact of severe acute respiratory syndrome on pulmonary function, exercise capacity and health status. *Respirology (Carlton, Vic.)*, *15*(3), 543–550. https://doi.org/10.1111/j.1440-1843.2010.01720.x

63. Nikolich-Žugich J. (2018). The twilight of immunity: emerging concepts in aging of the immune system. *Nature immunology*, *19*(1), 10–19. https://doi.org/10.1038/s41590-017-0006-x

64. Norris, F. H., Friedman, M. J., & Watson, P. J. (2002). 60,000 disaster victims speak: Part II. Summary and implications of the disaster mental health research. *Psychiatry*, *65*(3), 240–260. https://doi.org/10.1521/psyc.65.3.240.20169

65. Ofori-Asenso, R., Chin, K. L., Mazidi, M., Zomer, E., Ilomaki, J., Zullo, A. R. & Liew, D. (2019). Global incidence of frailty and prefrailty among community-dwelling older adults: a systematic review and meta-analysis. *JAMA network open*, *2*(8), e198398-e198398.

66. Oikawa, S. Y., Holloway, T. M., & Phillips, S. M. (2019). The Impact of Step Reduction on Muscle Health in Aging: Protein and Exercise as Countermeasures. *Frontiers in nutrition*, *6*, 75. https://doi.org/10.3389/fnut.2019.00075

67. Padmshree Mudgal et al.,October (2020) International Journal of Health Sciences and Research Vol.10; Issue: 10;

68. Polamarasetti, P., & Martirosyan, D. (2020). Nutrition planning during the COVID-19 pandemic for aging immunity. *Bioactive Compounds in Health and Disease*, *3*(7), 109-123.

69. Robbins, L. M., Hill, K. D., Finch, C. F., Clemson, L., and Haines, T. (2018). The association between physical activity and social isolation in community-dwelling older adults. Aging Ment. Health 22, 175–182. doi: 10.1080/13607863.2016.1242116

70. Rogerson, M., Wood, C., Pretty, J., Schoenmakers, P., Bloomfield, D., & Barton, J. (2020). Regular Doses of Nature: The Efficacy of Green Exercise Interventions for Mental Wellbeing. *International journal of environmental research and public health*, *17*(5), 1526. https://doi.org/10.3390/ijerph17051526

71. Rothan, H. A., & Byrareddy, S. N. (2020). The epidemiology and pathogenesis of coronavirus disease (COVID-19) outbreak. *Journal of autoimmunity*, *109*, 102433. https://doi.org/10.1016/j.jaut.2020.102433

72. Sánchez-García, S., García-Peña, C., Duque-López, M. X., Juárez-Cedillo, T., Cortés-Núñez, A. R., & Reyes-Beaman, S. (2007). Anthropometric measures and

nutritional status in a healthy elderly population. *BMC public health*, *7*, 2. https://doi.org/10.1186/1471-2458-7-2

73. Sanford, L. D., Suchecki, D., and Meerlo, P. (2014). "Stress, arousal and sleep," in Sleep, Neuronal Plasticity and Brain Function Current Topics in Behavioral Neurosciences, Vol. 25, eds P. Meerlo, R. Benca, and T. Abel (Berlin: Springer), 379–410.

74. Sanyaolu, A., Okorie, C., Marinkovic, A., Patidar, R., Younis, K., Desai, P., Hosein, Z., Padda, I., Mangat, J., & Altaf, M. (2020). Comorbidity and its Impact on Patients with COVID-19. *SN comprehensive clinical medicine*, 1–8. Advance online publication. https://doi.org/10.1007/s42399-020-00363-4

75. Schaller, M., Murray, D. R., & Bangerter, A. (2015). Implications of the behavioural immune system for social behaviour and human health in the modern world. *Philosophical transactions of the Royal Society of London. Series B, Biological sciences*, *370*(1669), 20140105. https://doi.org/10.1098/rstb.2014.0105

76. Senchina, D. S., & Kohut, M. L. (2007). Immunological outcomes of exercise in older adults. *Clinical interventions in aging*, *2*(1), 3–16. https://doi.org/10.2147/ciia.2007.2.1.3

77. Shigdel, R., Dalen, H., Sui, X., Lavie, C. J., Wisløff, U., & Ernstsen, L. (2019). Cardiorespiratory Fitness and the Risk of First Acute Myocardial Infarction: The HUNT Study. *Journal of the American Heart Association*, *8*(9), e010293. https://doi.org/10.1161/JAHA.118.010293

