"Measuring Disease Burden and Functional Outcome of Integrated Medical Therapies in Patients with Long-Term Ailments:

A DALY-Based Approach"

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Submitted by

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Declaration

I**, Shaheed S,** hereby declare that this dissertation entitled "Measuring Disease Burden and Functional Outcome of Integrated Medical Therapies in Patients with Long-Term Ailments: A DALY-Based Approach" is the outcome of my study undertaken under the guidance of **Prof. Dr. Bino Paul, Centre for Human Resources Management and Labour Relations, School of Management & Labour Studies, Tata Institute of Social Sciences, Mumbai.** It has not previously formed the basis for awarding any degree, diploma, or certificate of this Institute or any other institute or university. I have duly acknowledged all the sources I used in the preparation of this dissertation.

8TH April 2023 **Shaheed. S**

Mumbai

Certificate

This is to certify that the dissertation entitled "Measuring Disease Burden and Functional Outcome of Integrated Medical Therapies in Patients with Long-Term Ailments: A DALY-Based Approach" is the record of the original work done by **Mr. Shaheed S** under my guidance. The research results presented in this dissertation have not previously formed the basis of the award of any degree, diploma, or certificate in this or any other university.

Prof. Dr. Bino Paul

8TH April 2023

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Abbreviations

FIM – Functional Independence Measure

FAM – Functional Assessment Measure

DALY – Disability Adjusted Life in Years

QALY – Quality Adjusted Life in Years

GBD – Global Burden of Diseases

QoL – Quality of Life

ADL – Activity of Daily Living

TBI – Traumatic Brain Injury

TSCI – Traumatic Spinal Cord Injury

MS – Multiple Sclerosis

GDD – Global Developmental Delay

MEE-Myalgic Encephalomyelitis

IE – Infantile Encephalopathy

EHR -Electronic Health Records

CDSS – Clinical Decision Support Systems

CCC – Canadian Consensus Criteria

CFS – Chronic Fatigue Syndrome

ICC - International Consensus Criteria

IOM - Institute of Medicine

SCVMC - Santa Clara Valley Medical Centre

ASM – Age Standardised Mortality

Abstract

The dissertation titled "Measuring Disease Burden and Functional Outcome of Integrated Medical Therapies in Patients with Long-Term Ailments: A DALY-Based Approach". aimed to assess the effectiveness of integrated medical therapies in improving functional outcomes of patients suffering from long-term ailments such as ischemic stroke, traumatic brain injury, traumatic spinal cord injury, cerebral palsy, global developmental delay, multiple sclerosis, etc.

The study employed the **FIM-FAM scale** to assess the functional outcomes of patients who underwent integrated medical therapy interventions at the therapy centres that integrates Ayurveda with modern medicine, physiotherapy, occupational therapy, speech therapy, yoga, naturopathy, reflexology, acupuncture, among others. The research questions addressed were whether there is a change following integrated therapy, how effectively the treatment is the results, and the factors influencing the outcome.

The research findings indicate that the integrated medical therapy intervention resulted in significant improvement in the majority of patients, while some patients showed a remarkable improvement due to their proactive participation in the recovery process and the recent onset of their ailment. However, some patients demonstrated lesser outcomes, which were attributed to factors such as the timeline from the date of incidence, lack of incorporation of therapeutic modalities, and degenerative causes like demyelination, permanent damage to cord continuity, muscular dystrophy, among others.

Chapter 1: Introduction

Data has become an integral part of healthcare, revolutionizing the way care is delivered and managed. With the rise of electronic health records, wearable devices, and the Internet of Things, etc. Nowadays, medical experts have access to enormous quantities of data that can be leveraged to improve the quality of care and reduce operating expenses. The use of data has the ability to deliver a more personalised efficient solution to care in rehabilitation, allowing service providers to tailor treatments to the individual requirements of each patient.

In recent years, the utilization of data in healthcare has garnered increased attention, with many healthcare organisations investing in data analytics and advanced artificial intelligence (AI) instruments. These technologies possess the capacity to revolutionise the delivery of healthcare services, enabling providers to make more informed decisions and to provide better care to patients. For example, predictive analytics can be used to identify patients who are at high risk of readmission or complications, allowing providers to intervene early and prevent adverse outcomes.

In rehabilitative care, the use of data can be particularly valuable. Rehabilitation is a complex and often long-term process, involving a range of treatments and therapies. By collecting and analyzing data on patient outcomes, healthcare providers can gain insights into which treatments are most effective for specific patient populations. This can help providers to tailor treatments to the needs of each patient, improving the likelihood of success and reducing the risk of adverse outcomes.

Chronic diseases and long-term ailments are a developing global epidemic affecting millions globally. These ailments may profoundly affect a person's quality of life and independence in everyday life, resulting in physical, emotional, and social difficulties. (World Health Organization, 2018). Rehabilitation therapies have been used for decades to enhance the operational results in chronic disease patients. However, conventional rehabilitation approaches may not always be adequate to address the complex requirements of patients with chronic illnesses (Schroder et al., 2017).

As a result, a comprehensive, patient-centred approach that integrates complementary therapies has emerged as a promising approach to improve patient outcomes. The use of integrative medicine in healthcare has gained popularity in recent years, with an increasing number of centres offering a combination of traditional and modern medicine techniques, including Ayurveda, yoga, naturopathy, advanced physiotherapy, occupational therapy, speech therapy, reflexology, and acupuncture (Mukherjee et al., 2017).

Integrated therapy centres were established in different regions worldwide, including Kerala, India, in order to deliver comprehensive therapy for patients with chronic illnesses. These healthcare organizations take a multidisciplinary approach to patient care, seeking to meet the diverse requirements of patients with long-term illnesses. (Sengupta et al., 2016).

Despite the growing popularity of integrated therapy centres, the effectiveness of these centres in improving the functional outcomes of patients with long-term ailments is not yet clear. Several studies have suggested that integrative medicine can improve patient outcomes, but the evidence is limited and inconclusive (Elkins et al., 2010; Mukherjee et al., 2017).

This study aims to evaluate the functional outcomes of integrated medical therapies in patients with long-term ailments and to explore the factors that influence the functional outcomes. The study will also assess the change in disability-adjusted life years (DALYs) and quality-adjusted life years (QALYs) gained after the intervention and determine the success rate of the therapy in restoring functional independence of the patients.

.1 Problem Statement:

This research dissertation is centred on assessing the functional outcomes of integrated medical therapies in patients with long-term ailments. Patients with long-term ailments often experience significant reductions in their quality of life and functional independence. There is an evident trend that patients undergoing integrated therapies are getting better results as the therapy extend for usually long duration giving the time for results to be visible. However, there is a lack of research on the efficacy and factors influencing functional outcomes of integrated medical therapies for long-term ailments. By utilizing a DALY-based approach and evaluating the success rate of integrated medical therapies, my research aims to fill this gap and provide insights into the benefits

of these therapies in improving functional outcomes and overall quality of life for patients with long-term ailments.

.2 Objective of Study:

This particular research was focussed to evaluate the functional outcomes and its impact on quality of life of integrated medical therapies in patients with long-term ailments, using a DALY-based approach. Through primary and secondary research, This study seeks to evaluate the effectiveness along with associated factors. influencing functional independence after the intervention, as well as identify any gaps in current research and suggest areas for further investigation. In conclusion, the findings of this study will contribute to an expanded awareness of both the advantages and the possibilities of integrated medical therapies for managing chronic conditions and enhancing patients' overall health and well-being.

.3 Research Questions:

- ✓ What are the functional outcomes of integrated medical therapies in patients with long-term ailments, and how do they compare to traditional treatments?
- ✓ What factors influence the success rate of integrated medical therapies in restoring functional independence in patients with long-term ailments?
- ✓ How does the use of integrated medical therapies impact the “disability-adjusted life years (DALYs) and quality-adjusted life years (QALYs)” of patients with long-term ailments?
- ✓ What is the present position of research on the utilization of integrated medical therapies in patients with chronic conditions, and what knowledge gaps exist regarding their efficacy and factors influencing outcomes?
- ✓ How can integrated medical therapies be optimised in enhancing long-term illness patients' functional outcomes and quality of life?
- ✓ What are the potential cost savings and benefits to healthcare systems associated with the use of integrated medical therapies for long-term ailments?