78. Singh, A. K., Gupta, R., Ghosh, A., & Misra, A. (2020). Diabetes in COVID-19: Prevalence, pathophysiology, prognosis and practical considerations. *Diabetes & metabolic syndrome*, *14*(4), 303–310. https://doi.org/10.1016/j.dsx.2020.04.004

79. Slovic, P. (1987). Perception of risk. *Science*, *236*(4799), 280-285.

80. Steptoe, A., Lipsey, Z., and Wardle, J. (1998). Stress, hassles, and variations in alcohol consumption, food choice, and physical exercise: a diary study. Br. J. Health Psychol. 3, 51–63. doi: 10.1111/j.2044-8287.1998.tb00555.x

81. Thyrian, J. R., Kracht, F., Nikelski, A., Boekholt, M., Schumacher-Schönert, F., Rädke, A., ... & Kreisel, S. H. (2020). The situation of elderly with cognitive impairment living at home during lockdown in the Corona-pandemic in Germany. *BMC geriatrics*, *20*(1), 1-15.

82. United Nations Population Fund (2017). 'Caring for Our Elders: Early Responses' - India Ageing Report – 2017. UNFPA, New Delhi, India.

83. Vellas, B. J., Albarede, J. L., & Garry, P. J. (1992). Diseases and aging: patterns of morbidity with age; relationship between aging and age-associated diseases. *The American journal of clinical nutrition*, *55*(6 Suppl), 1225S–1230S. https://doi.org/10.1093/ajcn/55.6.1225S

84. Wang L, He W, Yu X, et al. (2020). Coronavirus disease 2019 in elderly patients: characteristics and prognostic factors based on 4-week follow-up. *J Infect Prev*, 80(6): 639-645. Schiffrin EL, Flack JM, Ito S, et al. (2020). Hypertension and COVID-19. *Am J Hypertens*, 33(5): 373-374.

85. Wang, C., Liu, L., Hao, X., Guo, H., Wang, Q., & Huang, J. & Wei, S.(2020). Evolving epidemiology and impact of non-pharmaceutical interventions on the outbreak of Coronavirus disease 2019 in Wuhan, China. *JAMA*, *323*(19), 1915-1923.

86. Wang, D., Hu, B., Hu, C., Zhu, F., Liu, X., Zhang, J., ... & Peng, Z. (2020). Clinical characteristics of 138 hospitalized patients with 2019 novel coronavirus–infected pneumonia in Wuhan, China. *Jama*, *323*(11), 1061-1069.

87. Weaver, L. K., & Behrens, E. M. (2017). Weathering the storm: Improving therapeutic interventions for cytokine storm syndromes by targeting disease

pathogenesis. Current treatment options in rheumatology, 3(1), 33–48. https://doi.org/10.1007/s40674-017-0059-x

88. Winter, J. E., MacInnis, R. J., Wattanapenpaiboon, N., & Nowson, C. A. (2014). BMI and all-cause mortality in older adults: a meta-analysis. *The American journal of clinical nutrition*, *99*(4), 875–890. https://doi.org/10.3945/ajcn.113.068122

89. World Health Organization. (2020). Coronavirus disease 2019 (COVID-19): situation report, 82.

90. Xiu, L., Binder, R. A., Alarja, N. A., Kochek, K., Coleman, K. K., Than, S. T.,& Gray, G. C. (2020). A RT-PCR assay for the detection of coronaviruses from four genera. *Journal of Clinical Virology*, *128*, 104391.

APPENDIX

APPENDIX I

QUESTIONNAIRE FOR THE CONDUCT OF SURVEY ASSESSMENT OF KAP ON THE NUTRITIONAL STATUS, PSYCHOLOGICAL BEHAVIOUR AND PHYSICAL ACTIVITY OF ELDERLY DURING CORONA VIRUS DISEASE PANDEMIC

1. GENERAL INFORMATION

1.1. NAME:

1.2 .AGE:

1.3. SEX:

1.4. PHONE NUMBER:

1.5. MARITAL STATUS: MARRIED ☐

UNMARRIED ☐

WIDOW ☐

1.6. EDUCATION: GRADUATE ☐

DIPLOMA ☐

HIGHER SECONDARY ☐

HIGH SCHOOL ☐

MIDDLE SCHOOL ☐

PRIMARY SCHOOL ☐

ILLITERATE ☐

OTHERS ☐

1.7. OCCUPATION:

1.8. DOMICILE: RURAL ☐ URBAN ☐

1.9. MONTHLY INCOME OF THE FAMILY: 10,000-20,000 ☐

20,000-50,000 ☐

ABOVE 50,000 ☐

2. NUTRITION ASSESSEMENT

2.1. ANTHROPOMETRIC MEASUREMENT

2.1.1. HEIGHT (CM):

2.1.2. WEIGHT (KG):

2.1.3. BMI :

2.2. BIO CHEMICAL ANALYSIS

2.2.1. BLOOD SUGAR LEVEL: NORMAL (70-100 MG/DL)

PREDIABETES (100-125MG/DL)

DIABETES (ABOVE 126MG/DL)

2.2.2. BLOOD PRESSURE LEVEL: NORMAL 120/80MMHG

PRE HYPERTENSION (139/89MMHG)

HIGH BLOOD PRESSURE >140/90MMHG

2.2.3. TOTAL CHOLESTROL : DESIRABLE : < 120-199MG/DL

BORDERLINE HIGH: 200-239MG/DL

HIGH: .45MG/DL

2.3. DIETARY ASSESSEMENT

2.3.1. FOOD CONSUMPTION PATTERN : VEGETARIAN

OVO –VEGETARIAN

LACTO – VEGETARIAN

NON- VEGETARIAN

2.3.2. HOW OFTEN DID YOU ADD SALT TO ANY FOOD ON THE TABLE?

ALWAYS

SOMETIMES

NEVER

2.3.3. CONSUMPTION OF MILK (INCLUDING MILK USED FOR TEA AND COFFEE)

1/2 GLASS

1 GLASS

MORE THAN 1 GLASS

3. MEDICAL HISTORY

3.1. ARE YOU A DIABETIC?

YES ☐

NO ☐

3.2. DO YOU HAVE ANY COMPLICATION?

DIABETES FOOT ☐ ☐

RETINOPATHY ☐

NEPHROPATHY ☐

INFECTIONS ☐

NIL ☐

3.3. DO YOU FOLLOW ANY MEASURES TO TAKE CONTROL

DIET ☐

EXCERCISE ☐

DRUGS ☐

INSULIN ☐

NIL ☐

3.4. DO YOU HAVE CHOLESTEROL?

YES ☐

NO ☐

3.5. DO YOU HAVE ANY COMPLICATION?

FATTY LIVER ☐

HEART DISEASES ☐

STROKE ☐

☐

HYPER CHOLESTREMIA

NIL ☐

3.6. DO YOU FOLLOW ANY MEASURES TO TAKE CONTROL ?

DIET ☐

EXCERCISE ☐

DRUGS ☐

NIL ☐

3.7. DO YOU SUFFER FROM ELEVATED BLOOD PRESSURE ?

YES ☐

NO ☐

3.8. DO YOU HAVE ANY COMPLICATION?

OEDEMA ☐

DIZZINESS ☐

VISUAL CHANGES ☐

HEADACHE ☐

SHORTNESS OF BREATH ☐

NIL ☐

3.9. DO YOU FOLLOW ANY MEASURE TO CONTROL?

DIET ☐

EXCERCISE ☐

DRUGS ☐

NIL ☐

4. KAP QUESTIONNAIRE

4.1. KNOWLEDGE ASSESSEMENT

4.1.1. ARE YOU AWARE ABOUT THE CURRENT PANDEMIC SITUATION? *

YES ☐ NO ☐ NOT SURE ☐

4.1.2. DO YOU KNOW THE SYMPTOMS OF THE COVID?

YES ☐ NO ☐ NOT SURE ☐

4.1.3. DO YOU KNOW THE COMPLICATIONS OF COVID 19?

YES ☐ NO ☐ NOT SURE ☐

4.1.4. ARE YOU AWARE THE SANITARY PRACTICE WHICH FOLLOW TO PREVENT COVID 19?

YES ☐ NO ☐ NOT SURE ☐

4.1.5. ARE YOU AWARE ABOUT IMMUNE BOOSTING FOODS THAT CAN PREVENT COVID 19?

YES ☐ NO ☐ NOT SURE ☐

4.1.6. DO YOU KNOW THE IMPORTANCE OF ZINC DURING THIS COVID PANDEMIC?

YES ☐ NO ☐ NOT SURE ☐

4.1.7. DO YOU KNOW THE IMPORTANCE OF VITAMIN C DURING THIS COVID PANDEMIC?

YES ☐ NO ☐ NOT SURE ☐

4.1.8. DO YOU KNOW THE NEED OF REGULAR EXERCISE IN OUR DAY TO DAY LIFE?

YES ☐ NO ☐ NOT SURE ☐

4.1.9. DO YOU KNOW THE IMPORTANCE OF REGULAR SLEEP DURING NIGHT?

YES ☐ NO ☐ NOT SURE ☐

4.1.10. DO YOU KNOW ANY SPECIFIC NUTRIENTS WHICH ARE IMPORTANT FOR BONE HEALTH?

YES ☐ NO ☐ NOT SURE ☐

4.1.11. DO YOU KNOW THE BENEFITS OF NUTRIENTS IN OUR DAILY DIET ?

YES ☐ NO ☐ NOT SURE ☐

4.1.12. YOU KNOW ANY SPECIAL NUTRITION SHOULD ELDERLY FOLLOW?

YES ☐ NO ☐ NOT SURE ☐

4.1.13. ARE YOU AWARE ABOUT IMMUNE BOOSTING FOODS?

YES ☐ NO ☐ NOT SURE ☐

4.1.14. DO YOU KNOW THE IMPORTANCE OF VITAMINS IN OUR DIET?

YES ☐ NO ☐ NOT SURE ☐

4.1.15. DO YOU KNOW ABOUT GERIATRIC NUTRITION?

YES ☐ NO ☐ NOT SURE ☐

4.1.16. DO YOU KNOW THE IMPORTANCE OF FRUITS AND VEGETABLES ?

YES ☐ NO ☐ NOT SURE ☐

4.1.17. DO YOU KNOW THE IMPORTANCE OF FIBER IN OUR DIET?

YES ☐ NO ☐ NOT SURE ☐

4.1.18. DO YOU KNOW WHICH TYPE OF FAT IS GOOD FOR HEALTH?

YES ☐ NO ☐ NOT SURE ☐

4.1.19. DO YOU KNOW ALCOHOL CONSUMPTION AND SMOKING LEADS TO METABOLIC SYNDROME?

YES ☐ NO ☐ NOT SURE ☐

4.1.20. DO YOU KNOW SMOKING LEADS TO HYPERTENSION?

YES ☐ NO ☐ NOT SURE ☐

4.2. ATTITUDE ASSESSEMENT

4.2.1. DO YOU THINK PROPER NUTRITION CAN PREVENT COVID 19?

YES ☐ NO ☐ NOT SURE ☐