Chapter 2 : Review of Literature

In this section, a comprehensive analysis of the fundamental factors that led to the identification of the research challenge in "Measuring Disease Burden and Functional Outcome of Integrated Medical Therapies in Patients with Long-Term Ailments: A DALY-Based Approach" is presented, with a focus on discussing and expanding on the key factors.

In the recent past, there is seems to be an increasing demand in utilising integrated medical therapies designed to improve the functional outcomes of patients with chronic diseases and persistent ailments. Integrated therapy institutions, which provide a combination of traditional and contemporary medical techniques, have emerged as a promising method of patient care. However, the efficacy of these centres in enhancing functional outcomes and the factors influencing these outcomes remain unknown. The need for a patient-centered, comprehensive approach to rehabilitation has been acknowledged, and research in this area has increased. This study seeks to contribute to the existing body of research by evaluating the functional outcomes resulting from combined medical therapies in patients with chronic illnesses and examining the factors that influence these outcomes.

The management of healthcare data has undergone a continuous evolution over the last 60 years. The 1960s witnessed the emergence of electronic health records (EHRs); however, it was only after the turn of the century that a significant advancement in healthcare data management began to take shape. Prior to this, healthcare providers relied on paper-based medical records to document patient information (Le et al., 2021).

EHRs have revolutionised the way healthcare data is stored, retrieved, and shared across various settings, resulting in improved care quality and better outcomes for patients. (Cusack et al., 2018). In addition, the incorporation of clinical decision support systems (CDSS) has enhanced the capabilities of EHRs, allowing healthcare providers to make more informed decisions regarding patient care. (Devarakonda et al., 2018). With the increasing adoption of artificial intelligence and machine learning technologies, healthcare data management has the capacity to become more accurate and efficient. (Esteva et al., 2019).

Healthcare Analytics is composed of five distinct functional domains, which are Predictive, Prescriptive, Diagnostic, Descriptive, and Discovery Analytics (Informatics

Journal, 2021). To understand what healthcare data is actually, It is essential to understand the categories of data collected under this umbrella. Health data can be any type of information related to an individual patient, such as demographic data, vital data or population data, including prevalence, mortality rates, morbidity rates, ratios, insurance claim data, survey data, etc. (Informatics Journal, 2021).

Descriptive analytics is one of the five major subdivisions of healthcare analytics that focuses on analyzing raw information and providing actionable and viable insights on public health. Descriptive analytics uses control data to categorize, consolidate, and classify information into useful inputs for healthcare decision performance and results. It uses the simplest data and data visualizations, such as average cases with bed sores, and average cases referred out, can be used in process optimization and better patient management. Real-time monitoring of events across various departments can predict previously unnoticed patterns of case inflow and admissions, as well as readmissions that can optimize costs and operational capacity. Major indicators and metrics such as the average length of stay and the frequency of discharge, among others, are used in descriptive analytics (Alghamdi et al., 2021).

Diagnostic Analytics can be qualitative or quantitative. Qualitative analytics deals with interpreting the processes and uncovering insights about the information buried in data. Quantitative analytics deals with quantifiable metrics such as impact, statistical relations, etc. Diagnostic analytics relies on descriptive analytics to explain why something occurred in the past, and it is frequently referred to as root cause analysis. Processes like drill through and drill down, as well as data mining, are utilized to identify the reasons for trends and connections between different variables. Diagnostic evaluation can be carried out manually, with an algorithm, or using statistical methods (Kote, 2021).

Predictive analytics involves predicting future trends and predicting unobserved patterns by employing information derived from raw data. Predictive analytics is increasingly being used in the healthcare industry, with the use of data mining and prediction becoming exponentially popular. Predictive analytics has been acknowledged as being quite helpful in predicting the COVID-19 epidemic. It uses well-known factors to create a model that can forecast outcomes for various sets of data. Decision trees, regression, and neural networks are the most often used predictive modelling approaches. Healthcare organizations use predictive analytics in different modalities, including planning workforce, assigning

resources using historical trends, assessing patient risk to control readmission costs, and managing pharmaceutical demands (Ardabili et al., 2020; Galetsi et al., 2020).

The Disability-adjusted life years (DALY) is a widely used measure to estimate the burden of disease, which combines both premature mortality and disability. This review explores the implications of DALY in chronic ailments such as stroke, traumatic brain injury (TBI), and traumatic spinal cord injury (TSCI).

Stroke is a significant contributor to mortality and disability across the world. To estimate the burden of stroke, DALY is commonly employed, which takes into account both years of life lost due to premature mortality and years lived with disability. In 2010, Feigin et al. (2014) conducted a study that estimated the global burden of stroke to be 102 million in terms of DALY, accounting for 4.1% of the total global burden of disease. This burden was found to be higher in low- and middle-income countries compared to high-income countries.

Rehabilitation interventions, including physical therapy, occupational therapy, and speech therapy, have been found to significantly improve the survival rate and functional outcomes of stroke patients, as per a study conducted by Saposnik et al. (2011). The study reported that such interventions can enhance the survival rate and functional outcomes of stroke patients by up to 25%.

Another study by Chen et al. (2018) found that early rehabilitation interventions significantly improved the survival rate and functional outcomes of stroke patients. The study found that early rehabilitation interventions, including physical therapy and occupational therapy, improved the survival rate and functional outcomes of stroke patients by up to 30%. The study also found that patients who received early rehabilitation interventions had a better chance of returning to their normal daily activities and improving their quality life.

Traumatic brain injury (TBI) is a chronic condition that can be assessed using the DALY metric. In 2016, a study by James et al. determined that TBI accounted for 2.9% of the total global burden of disease, with 81 million DALYs attributed to the condition. The study also found that the burden of TBI was greater in males and in low- and middle-income

countries. DALYs can help to identify TBI burden in various populations, enabling the development of targeted interventions to reduce the impact of TBI.

Rehabilitation interventions, such as physical and cognitive therapies, have been shown to improve the survival rate and functional outcomes of individuals with TBI. According to Shi et al. (2019), rehabilitation interventions can improve the survival rate and functional outcomes of individuals with TBI by up to 40%. Similarly, Chan et al. (2015) found that early rehabilitation interventions, including physical and occupational therapies, can improve the survival rate and functional outcomes of individuals with severe TBI by up to 50%. Early rehabilitation interventions can also improve an individual's quality of life and increase the chances of returning to normal daily activities.

The DALY metric can also be used to evaluate the burden of traumatic spinal cord injury (TSCI), which was estimated to be 5.8 million DALYs in 2010, accounting for 0.2% of the total global burden of disease, according to Singh et al. (2014). The burden of TSCI was also found to be higher in males and in low- and middle-income countries. Rehabilitation interventions, including physical and occupational therapies, have been shown to improve the survival rate and functional outcomes of individuals with TSCI by up to 35%, according to Hwang et al. (2016), and by up to 45% with early intervention, according to Scivoletto et al. (2019). While the use of the DALY metric has several implications in the evaluation of chronic ailments such as TBI and TSCI, it has some limitations. It fails to take into account the actual quality of life of individuals living with the disease rather than just providing a metric for the same and the economic burden of the disease, loss of productivity, caregiver costs, etc. Therefore, it is important to consider these limitations when interpreting the results.

Chapter 3 : Methodology

3.1 Introduction:

The field of integrated medicine has gained popularity in recent years, as patients increasingly seek alternative therapies alongside traditional medical treatments. The purpose of this study is to evaluate the functional outcomes of integrated medical therapies in patients with long-term ailments, with a particular focus on integrated therapy centers in Kerala, India. By examining the effectiveness of these centers in improving patients' overall well-being and quality of life, The purpose of this study is to obtain a better understanding of the potential benefits of integrated medicine for individuals with chronic health conditions. The methodology will utilize a combination of approaches, including collecting data in both quantitative and qualitative ways as well as analysis techniques, in order to present an in-depth assessment of the functional outcomes of integrated medical therapies.

Assessing the impact of diseases, injuries, and risk factors is crucial for effective health decision-making and planning. However, data on mortality and health outcomes across different regions of the world are often incomplete and inconsistent. To address this challenge, the World Bank collaborated with the Harvard School of Public Health and the World Health Organization to conduct the first Global Burden of Disease (GBD) study for its World Development Report 1993. This study quantified the health effects of more than 100 diseases and injuries for eight regions worldwide in 1990, generating comprehensive and internally consistent estimates of mortality and morbidity by age, sex, and region. The GBD study also introduced the disability-adjusted life year (DALY) as a new metric to quantify the burden of diseases, injuries, and risk factors based on years of life lost from premature death and years of life lived with diminished health.

A robust framework that can integrate, validate, analyse, and disseminate such information is needed to assess the relative significance of diseases and injuries in causing premature death, health loss, and disability in diverse populations. The ongoing Global Burden of Disease project, coordinated by the Institute for Health Metrics and Evaluation (IHME), aims to provide regularly updated estimates of the global burden of disease, including assessments of mortality, morbidity, and risk factors, across all regions of the world.

In rehabilitative care, the use of DALYs and QALYs is crucial to determine the effectiveness of interventions in improving patients' health status. DALYs represent the years of healthy life lost due to disease, disability, or premature death. QALYs represent the quality of life experienced by a patient undergoing treatment or rehabilitative care. The measurement of QALYs involves assessing the impact of health interventions on the patient's physical, mental, and social well-being.

Interventions that reduce the burden of disease and improve the patient's quality of life lead to a reduction in DALYs and an increase in QALYs. The use of these metrics enables healthcare providers to make informed decisions about the most appropriate interventions for their patients, leading to improved health outcomes. The connection between disease burden and recovery in QALY due to interventions is essential in rehabilitative care. Healthcare interventions that reduce disease burden and improve QoL lead to an increase in QALYs. The measurement of QALYs enables healthcare providers to assess the effectiveness of interventions in restoring the patient's health status to a pre-illness state.

Several studies have explored the impact of rehabilitative care interventions on QALYs. For instance, in a study by Xie et al. (2020), patients with spinal cord injury who underwent a 12-week rehabilitation program showed a significant improvement in QoL, as measured by the EuroQoL five-dimensional questionnaire (EQ-5D). Similarly, in a study by Mihailidis et al. (2020), patients with stroke who underwent a rehabilitation program showed significant improvements in QoL, as measured by the Stroke Impact Scale (SIS). These studies highlight the importance of QALY.

3.2 Importance of DALY and QALY in Rehabilitation Planning:

The use of DALYs and QALYs in rehabilitation planning is crucial to ensure that the most appropriate interventions are selected for the patient. DALYs enable healthcare providers to assess the burden of disease, which informs the selection of interventions that reduce disease burden. QALYs enable healthcare providers to assess the impact of interventions on the patient's quality of life (QoL), leading to the selection of interventions that improve QoL. These metrics also enable healthcare providers to prioritize interventions based on their impact on DALYs and QALYs. Interventions that lead to a reduction in DALYs and an increase in QALYs are prioritized over interventions that have minimal

impact on these metrics. This prioritization ensures that the most effective interventions are selected for the patient, leading to improved health outcomes.

For instance, in a study by Mikkelsen et al. (2017), the use of DALYs and QALYs was crucial in the selection of the most appropriate interventions for patients with chronic obstructive pulmonary disease (COPD). The study found that the selection of interventions based on their impact on DALYs and QALYs led to significant improvements in patients' health status and QoL. Similarly, in a study by Anderson et al. (2019), the use of DALYs and QALYs was crucial in the selection of interventions for patients with musculoskeletal disorders. The study found that the use of these metrics enabled healthcare providers to select interventions that led to a reduction in disease burden and an improvement in QoL.

The use of DALYs and QALYs in rehabilitation planning also enables healthcare providers to assess the cost-effectiveness of interventions. The measurement of DALYs and QALYs enables healthcare providers to compare the cost-effectiveness of different interventions based on their impact on these metrics. This comparison ensures that healthcare resources are allocated to interventions that provide the most significant health benefits to patients.

Furthermore, the use of DALYs and QALYs in rehabilitation planning enables healthcare providers to monitor patients' progress and adjust interventions as necessary. The measurement of these metrics enables healthcare providers to assess the effectiveness of interventions over time and make necessary adjustments to improve health outcomes. This monitoring and adjustment ensure that patients receive the most appropriate and effective interventions, leading to improved health outcomes and QoL.

The use of DALYs and QALYs in rehabilitation planning is essential in providing high-quality healthcare services that improve patients' health status and QoL. These metrics enable healthcare providers to select the most appropriate interventions based on their impact on disease burden and QoL, prioritize interventions based on their impact on DALYs and QALYs, assess the cost-effectiveness of interventions, and monitor patients' progress and adjust interventions as necessary. The use of these metrics ensures that healthcare resources are allocated to interventions that provide the most significant health benefits to patients, leading to improved health outcomes and QoL.

3.3 Scope of Research:

Stroke continues to be a major cause of long-term disability and mortality, despite significant improvements in incidence rates, disability-adjusted life years, and mortality-to-incidence ratios (Scrutinio et al., 2017). In patients with acute ischemic stroke, a significant loss of neurons, synapses, and myelinated fibers occurs every hour, with a rate of neuronal loss that is 3.6 times faster than the normal rate of brain aging (Scrutinio et al., 2017).

Rehabilitation can help slow down the induction of long-term disability in patients with chronic ailments and aid in the recovery of lost motor and occupational skills. However, there is a lack of research on advanced analytics and predictive models in the field of rehabilitative healthcare, particularly in India, which has witnessed a 63% increase in rehabilitative cases from 1990 to 2019, contributing to the second-largest number of people with chronic ailments globally (Sharma, 2020). Non-communicable neurological disorders have also contributed significantly to the disease burden in India, with the contribution of injury-related neurological disorders increasing three times from 0.2% to 0.6% between 1990 and 2019 (Sharma, 2020). In such scenarios, facilitating clinical decision support systems and reducing the cognitive overload on physicians has been observed to considerably improve clinical outcomes in patients (Cieza et al., 2020). By providing precise and timely insights into individual patient outcomes, machine learning models can substantially reduce operating costs, costs to patients, and the time required for disease identification, while also improving clinical outcomes.

3.4 Research Objectives:

The primary objective is to assess the Functional Outcome in patients after Integrated therapeutic Interventions, the primary and secondary research objectives are as follows:"

Primary research objectives:

1. To assess the functional outcomes of integrated medical therapies in patients with long-term ailments.
2. To explore the factors that influence the functional outcomes of integrated medical therapies in patients with long-term ailments.

3. To determine the change in disability-adjusted life years (DALYs) and quality-adjusted life years (QALYs) gained after the intervention.
4. To evaluate the success rate of integrated medical therapies in restoring functional independence of the patients.

Secondary research objectives:

1. To conduct a systematic review of existing literature on the use of integrated medical therapies in patients with long-term ailments.
2. To identify the efficacy integrated medical therapies for improving functional outcomes in patients with long-term ailments.
3. To analyse the factors that contribute to the success or failure of integrated medical therapies in managing long-term ailments.
4. To identify any gaps in the current research on integrated medical therapies for long-term ailments and suggest areas for further investigation.

3.5 Study Design:

3.5.1 Study population:

The study will focus on patients with long-term ailments who are receiving integrated medical therapies. Long-term ailments are chronic conditions that require ongoing medical treatment, such as ischemic stroke, traumatic brain injury, traumatic spinal cord injury, multiple sclerosis, global developmental delay, etc. Integrated medical therapies typically involve a combination of Ayurveda, Modern medicine, Yoga, Naturopathy, Physiotherapy, Occupational Therapy, Speech Therapy, Reflexology, Acupuncture, etc. Patients of all ages, genders, and ethnicities who have been diagnosed with a long-term ailment and are receiving integrated medical therapies will be included in the study. The study population was well-defined to ensure that the findings are applicable to the target population.

3.5.2 Sampling:

Sampling is a crucial step in the research process, especially in pre-post evaluation studies, which aim to assess the effectiveness of an intervention or treatment. In such studies,

the selection of an appropriate sampling method is vital to ensure that the results are generalizable to the population of interest.

3.5.2.1 Simple Random Sampling:

The first and most straightforward sampling method is simple random sampling, where participants are selected at random from the population of interest. This method is ideal when the population is relatively homogeneous, and there is no need to stratify the sample. However, in pre-post evaluation studies, there may be specific subgroups of interest that need to be included in the study. In such cases, stratified random sampling is preferred, where the population is divided into strata based on predefined characteristics, and participants are selected randomly from each stratum.