4.2.2. DO YOU THINK DRINKING LUKE WARM WATER IS BENEFICIAL DURING THIS PANDEMIC?

YES ☐ NO ☐ NOT SURE ☐

4.2.3. DO YOU THINK PROPER SANITARY PRACTICES CAN PREVENT COVID 19?

YES ☐ NO ☐ NOT SURE ☐

4.2.4. DO YOU THINK MAINTAINING AN IDEAL BODY WEIGHT IS IMPORTANT TO PREVENT LIFESTYLE DISEASES?

YES ☐ NO ☐ NOT SURE ☐

4.2.5. DO YOU THINK 8 TO 12 MINIMUM GLASSES OF WATER IS ENOUGH PER DAY?

YES ☐ NO ☐ NOT SURE ☐

4.2.6. DO YOU THINK FRUITS AND VEGETABLES ARE IMMUNE BOOSTERS?

YES ☐ NO ☐ NOT SURE ☐

4.2.7. IS THERE ANY RELATION SHIP BETWEEN CALCIUM AND VITAMIN D?

YES ☐ NO ☐ NOT SURE ☐

4.2.8. DO YOU THINK CALCIUM INTAKE IS ESSENTIAL FOR ELDERLY ?

YES ☐ NO ☐ NOT SURE ☐

4.2.9. DO YOU THINK FIBRE RICH FOOD STIMULATE BOWEL MOVEMENT?

YES ☐ NO ☐ NOT SURE ☐

4.2.10. DO YOU THINK A BALANCED DIET CAN PREVENT METABOLIC SYNDROME?

YES ☐ NO ☐ NOT SURE ☐

4.2.11. DO YOU THINK REGULAR PHYSICAL EXERCISE IN OLD AGE IS NECESSARY?

YES ☐ NO ☐ NOT SURE ☐

4.2.12. DO YOU THINK DAILY CONSUMPTION OF MILK IS ESSENTIAL FOR ELDERLY ?

YES ☐ NO ☐ NOT SURE ☐

4.2.13. DO YOU THINK EXCESSIVE CONSUMPTION OF TEA AND COFFEE AFFECT THE ABSORPTION OF NUTRIENTS?

YES ☐ NO ☐ NOT SURE ☐

4.2.14. DO YOU THINK EXCESSIVE CONSUMPTION OF COFFEE AND TEA LEADS TO SLEEPLESSNESS?

YES ☐ NO ☐ NOT SURE ☐

4.2.15. DO YOU THINK REGULAR EXERCISE AND RECREATIONAL ACTIVITIES ARE BENEFICIAL PRACTICES?

YES ☐ NO ☐ NOT SURE ☐

4.2.16. DO YOU THINK OVER CONSUMPTION OF FRIED FOODS CAN INCREASE BAD CHOLESTEROL?

YES ☐ NO ☐ NOT SURE ☐

4.3. PRACTICE ASSESSEMENT

4.3.1. ARE YOU FOLLOWING A BALANCED DIET?

YES ☐ NO ☐ NOT SURE ☐

4.3.2. WHICH TYPE OF FOOD DO YOU PREFER ?

HOMEMADE FOOD ☐

PURCHASED FOOD ☐

PROCESSED FOOD ☐

4.3.3. FREQUENCY OF FOOD INTAKE IN A DAY?

LESS THAN 4 TIMES ☐

4 TIMES ☐

MORE THAN 4 TIMES ☐

4.3.4. DO YOU DRINK 8-12 GLASSES OF LIQUID IN A DAY?

YES ☐ NO ☐

4.3.5. HOW MUCH WATER SHOULD YOU DRINK EVERYDAY ?

MORE THAN 2 LITERS ☐

2 LITERS ☐

LESS THAN 2 LITERS ☐

4.3.6. DO YOU TAKE ANY OF THESE NUTRIENT SUPPLEMENTS ?

VITAMIN C ☐

CALCIUM ☐

ZINC ☐

NIL ☐

4.3.7. HOW OFTEN DO YOU EAT FROM OUTSIDE?

LESS THAN 4TIMES ☐

4 TIMES ☐

MORE THAN 4 TIMES ☐

NIL ☐

4.3.8. DO YOU EAT ANY NON VEGETARIAN DAILY?

YES ☐ NO ☐ NOT SURE ☐

4.3.9. IF YES ,WHICH ?

EGG ☐

FISH ☐

MEAT ☐

4.3.10. PATTERN OF SLEEP ?

REGULAR SLEEP ☐

INSOMNIA ☐

INTERMITTENT SLEEP ☐

4.3.11. ARE YOU TAKING IMMUNE BOOSTERS ?

YES ☐ NO ☐ NOT SURE ☐

4.3.12. DO YOU TAKE ANY PARTICULAR FOOD RICH IN ZINC SUCH AS BEANS, NUTS, WHOLE GRAINS?

YES ☐ NO ☐ SOMETIMES ☐

4.3.13. DO YOU EAT VITAMIN C RICH FOODS SUCH AS GUAVAS, KIWIFRUIT, ORANGE, BROCCOLI ?

YES ☐ NO ☐ SOMETIMES ☐

4.3.14. DO YOU EAT VITAMIN E RICH FOODS SUCH AS NUTS ,SEEDS, GREEN LEAFY VEGETABLES ?

YES ☐ NO ☐ SOMETIMES ☐

4.3.15. DO YOU HAVE ZINC SUPPLEMENT DAILY?

YES ☐ NO ☐ SOMETIMES ☐

4.3.16. DO YOU EAT ANY FRIED FOODS ?

YES ☐ NO ☐ SOMETIMES ☐

4.3.17. DO YOU EAT SWEETS?

YES ☐ NO ☐ SOMETIMES ☐

4.3.18. HOW MANY TIMES DO YOU CONSUME TEA OR COFFEE?

YES ☐ NO ☐ SOMETIMES ☐

4.3.19. DO YOU SMOKE?

YES ☐ NO ☐ SOMETIMES ☐

4.3.20. DO YOU HAVE ALCOHOL CONSUMPTION?

YES ☐ NO ☐ SOMETIMES ☐

4.3.21.DO YOU EXCERCIE REGULARLY?