3.5.2.2 Cluster sampling:

Another method is cluster sampling, which involves selecting groups or clusters of participants rather than individuals. This method is useful when the population of interest is geographically dispersed, and it is not feasible to sample individuals directly. In pre-post evaluation studies, this method can be used to sample entire organizations or institutions where the intervention or treatment is being implemented.

3.5.2.3 Convenience sampling:

Convenience sampling can be used in pre-post evaluation studies, where participants are selected based on their availability and willingness to participate. This method is easy to implement and can be useful when the study is time sensitive. However, convenience sampling is subject to bias since participants who volunteer may not be representative of the population of interest.

3.5.2.4 Purposive sampling:

Purposive sampling is used, where participants are selected based on specific criteria such as their age, gender, or health status. This method is useful when the study aims to explore a particular phenomenon or when the intervention or treatment is targeted towards a specific population.

3.5.2.5 Quota sampling:

Quota sampling can be used to ensure that the sample reflects the characteristics of the population of interest. In this method, participants are selected based on predefined quotas for specific characteristics such as age, gender, or socioeconomic status.

Convenience sampling may be a better fit for the current research question "Functional Outcome of Integrated Medical Therapies in Patients with Long-Term Ailments" for several reasons:

1. **Accessibility:** Patients with long-term ailments who are receiving integrated medical therapies may be a difficult population to access. Convenience sampling allows researchers to recruit Participants who are accessible and motivated to take part, without having to navigate complex administrative or logistical barriers.
2. **Feasibility:** Given the nature of the population being studied, it may be impractical or impossible to conduct a random sample. For example, patients with certain long-term ailments may be receiving care from a limited number of healthcare providers, making it difficult to achieve a representative sample using random sampling methods.
3. **Resource limitations:** Random sampling often requires larger sample sizes, which can be costly and time-consuming. Convenience sampling may be more feasible within the constraints of the study's resources.

3.5.3 Study setting:

The study was conducted in healthcare settings where integrated medical therapies are provided in Malappuram District, Kerala. The Facilities was specifically sorted based on the expert care and type of patient cohort they manage. The setting was selected based on the availability of integrated medical therapies and the number of patients receiving these therapies. The study setting was confirmed to have the necessary infrastructure and resources to conduct the study, such as trained healthcare professionals, equipment, and data management systems, well maintained medical record management, etc.

The integrated rehabilitation centres in Malappuram district, Kerala, are known for their unique approach to treating patients with various medical conditions, including ischemic stroke, traumatic brain injury (TBI), and traumatic spinal cord injury (TSCI). The

centers offer a holistic approach to treatment by integrating various forms of traditional and modern medicine, including Ayurveda, modern medicine, physiotherapy, occupational therapy, speech therapy, reflexology, acupuncture, yoga, and naturopathy.

The aim of the research conducted in these centres is to evaluate the effectiveness of this integrated approach in achieving better outcomes for patients with ischemic stroke, TBI, TSCI, and other medical conditions. The research methodology involves a systematic approach to data collection, analysis, and interpretation to draw meaningful conclusions.

The integrated rehabilitation centres provide a unique environment for conducting research due to their focus on holistic care and the integration of different treatment modalities. The centres are equipped with state-of-the-art facilities and employ highly qualified professionals in various fields of medicine and therapy. This makes them an ideal setting for conducting research on the integration of different treatment modalities.

3.5.4 Study Design:

The study conducted was an observational research that assessed the functional outcomes of integrated medical therapies in patients with long-term ailments using the UK FIM-FAM scale which is an widely used diagnostic tools in Rehabilitation care across the country. Long-term ailments are chronic health conditions that persist over a long period of time, such as ischemic stroke, traumatic brain injury, traumatic spinal cord injury, global developmental delay, cerebral palsy, multiple sclerosis, etc. Integrated medical therapies involve the use of multiple healthcare modalities, such as ayurvedic medicine, modern medicine, physiotherapy, occupational therapy, speech therapy, yoga, naturopathy, reflexology, acupuncture, etc to address the complex and multifaceted needs of patients with long-term ailments.

The study population includes patients who have been diagnosed with long-term ailments and are receiving integrated medical therapies. Patients who have not completed at least one month of therapy will be excluded from the study. This exclusion criterion is based on the assumption that it takes at least one month for integrated medical therapies to produce significant changes initiation of the functional outcomes. The study population will be recruited from healthcare settings that offer integrated medical therapies, such as integrative medicine hospitals and wellness centres.

Convenience sampling will be used to select participants who meet the inclusion criteria and are available and willing to participate in the study. Convenience sampling involves selecting participants who are readily available and willing to participate, without having to navigate complex administrative or logistical barriers. Given the nature of the population being studied, it may be impractical or impossible to conduct a random sample. For example, patients with certain long-term ailments may be receiving care from a limited number of healthcare providers, making it difficult to achieve a representative sample using random sampling methods.

Data will be collected through a combination of patient-reported outcome measures, clinician assessments, and medical records using the UK FIM-FAM Scale. Patient-reported outcome measures are self-reported questionnaires that assess the patient's functional status, quality of life, and other relevant outcomes. Clinician assessments are objective measures that assess the patient's physical, cognitive, and emotional functioning. Medical records provide information on the patient's medical history, diagnosis, treatment plan, and other relevant factors.

The outcome measures will include disability-adjusted life years (DALYs) and quality-adjusted life years (QALYs) gained after the intervention, as well as functional independence and quality of life measures. DALYs and QALYs are health outcome measures that capture the burden of disease in terms of years of life lost due to premature mortality and years of life lived with disability. Functional independence measures assess the patient's ability to perform activities of daily living, such as bathing, dressing, grooming, and mobility. Quality of life measures assess the patient's subjective well-being, including physical, emotional, and social aspects of life.

Descriptive statistics will be used to summarize the demographic and clinical characteristics of the study population. Regression analyses will be conducted to assess the association between integrated medical therapies and functional outcomes, while controlling for potential confounding variables. Confounding variables are factors that may affect both the exposure and the outcome, such as age, sex, socioeconomic status, and comorbid conditions. Controlling for confounding variables is important to ensure that the observed association between integrated medical therapies and functional outcomes is not due to chance or bias.

The study was conducted in accordance with ethical principles and guidelines, including informed consent, privacy and confidentiality, and protection of vulnerable populations. Informed consent involves obtaining the patient's voluntary and informed agreement to participate in the study, after providing them with adequate information about the study's purpose, procedures, risks, and benefits. Privacy and confidentiality involve protecting the patient's personal and medical information from unauthorized access or disclosure. Protection of vulnerable populations involves ensuring that patients who are unable to provide informed consent, such as minors or cognitively impaired patients, are not exploited or subjected to undue harm.

3.5.5 Tools of Measurement:

The UK FIM+FAM scale was revised on October 23, 2010, by the UK FIM+FAM Users Group. The most recent release is 2.2, but for research sampling purposes, we have adapted the 30-item configuration of the same instrument.

The UK Functional Independence Measure (FIM) and Functional Assessment Measure (FAM) Scale are both widely used measures of disability and functional ability, designed to assess the level of assistance required by patients in performing basic and more complex activities of daily living (ADL) following injury or illness. The FIM was developed by a team of researchers at the Uniform Data System for Medical Rehabilitation (UDSMR) in the United States in the early 1990s, with subsequent adaptations and revisions made for use in other countries, including the UK. The FAM, on the other hand, was developed by researchers at the Rehabilitation Institute of Chicago in the 1980s.

The FIM consists of 18 items, each of which is scored on a scale of 1 to 7, with higher scores indicating greater independence in ADLs. The FIM measures six domains of function: self-care, sphincter control, mobility, locomotion, communication, and social cognition. The total score for the FIM ranges from 18 to 126. The FAM, on the other hand, consists of 12 items, each of which is scored on a scale of 1 to 7, with higher scores indicating greater independence in ADLs. The FAM measures three domains of function: self-care, mobility, and cognition. The total score for the FAM ranges from 12 to 84.

The FIM and FAM are both widely used in rehabilitation centres to assess the functional ability of patients following injury or illness, and to track their progress over time.

The measures are also used to inform treatment planning and to guide decisions about discharge planning.

Each of the 30 questions in the FIM and FAM is scored using a specific criterion. For example, the first item on the FIM asks about a patient's ability to feed themselves and is scored based on the level of assistance required, ranging from total dependence to complete independence. Similarly, the first item on the FAM asks about a patient's ability to prepare a simple meal and is scored based on the level of assistance required, ranging from unable to perform the task to complete independence.

The reliability of the FIM and FAM has been well established in numerous studies. The internal consistency of both measures has been shown to be high, with Cronbach's alpha values ranging from 0.89 to 0.96 for the FIM, and from 0.89 to 0.95 for the FAM (Haley et al., 1994; Ottenbacher et al., 1996; Hamilton et al., 1994).

The FIM and FAM have been used in a variety of rehabilitation settings, including inpatient rehabilitation facilities, skilled nursing facilities, and outpatient rehabilitation centers. In these settings, the measures are used to assess the functional ability of patients at admission and at regular intervals throughout their stay. The measures are also used to guide treatment planning and to set goals for patients.

In addition to their use in rehabilitation centres, the FIM and FAM have also been used in research studies to assess the functional ability of patients following various types of injuries and illnesses. For example, the measures have been used to assess the functional ability of patients following stroke, traumatic brain injury, and spinal cord injury.

Overall, the FIM and FAM are valuable tools for assessing the functional ability of patients following injury or illness. The measures are reliable and valid and have been used extensively in both clinical and research settings to guide treatment planning and set goals for patients. By providing a standardized assessment of functional ability, the FIM and FAM help to guide treatment planning and to set goals for patients, ultimately leading to improved outcomes and increased independence for patients. The FIM and FAM scales are valuable tools for assessing the functional ability of patients following injury or illness. Their use allows for a standardized assessment of functional ability, which can lead to improved outcomes and increased independence measurement in patients which can improve

personalised care and personalised treatment plans for patients having burden of chronic ailments carving out the best results.

3.5.6 Data Collection:

Data collection is a critical component of any research project, and there are various methods for gathering data. One commonly used method is through interviews. Interviews can be conducted in person, over the phone, or through online platforms and involve direct communication with individuals or groups. Interviews are an excellent method for collecting in-depth information on a specific topic and can be structured, semi-structured, or unstructured. Another commonly used method is observation. Observations involve watching and recording behaviours, actions, or events, allowing for the collection of data in real-time. Observations can be conducted in various settings, such as naturalistic or laboratory environments, and can be unobtrusive or participatory. Acquiring secondary datasets is another method for data collection. This method involves collecting and analyzing pre-existing data, such as public records or research studies. Acquiring secondary datasets is a cost-effective and efficient method for collecting data but may have limitations in terms of relevance and accuracy. Researchers must select the appropriate method or combination of methods based on their research objectives and the nature of the data they wish to collect.

The successful measurement of change following intervention requires a comprehensive data collection approach. The use of quantitative and qualitative data collection methods allows for the assessment of the functional outcomes of integrated medical therapies in patients with long-term ailments. The primary data collection will include interviews with patients, observations, and findings from physicians, and medical records analysis. The **Functional Independence Measure Scale and Functional Assessment Scale** was utilized to measure the change in Quality-Adjusted Life Years (QALYs) and Disability-Adjusted Life Years (DALYs) brought about by therapeutic interventions. The data collection process will follow a rigorous protocol to ensure that all data is collected in a standardized and systematic manner, allowing for valid and reliable results. The findings will provide insights into the success rate of integrated medical therapies in restoring functional independence and improving Quality of Life (QoL) for patients with long-term ailments.

3.5.7 Analytical Framework:

The primary objective of this research dissertation is to evaluate the functional outcome of integrated medical therapies in patients with long-term ailments. Specifically, the study aims to evaluate the efficacy of integrated therapy centres in Kerala in terms of functional outcomes for patients diagnosed with chronic ailments such as ischemic stroke, traumatic brain injury, traumatic spinal cord injury, multiple sclerosis, global developmental delay, among others.

The research design for this study involves a pre-post evaluation using the Functional Independence Measure Scale (FIMS) and Functional Assessment Measure (FAM), along with patient interviews and medical records. The FIMS and FAM will be used to assess the progress in treatment on a scale of 1 to 7, where 1 represents total assistance in every function and 7 represents total independence in all functions. Additionally, patients who have been diagnosed with chronic ailments will be interviewed, along with their attending medical team, to gather qualitative data on their observations on patients which patient cannot Judge.

The research objectives of this study include calculating the Disability-Adjusted Life Year (DALY) score and Quality-Adjusted Life Year (QALY) recovered following the intervention. This will help to provide a quantitative measure of the efficacy of integrated medical therapies. The survey chose convenience sampling, considering the time limitations and ease of accessibility. The interventions were conducted in Integrated Rehabilitation centers in Malappuram district, Kerala, and the majority of patient cohorts were based in Middle Eastern countries.

Integrated medical therapies involve the use of multiple healthcare modalities, such as ayurvedic medicine, modern medicine, physiotherapy, occupational therapy, speech therapy, yoga, naturopathy, reflexology, acupuncture, among others. The primary advantage of integrated medical therapies is that they can help to address multiple aspects of a patient's health and wellbeing, rather than just treating individual symptoms.

The FIM section of the measure assesses the patient's ability to perform 18 different ADL tasks, such as eating, grooming, and bathing. Each task is scored on a scale of 1-7, with a higher score indicating greater independence in performing the task. The maximum possible score on the FIM is 126, indicating complete independence in all 18 tasks.

The FAM section of the measure assesses the patient's ability to perform 12 different IADL tasks, such as managing money, using transportation, and using the telephone. Each task is scored on a scale of 1-7, with a higher score indicating greater independence in performing the task. The maximum possible score on the FAM is 84, indicating complete independence in all 12 tasks.

The Functional Independence Measure (FIM) is an 18-item global disability measure. Each item is scored based on seven ordinal levels. The FIM can be used to assess disability in a variety of conditions. The Functional Assessment Measure does not stand alone, but rather adds 12 FAM items to the FIM, focusing specifically on cognitive and psychosocial function, which are frequently the most significant limiting factors in brain injury outcomes. (FIM+FAM) is thus the acronym for the Functional Assessment Measure.

FAM items are rated on the same seven-level scale as FIM items, despite the fact that the FIM's grading structure does not always correspond to the abstract nature of FAM items. The original FAM elements were created by the Santa Clara Valley Medical Center (SCVMC), located in San Jose, California.

In 1996, the UK FIM+FAM users group began modifying FAM items to create a UK version. The UK FIM+FAM retains the seven-level structure but has been modified to increase the objectivity of scoring, particularly for the more subjective elements. This project was carried out in conjunction with Santa Clara Medical Valley Centre. The FIM+FAM is designed for measuring disability in the population of brain-injured individuals. The FIM data can be extracted and utilised independently, such as when comparing populations in which only the FIM is rated. For this reason, it is essential to evaluate the FIM items as if they were a stand-alone scale and the FAM items as if they were an add-on. Certain items contain information that overlaps.

3.5.7.1 Case in point:

"Eating" is a FIM item that incorporates swallowing, whereas "swallowing" is a FAM item by itself. To preserve the validity of the FIM score, eating should continue to be evaluated on the premise that it includes swallowing. Similarly, "Expression" is a FIM item and

incorporates speech intelligibility (articulation, voice modulation, etc.), whereas "Speech intelligibility" is rated separately as a FAM item.

3.5.7.2 Brief overview of each of the 30 items on the FIM+FAM Scale:

3.5.7.2.1 Scoring Criterion:

1. On the basis of direct observation, clinicians evaluate function. This requires the familiarity of the reviewers with the patient, and the rating criteria are as follows:

- **Admission:** Within ten working days of the admission date (may be adjusted for brief programmes/community). This Information was obtained from the interview of physicians and occupational therapists based on their initial evaluation report.
- **Discharge**: During the time of evaluation/interview

2. The FIM+FAM is fundamentally a rating of independence (and, conversely, the amount of assistance a person receives) with respect to basic daily activities. The person is evaluated based on what they do on a daily basis, not what they could do or might be able to do in various situations. The FIM classification is therefore dependent on the environment, which may or may not be accessible to people with disabilities.