YES ☐ NO ☐ SOMETIMES ☐

4.3.22. IF YES ,WHICH TYPE?

YOGA ☐

WALKING ☐

JOGGING ☐

NIL ☐

4.3.23. HOW MUCH TIME DID YOU SPEND FOR DOING EXERCISE?

15MIN ☐

30MIN ☐

1HOUR ☐

>1HOUR ☐

NIL

6. GERIATRIC DEPRESSION SCALE (DURING LOCKDOWN)

- ✓ Answers in bold indicate depression. Score 1 point for each bolded answer.
- ✓ A Score > 5 points is suggestive of depression.
- ✓ A score ≥ 10 points is almost always indicative of depression.
- ✓ A score > 5 points should warrant a follow-up comprehensive assessment

6.1. ARE YOU BASICALLY SATISFIED WITH YOUR LIFE?

YES ☐

NO ☐

6.2. HAVE YOU DROPPED MANY OF YOUR ACTIVITIES AND INTERESTS?

YES ☐

NO ☐

6.3. DO YOU FEEL THAT YOUR LIFE IS EMPTY?

YES ☐

NO ☐

6.4.DO YOU OFTEN GET BORED?

YES ☐

NO ☐

6.5. ARE YOU IN GOOD SPIRITS MOST OF THE TIME?

YES ☐

NO ☐

6.6. ARE YOU AFRAID THAT SOMETHING BAD IS GOING TO HAPPEN TO YOU?

YES ☐

NO ☐

6.7. DO YOU FEEL HAPPY MOST OF THE TIME?

YES ☐

NO ☐

6.8.DO YOU OFTEN FEEL HELPLESS?

YES ☐

NO ☐

6.9. DO YOU PREFER TO STAY AT HOME, RATHER THAN GOING OUT AND DOING NEW THINGS?

YES ☐

NO ☐

6.10. DO YOU FEEL YOU HAVE MORE PROBLEMS WITH MEMORY THAN MOST?

YES ☐

NO ☐

6.11. DO YOU THINK IT IS WONDERFUL TO BE ALIVE NOW?

YES ☐

NO ☐

6.12. DO YOU FEEL PRETTY WORTHLESS THE WAY YOU ARE NOW?

YES ☐

NO ☐

6.13. DO YOU FEEL FULL OF ENERGY?

YES ☐

NO ☐

6.14. DO YOU FEEL THAT YOUR SITUATION IS HOPELESS?

YES ☐

NO ☐

6.15. DO YOU THINK THAT MOST PEOPLE ARE BETTER OFF THAN YOU ARE?

YES ☐

NO ☐

Table no 57: KNOWLEDGE ASSESSEMENT

Questions	No	Not sure	Yes
Are you aware about the current pandemic situation?	0	2	97
Do you know the symptoms of the covid ?	8	1	90
Do you know the complications of covid 19?	9	8	82
Are you aware the sanitary practice which follow to prevent covid 19?	1	1	97
Are you aware about immune boosting foods that can prevent covid 19?	15	20	64
Do you know the importance of zinc during this covid pandemic?	50	23	26
Do you know the importance of Vitamin C during this covid pandemic?	34	17	48
Do you know the need of regular exercise in our day to	7	9	83

day life?			
Do you know the importance of regular sleep during night?	3	96	99
Do you know any specific nutrients which are important for bone health?	8	42	49
Do you know the benefits of nutrients in our daily diet ?	11	23	65
Do you know any special nutrition should elderly follow?	32	30	37
Are you aware about immune boosting foods?	20	34	45
Do you know the importance of vitamins in our diet?	6	22	71
Do you know about geriatric nutrition?	52	24	23
Do you know the importance of fruits and vegetables?	4	6	89
Do you know the importance of fiber in our diet?	10	23	66
Do you know which type of fat is good for health?	23	40	36
Do you know alcohol consumption and smoking leads to metabolic syndrome?	7	15	77
Do you know smoking leads to hypertension?	6	14	79

Table no 58: ATTITUDE ASSESSEMENT

Questions	No	Not sure	Yes
Do you think proper nutrition can prevent covid 19?	7	24	68