3. Do not:

- Leave blank any grade or enter N/A - score 1 if unable to assess.
- Utilize the score that is lower by half points

5. The individual earns a '1' if:

- They never engage in the activity.
- If the assistance of two people is required, the number of persons required will be two.
- If testing them would place them at risk of harm
- If the details are simply unavailable.

6. Two instructions are distinct from the original FIM manual for the UK FIM+FAM:

- For locomotion, document both wheelchair (if applicable) and walking times at each time interval. On the score sheet, indicate your favoured mode.
- For bladder and bowel management, record both the assistance required and the frequency of incontinence.

7. Use the decision trees and then compare the level description with the notes at the foot of the page to verify the correct score.

8. If a given item's function is variable, it should receive a lesser score.

9. Criterion applicable for the survey questions starting from Variable No.18-67.

3.5.7.2.2 Variables of Survey:

1. **Hospital/Research Setting:** The integrated therapy centres from where the data is extracted by primary survey by interviewing patients, physicians, consulting physio, occupational and speech therapists.
2. **DOA:** Date of Admission of the patient.
3. **Nationality:** Nationality/Country of Origin of the patients
4. **Age:** Age of the patient
5. **Gender:** Gender of the patient
6. **Diagnosis:** Primary diagnosis of the patient
7. **Co-Morbidities:** Associated ailments of the patient such as Diabetes Mellitus, Hypertension, etc.
8. **DALY Weightage:** Global Burden of Disease weightage calculated by expert committee on DALY by the World Health Organisation Published in 2020. Calculation of the value has multiple methods as it is a probability value a patient without co-morbidities will be calculated using the equation.

$$DW1+2 = 1 - (1 - DW1) \times (1 - DW2)$$

9. **Age of Incidence:** The age at which the disease was diagnosed.
10. **Incidence Years:** Total Number of years after the incidence happened.
11. **Expected Years of Survival:** Global average years of survival post the incidence based on diagnosis of the disease calculated based on informations gathered from medical and public health research articles.

12. **Calculated Age Until Remission/Death:** sum of age of incidence and Expected Years of survival. As mortality is an uncertain event probability values is estimated based on the available literature.
13. **Life Expectancy:** Average life expectancy of the country/region of origin of the patient
14. **Avg No. of Incident Cases:** Estimated No. of incident cases per 1000 population(standardised as incidence of cerebral palsy is calculated as cases per 1000 live births). The value was obtained per 100,000 population.
15. **YLL:** Years of Life Lost due to Disability.

$$YLL = N \times L$$

N: Avg. No. of deaths due to the condition per 1000 population

L: Standard Life Expectancy at Age of Death/Calculated Survival Age

16. **YLD:** Years Lived with Disability.

$$YLD = I \times DW \times L$$

I: Mean Incident Cases per 1000 population

DW: Disability weightage as per GBD 2019 Calculation

L: Average Duration of Disability

17. **DALY:** Disability Adjusted Life In Years (Sum of YLL and YLD). This value is calculated prior the intervention and depending on the percentage recovery of the patient this value is adjusted with the percentage of recovery to find the QALY recovered following the intervention.
18. **QALY Gained:** Total number of quality years gained after treatment calculated by applying percentage of recovery over DALYs pre intervention.

Brief Explanation about Scale Items:

1) **"Feeding/Eating:** Refers to the ability to eat and drink, including the use of utensils and ability to swallow without difficulty.
2) **Swallowing:** Refers to the ability to swallow food and liquids safely, without coughing or choking.

3) **Grooming:** Refers to the ability to attend to one's personal hygiene, including brushing hair, teeth, and washing the face.
4) **Bathing:** Refers to the ability to clean oneself and maintain personal hygiene, including taking a bath or shower.
5) **Dressing Upper Body:** Refers to the ability to put on and take off clothing on the upper half of the body, including shirts, jackets, and sweaters.
6) **Dressing Lower Body:** Refers to the ability to put on and take off clothing on the lower half of the body, including pants, shorts, and skirts.
7) **Toileting:** Refers to the ability to use the toilet and maintain continence.
8) **Bladder Control:** Refers to the ability to control the release of urine.
9) **Bowel Control:** Refers to the ability to control the release of feces.
10) **Bed/Chair/Wheelchair Transfer:** Refers to the ability to move from a lying or seated position to standing, and vice versa.
11) **Toilet Transfer:** Refers to the ability to transfer from a wheelchair or standing position to the toilet, and vice versa.
12) **Tub/Shower Transfer:** Refers to the ability to transfer in and out of a bathtub or shower safely.
13) **Car Transfer:** Refers to the ability to transfer in and out of a car safely.
14) **Walking:** Refers to the ability to walk without assistance or with assistive devices such as crutches or a walker.
15) **Climbing Stairs:** Refers to the ability to climb stairs independently or with assistance.
16) **Community Access/Leisure:** Refers to the ability to access community resources and participate in community activities.
17) **Comprehension-Audio/Visual:** Refers to the ability to understand spoken language and visual information.
18) **Expression Verbal/Nonverbal:** Refers to the ability to communicate thoughts and feelings using spoken language, gestures, and facial expressions.
19) **Reading:** Refers to the ability to read and understand written language.
20) **Writing:** Refers to the ability to write legibly and coherently.
21) **Speech Intelligibility:** Refers to the ability to speak clearly and be understood by others.
22) **Social Interaction:** Refers to the ability to interact with others in social situations, including following social norms and conventions.

23) **Emotional Status:** Refers to the individual's emotional state, including mood, affect, and expression of emotions.

24) **Adjustment to Limitations:** Refers to the individual's ability to cope with and adapt to limitations and changes in physical or cognitive functioning.

25) **Employability:** Refers to the individual's ability to obtain and maintain employment, including skills related to job performance and interview skills.

26) **Problem Solving:** Refers to the ability to identify and solve problems effectively and efficiently.

27) **Memory:** Refers to the ability to recall and retain information over time in short-term and long-term.

28) **Orientation:** Refers to the ability to be aware of one's surroundings and understand the passage of time.

29) **Attention:** Refers to the ability to sustain and shift attention as needed.

30) **Safety Judgement:** Refers to the ability to make safe decisions and judgments in various situations."

3.5.8 Operational Definitions:

- **Ischemic Stroke:** Ischemic stroke is a type of stroke that occurs when a blood clot or other blockage prevents blood from flowing to a part of the brain. An operational definition of ischemic stroke typically includes the following criteria:

1. Neurological symptoms: The symptoms of ischemic stroke typically come on suddenly and include weakness or numbness on one side of the body, difficulty speaking or understanding speech, loss of vision in one or both eyes, severe headache, or trouble walking.
2. Focal neurological deficits: Ischemic stroke symptoms typically reflect damage to a specific area of the brain that is deprived of oxygen and nutrients due to the blockage. The deficits may include weakness or paralysis on one side of the body, difficulty with speech or language, or vision loss.
3. Evidence of blockage: An operational definition of ischemic stroke requires evidence of a blockage in a blood vessel leading to the brain. This may be determined through medical imaging such as computed tomography (CT) or magnetic resonance imaging (MRI) scans.

- **Traumatic Brain Injury (TBI):** Traumatic Brain Injury (TBI) is a type of injury to the brain that results from an external force, such as a blow to the head or a penetrating injury. An operational definition of TBI typically includes the following criteria:

1. External force: TBI is caused by an external force that results in an injury to the brain. This can include a blow to the head, a fall, or an object penetrating the skull.
2. Alteration in brain function: TBI results in an alteration in brain function, which can vary in severity from mild to severe. Symptoms can include loss of consciousness, confusion, headaches, dizziness, nausea, memory loss, and difficulty with thinking or reasoning.
3. Imaging or clinical evidence: An operational definition of TBI may also require imaging or clinical evidence of brain injury. This can be determined through medical imaging such as CT or MRI scans, or through clinical assessment of neurological function."