Do you think drinking Luke warm water is beneficial during this pandemic?	2	8	89
Do you think proper sanitary practices can prevent covid 19?	2	2	95
Do you think maintaining an ideal body weight is important to prevent lifestyle diseases?	2	8	89
Do you think 8 to 12 minimum glasses of water is enough per day ?	4	7	88
Do you think fruits and vegetables are immune boosters?	5	23	71
Is there any relation ship between calcium and vitamin D?	16	46	37
Do you think calcium intake is essential for elderly ?	2	20	77
Do you think fibre rich food stimulate bowel movement ?	4	37	58
Do you think a balanced diet can prevent metabolic syndrome?	6	24	69
Do you think regular physical exercise in old age is necessary?	6	15	78
Do you think daily consumption of milk is essential for elderly ?	5	12	82
Do you think excessive consumption of tea and coffee affect the absorption of nutrients?	18	45	36
Do you think excessive consumption of coffee and tea leads to sleeplessness?	10	27	62

Do you think regular exercise and recreational activities are beneficial practices?	1	21	77
Do you think over consumption of fried foods can increase bad cholesterol ?	1	7	91

Table no 59: PRACTICE ASSESSEMENT

Questions	No	Not sure /Sometimes	Yes
Are you following a balanced diet?	9	40	50
Do you drink 8-12 glasses of liquid in a day?	17	0	82
Do you take any nutrient supplements ?	74	0	25
Do you eat from outside?	47	0	56
Do you eat any non vegetarian daily?	30	5	64
Are you taking immune boosters ?	84	0	15
Do you take any particular food rich in zinc such as beans, nuts, whole grains?	15	48	36
Do you eat vitamin c rich foods such as guavas, kiwifruit, orange, broccoli ?	9	51	39
Do you eat vitamin E rich foods such as nuts ,seeds, green leafy vegetables ?	4	41	54
Do you have zinc supplement daily?	68	23	8

Do you eat any fried foods ?	17	52	30
Do you eat sweets?	24	57	18
Do you smoke?	94	4	1
Do you have alcohol consumption?	86	6	7
Are you doing exercise on the regular basis?	48	29	22
Do you engage in light sport or recreational activities ?	54	0	45

APPENDIX II

FOOD FREQUENCY CONSUMPTION

SI.NO	FOOD GROUPS	DAILY	WEEKLY	MONTHLY	NEVER
1	**CEREALS** • **RICE**				
	• **WHEAT**				
	• **SEMOLINA**				
	• **OATS**				
	• **CORN FLAKES**				
	• **PASTA**				
2	**PULSES**				
	• **BENGAL GRAM**				
	• **COWPEA**				
	• **GREENGRAM**				
	• **LENTILS**				
	• **GREEN PEAS**				
	• **BROAD BEAN**				
	• **SOYABEAN**				

3	**GREEN LEAFY VEGETABLES/OTHER VEGETABLES**				
	• **SPINACH**				
	• **DRUMSTICK LEAVES**				
	• **BEANS**				
	• **CABBAGE**				
	• **CAULIFLOWER**				
	• **TOMATO**				
	• **PAPPAYA**				
	• **BITTERGOURD**				
	• **PUMPKIN**				
	• **CUCUMBER**				
4	**ROOTS &TUBERS**				
	• **TAPIOCA**				
	• **COLACASSIA**				
	• **YAM**				
	• **CARROT**				
	• **BEETROOT**				
	• **POTATO**				
	• **ONION**				

	• **OTHERS**				
5	**FRUITS**				
	• **APPLE**				
	• **MANGO**				
	• **ORANGE**				
	• **BERRIES**				
	• **PINEAPPLE**				
	• **GUAVA**				
	• **GRAPES**				
	• **JACKFRUIT**				
	• **PASSIONFRUIT**				
6	**NUTS AND OILS**				
	• **PEANUT**				
	• **ALMONDS**				
	• **CASHEWNUTS**				
	• **PISTA**				
	• **GROUNDNUTS**				
	• **OTHERS**				
7	**FATS AND OILS**				
	• **COCONUT OIL**				
	• **VEGETABLE OIL**				

	• **BUTTER**				
	• **GHEE**				
	• **OTHERS**				
8	**DRIED FRUITS AND SEEDS**				
	• **APRICOTS**				
	• **FIG**				
	• **FLAX SEEDS**				
	• **SESAME**				
	• **RAISINS**				
	• **DATES**				
9	**MEAT &MEAT PRODUCTS**				
	• **CHICKEN**				
	• **FISH**				
	• **EGG**				
	• **MUTTON**				
	• **BEEF**				
	• **PORK**				
	• **OTHERS**				
10	**MILK AND**				

	MILK PRODUCTS				
	• **MILK**				
	• **CURD**				
	• **CHEESE**				
	• **BUTTERMILK**				
	• **OTHERS**				
12	**SUGARS**				
	SUGAR				
	• **JAGGERY**				
	• **HONEY**				
	• **OTHERS**				
13	**PROCESSED FOODS**				
	• **PICKELS**				
	• **PAPAD**				
	• **SWEETS**				
	• **JAM**				
	•				
	•				
	•				
	•				

APPENDIX III

24 HOUR RECALL

WORKING DAY 1

TIME	MENU	SERVING SIZE	INGREDIENTS	AMOUNT(g)

WORKING DAY 2

TIME	MENU	SERVING SIZE	INGREDIENTS	AMOUNT(g)

HOLIDAY

TIME	MENU	SERVING SIZE	INGREDIENTS	AMOUNT(g)

APPENDIX IV

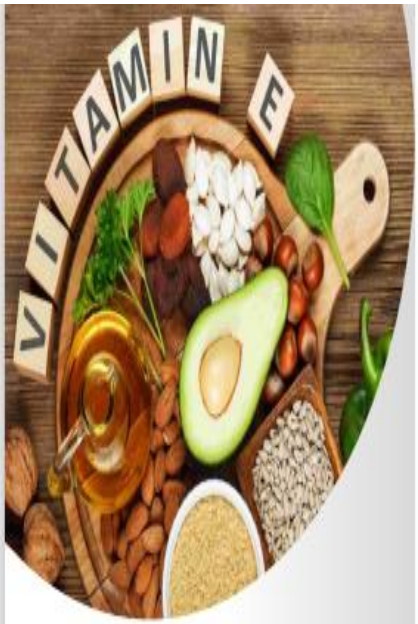
TOOLS DEVELOPED TO CREATE AWARENESS AMONG THE PARTICIPANTS BROCHURE

സമീകൃതാഹാരം ലക്ഷ്യമാക്കുക.
സമീകൃതാഹാരം ഒരു വ്യക്തിക്കു ആവശ്യമായ പോഷകങ്ങൾ നൽകുന്നു.

നാരുള്ള ഭക്ഷണം, ജീവകം, ധാതുക്കൾ, മറ്റു പോഷകങ്ങൾ അടങ്ങിയ ഭക്ഷണം കഴിക്കുക.

സംസ്ക്കരിച്ച പഞ്ചസാര ധാരാളമായി അടങ്ങിയ ഭക്ഷണം, കൊഴുപ്പുള്ള ഭക്ഷണം, കുതിർത്ത ഭക്ഷണം, ഉപ്പ് അടങ്ങിയ ഭക്ഷണം, തുടങ്ങിയവ മിതമാക്കുക .

ജലാംശം നിലനിർത്തുക.



പ്രായമായവരിൽ പ്രതിരോധശേഷി വർദ്ധിപ്പിക്കുന്നതിനാ-യിട്ടുള്ള പ്രഥ്യാഹാരക്രമം

- ജീവകങ്ങളും ധാതുക്കളും അടങ്ങിയ ആഹാരക്രമം പ്രതിരോധശേഷി വർദ്ധിപ്പിക്കുന്നു.
- ഓറഞ്ച്, പപ്പായ തുടങ്ങിയ ഫലങ്ങളിലും,ബീറ്റ്റൂട്ട്, സ്പിനാച്ച്, കോളിഫ്ലവർ തുടങ്ങിയ പച്ചക്കറികളിലും ജീവകം- C ധാരാളമായി അടങ്ങിയിരിക്കുന്നു.
- മധുരവും, കൊഴുപ്പും കുറച്ചിട്ട്, ധാന്യങ്ങളും പ്രോട്ടീനും അടങ്ങിയ ഭക്ഷണം ഉൾപെടുത്തുക.

- അണുബാധയിൽ നിന്നും, രോഗം പരത്തുന്ന ബാക്ട്ടീരിയ, വൈറസ് തുടങ്ങിയവിൽ നിന്നും ജീവകം -E സംരക്ഷണം നൽകുന്നു.
- കുതിർത്ത ബദാം, നിലക്കടല,സൂര്യകന്തി യുടെ വിത്തുകൾ തുടങ്ങിയവ ജീവകം -E പകർന്നു നൽകുന്നു.

എന്നും നമ്മളെ പരിചരിക്കുന്നവർക്കായി കൂടുതൽ പരിചരണം നൽകാം