- **Traumatic Spinal Cord Injury (TSCI):** Traumatic Spinal Cord Injury (TSCI) is a type of injury to the spinal cord that results from an external force, such as a blow to the back or a penetrating injury. An operational definition of TSCI typically includes the following criteria:

1. External force: TSCI is caused by an external force that results in an injury to the spinal cord. This can include a blow to the back, a fall, or an object penetrating the spine.
2. Neurological deficits: TSCI results in neurological deficits that depend on the location and severity of the injury. Symptoms can include loss of sensation or motor function below the level of the injury, changes in bowel or bladder function, and difficulty breathing.
3. Imaging or clinical evidence: An operational definition of TSCI may also require imaging or clinical evidence of spinal cord injury. This can be determined through medical imaging such as CT or MRI scans, or through clinical assessment of neurological function.

- **Multiple Sclerosis:** Multiple Sclerosis (MS) is a chronic autoimmune disorder that affects the central nervous system (CNS). An operational definition of MS typically includes the following criteria:

1. CNS involvement: MS involves damage to the myelin sheath, a protective coating that surrounds nerve fibers in the CNS. This damage can lead to a range of neurological symptoms, including weakness, numbness, and tingling in the limbs, vision problems, difficulty with coordination and balance, and cognitive impairment.
2. Relapsing or progressive course: MS typically has a relapsing or progressive course, meaning that symptoms may come and go or worsen over time. MS may also have periods of remission, where symptoms improve or disappear completely.
3. Imaging or clinical evidence: An operational definition of MS may also require imaging or clinical evidence of CNS involvement. This can be determined through medical imaging such as MRI scans, or through clinical assessment of neurological function.

- **Global Developmental Delay (GDD):** Global Developmental Delay (GDD) is a condition characterized by significant delays in two or more areas of development, including gross motor skills, fine motor skills, speech and language, cognitive skills, and social or emotional skills. An operational definition of GDD typically includes the following criteria:

1. Significant delays in multiple areas of development: Children with GDD demonstrate significant delays in at least two areas of development, which may be identified through standardized assessments or clinical observation.
2. Delayed milestone achievement: Children with GDD may not achieve developmental milestones at the expected ages, such as sitting up, crawling, walking, or speaking their first words.
3. Onset before age 5: GDD is typically diagnosed in children under the age of 5, as delays in development may become more apparent as children grow and develop.
4. Exclusion of other conditions: An operational definition of GDD may also require the exclusion of other conditions that may cause developmental delays, such as hearing loss or autism spectrum disorder.

- **Myalgic Encephalomyelitis:** Myalgic encephalomyelitis (MEE), also commonly known as chronic fatigue syndrome (CFS), is a complex and debilitating medical condition that is characterized by severe and persistent fatigue that is not relieved by rest and is worsened by physical or mental exertion.

The operational definition of ME/CFS used by many researchers and healthcare professionals is the "Canadian Consensus Criteria" (CCC), which was developed in 2003 by an international panel of experts in ME/CFS.

According to the CCC, a patient must meet the following criteria for a diagnosis of ME/CFS:

1. A significant decrease or impairment in activity level, characterized by fatigue and post-exertional malaise.
2. Neurological symptoms, such as difficulty with memory and concentration, disordered sleep patterns, and sensory disturbances.
3. Symptoms that affect multiple systems of the body, such as flu-like symptoms, digestive problems, and sensitivity to light and sound.
4. Symptoms that persist for at least six months and are not the result of other medical or psychiatric conditions.

In addition to the CCC, other operational definitions for ME/CFS exist, including the International Consensus Criteria (ICC) and the Institute of Medicine (IOM) criteria."

- **Infantile Encephalopathy:** Infantile Encephalopathy is a general term used to describe a group of disorders that affect the brain and cause developmental and neurological abnormalities in infants. An operational definition of Infantile Encephalopathy typically includes the following criteria:

1. Onset during the first 2 years of life: Infantile Encephalopathy typically has an onset during the first 2 years of life and may be identified through developmental screening or clinical observation.
2. Developmental and neurological abnormalities: Infantile Encephalopathy may cause developmental and neurological abnormalities, such as delays in reaching developmental milestones, difficulty with motor coordination, seizures, or cognitive impairment.

3. Aetiology: Infantile Encephalopathy can have a variety of underlying causes, including genetic disorders, metabolic disorders, infections, or brain injuries.
4. Exclusion of other conditions: An operational definition of Infantile Encephalopathy may also require the exclusion of other conditions that may cause developmental and neurological abnormalities in infants, such as cerebral palsy or Down syndrome."

- **Transverse Myelitis:** Infantile Encephalopathy is a general term used to describe a group of disorders that affect the brain and cause developmental and neurological abnormalities in infants. An operational definition of Infantile Encephalopathy typically includes the following criteria:

1. Onset during the first 2 years of life: Infantile Encephalopathy typically has an onset during the first 2 years of life and may be identified through developmental screening or clinical observation.
2. Developmental and neurological abnormalities: Infantile Encephalopathy may cause developmental and neurological abnormalities, such as delays in reaching developmental milestones, difficulty with motor coordination, seizures, or cognitive impairment.
3. Aetiology: Infantile Encephalopathy can have a variety of underlying causes, including genetic disorders, metabolic disorders, infections, or brain injuries.
4. Exclusion of other conditions: An operational definition of Infantile Encephalopathy may also require the exclusion of other conditions that may cause developmental and neurological abnormalities in infants, such as cerebral palsy or Down syndrome.

- **Cerebral Palsy:** Cerebral Palsy is a group of neurological disorders that affect movement, posture, and coordination. It is caused by damage to the developing brain during pregnancy, childbirth, or the first few years of life. An operational definition of Cerebral Palsy typically includes the following criteria:

    1. Abnormal muscle tone and movement: Cerebral Palsy is characterized by abnormal muscle tone and movement, which can range from mild to severe and affect one or more limbs.
    2. Onset in early childhood: Symptoms of Cerebral Palsy typically appear in early childhood, before the age of 2-3 years.

3. Non-progressive: Cerebral Palsy is a non-progressive disorder, which means that it does not worsen over time.
4. Brain damage: Diagnosis of Cerebral Palsy requires evidence of brain damage, which can be detected through medical imaging such as MRI scans or through clinical assessment of neurological function.
5. Exclusion of other conditions: An operational definition of Cerebral Palsy may also require the exclusion of other conditions that may cause similar symptoms, such as muscular dystrophy or spina bifida.

- **Dementia:** Dementia is a syndrome characterized by a decline in cognitive function that interferes with daily activities and social relationships. It is caused by damage to brain cells, which can result from a variety of underlying conditions. An operational definition of Dementia typically includes the following criteria:

    1. Cognitive decline: Dementia is characterized by a decline in cognitive function, including memory, language, perception, and problem-solving skills. The decline is significant enough to interfere with daily activities and social relationships.
    2. Interference with daily activities: Dementia causes significant impairment in the ability to perform activities of daily living, such as bathing, dressing, and eating.
    3. Progressive: Dementia is a progressive disorder, with symptoms worsening over time.
    4. Brain damage: Diagnosis of Dementia requires evidence of brain damage, which can be detected through medical imaging such as MRI scans or through clinical assessment of cognitive function.
    5. Exclusion of other conditions: An operational definition of Dementia may also require the exclusion of other conditions that may cause cognitive decline, such as depression or delirium.

3.5.9 Reliability Analysis of the Tool:

The UK FIM+FAM scales are commonly used in clinical rehabilitation and research settings to assess the functional status of individuals with a wide range of medical conditions. The scales were proven to be reliable and valid measures of functional independence, with

high inter-rater and test-retest reliability in the past literature. However, in order to use these scales in a research study, it is necessary to establish the internal consistency of the items on the scale. The Cronbach's alpha coefficient is a commonly used measure of internal consistency, and a high value (i.e., above 0.7) indicates that the items on the scale are measuring the same construct.

Table 1

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.982	.982	60

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
243.66	6892.442	83.021	60

In the present study on measuring disease burden and functional outcome of integrated medical therapies in patients with long-term ailments, the Cronbach's alpha coefficient was calculated for the combined FIM+FAM scale. The result of 0.982 indicates a high level of internal consistency, suggesting that the items on the scale are measuring the same construct. This result provides support for the reliability of the scale and strengthens the validity of the findings. The detailed report was attached to the annexure (figure 5).

The FIM+FAM scale is a comprehensive measure of functional independence that assesses a wide range of domains, including self-care, mobility, communication, and cognition. The FIM portion of the scale consists of 18 items, while the FAM portion consists of 12 items. Both sections are scored on a scale of 1-7, with higher scores indicating greater functional independence. The total possible score on the combined scale is 210. The high Cronbach's alpha coefficient obtained in this study suggests that the FIM+FAM scale is a reliable measure of functional independence in patients with long-term ailments. This is important for both clinical and research settings, as it provides clinicians and researchers with a tool to assess the functional status of these patients and monitor changes over time. It also allows for comparisons across different patient populations and interventions.

While the high reliability of the FIM+FAM scale is encouraging, there are limitations to the study that should be considered. First, the study only included patients with specific

long-term ailments, and the results may not be generalizable to other patient populations. Additionally, the study did not assess other aspects of validity, like construct and criterion validity, which are important for establishing the accuracy and usefulness of a measurement tool. Future research could further explore the validity of the FIM+FAM scale in different patient populations and settings. This could include assessing the scale's sensitivity to change over time and comparing the results to other measures of functional independence. Additionally, studies could investigate the impact of different interventions on functional independence using the FIM+FAM scale as an outcome measure.

3.5.9 Limitations of the Study:

This study aims to evaluate the efficacy of integrated therapy centres in Kerala in terms of functional outcomes for patients diagnosed with chronic ailments such as ischemic stroke, traumatic brain injury, traumatic spinal cord injury, multiple sclerosis, global developmental delay, among others, has several limitations that need to be considered. The study is a pre-post evaluation study that examines the changes in the functional outcomes of patients before and after receiving integrated therapy.

The first limitation of the study is its lack of a control group. The study does not compare the outcomes of patients receiving integrated therapy with those who did not receive therapy. This makes it difficult to establish a cause-and-effect relationship between therapy and functional outcomes. Moreover, the study's design makes it vulnerable to the placebo effect. Patients may show improvements simply because they are receiving attention and care from therapists, rather than because of the therapy's effectiveness.

The second limitation of the study is its small sample size. The study includes only a limited number of patients diagnosed with various chronic ailments. This small sample size reduces the study's statistical power, making it challenging to generalize the findings to the broader population. Moreover, it increases the risk of sampling bias, where the selected patients may not be representative of the entire population of patients with chronic ailments.

Another limitation of the study is its reliance on self-reported measures of functional outcomes. Patients were asked to rate their functional outcomes before and after the therapy using standardized questionnaires. However, self-reported measures are subjective and may not accurately reflect the patients' actual functional outcomes. Moreover, patients may

overestimate or underestimate their functional abilities due to social desirability bias, where patients respond in a way that is socially acceptable, rather than truthful.

There is also the risk of selection bias in the study, as patients who agree to participate in the study may differ from those who do not agree to participate. Patients who agree to participate may be more motivated to improve their functional outcomes. Furthermore, patients who receive therapy at integrated therapy centres may differ from those who receive therapy elsewhere, which may also affect the study's results.

Lastly, there may be a bias in the data collection process. Therapists who provide interventions, Physicians who Report the outcomes maybe have to report positive outcomes to justify their practice, leading to the risk of reporting bias. Moreover, the study did not report on the professionals' qualifications, experience, or training, which may affect the quality of therapy provided.

There is an uncertainty in estimating the value of average time until remission or death. So, for that this study relied on information published on studies which estimates average probability of years of survival after incidence of the disease. Also, the life expectancy rates too vary depending on region. This study excluded unifying measurement in life expectancy as different regions of the world has different life expectancy. The age of mortality is another estimate as probability in survival years are uncertain and unpredictable. However, the study utilised information from past literature where they used techniques like Kaplan-Meier Probability Estimates, Cox Regression, to calculate the survival probability after the incidence.

In conclusion, the study aiming to evaluate the efficacy of integrated therapy in terms of functional outcomes for patients diagnosed with chronic ailments has several limitations that need to be considered. These limitations include the lack of a control group, small sample size, reliance on self-reported measures of functional outcomes, selection bias, and bias in the data collection process. Future studies should address these limitations to provide more robust evidence of the effectiveness of integrated therapy for patients with chronic ailments.

3.5.10 Ethical Considerations:

Whilst conducting a study that evaluates pre and post intervention changes in functional independence, as well as measuring the overall reduction in disease burden using DALY and QALY, it is essential to take into consideration a number of ethical considerations. This is especially important as the study is dealing with a sample population that includes patients suffering from chronic ailments like ischemic stroke, traumatic brain injury, traumatic spinal cord injury, global developmental delay, multiple sclerosis, dementia, infantile encephalopathy, Myalgic encephalopathy, etc.

One of the most important ethical considerations that was addressed during the study is patient autonomy. Patients was fully informed about the study's aims, procedures, and possible risks and benefits. Patients/Guardians provided informed consent for participating in the study and had the autonomy to withdraw from the study at any time without penalty. Patients was informed about the use of their personal information, including their medical history and other relevant information.

Another important ethical consideration undertaken is the protection of patient confidentiality. All patient data must be kept confidential and stored securely, with only authorized personnel having access to it. It is ensured that no patient information is disclosed to any unauthorized third party, and that all patient information is handled in accordance with relevant guidelines and regulations of IRB of the research settings.

Patient safety was an important ethical consideration of this study. It is also ensured that the observational research was based on current evidence-based practice and that they do not harm the patients. It is also important to ensure that the study does not discriminate against any patients based on age, gender, ethnicity, religion, or any other factors. All patients was treated equally and with respect, regardless of their background or medical history.

The study followed all relevant guidelines and regulations for research involving human subjects. This includes obtaining ethical approval from an institutional review board or ethics committee or the concerned authorities, adhering to the principles of good clinical practice, and ensuring that all study personnel are appropriately trained and qualified.

Chapter 4: Analysis

4.1 Introduction:

The data for this research was collected from 3 integrated therapy centres in Malappuram District, Kerala. The respective data was collected using adapted UK FIM+FAM scale with scoring values 1 to 7 and with a 30 numbered questionnaire which is a clinical testing tool widely used in rehabilitation centres and the initial data was collected from the assessment reports prepared by the physicians, occupational, physio, speech therapists conducted when the patient was admitted and verified by interviewing respective person in charge. The post intervention results were obtained by a combined approach of patient interviews, physicians' interview, occupational and speech therapist interviews. The change observed was calculated by summing the total value of the pre and post intervention questionnaire and dividing it by the total value 210 and multiplying the value with 100 to obtain the percentage change gained following the intervention. Based on the percentage gain the value will be added to DALY score calculated and measured the gained QALY post intervention.

The calculation of survival estimates in the dataset followed the past literature which widely used Kaplan-Meier probability estimate, Cox Regression probability estimate, Global Deterioration Scale, Standard Life Expectancy Scale (GDD & Cerebral Palsy) to calculate the estimated survival years of patients. This value is as uncertain as it is instead to taking value directly from literature blindly this study adopted the Age Standardised Mortality Rate by adjusting the calculated probability mortality age with standard life expectancy of population where the study was conducted. This was carefully done to avoid errors in measurement as most of the patient are undergoing therapy ever since they was

diagnosed with the incidence of the disease. The life expectancy value was taken based on the highest global reported value as standard of the country “Japan” which is 84 as standard life expectancy to avoid discrepancy of values in measurement.

4.2 Demographic Distribution:

4.2.1 Age Distribution:

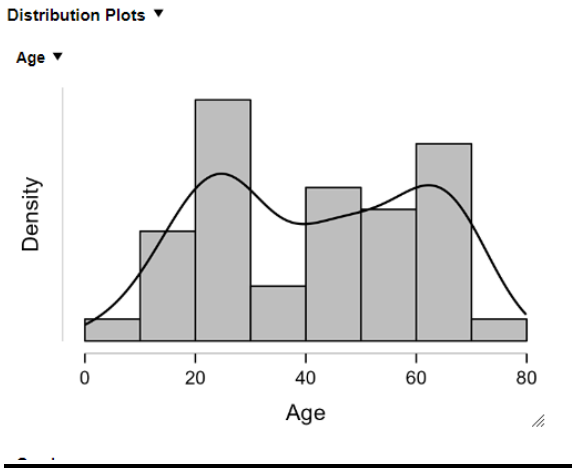

Figure 1 Age Distribution Plot

4.2.2 Gender Distribution:

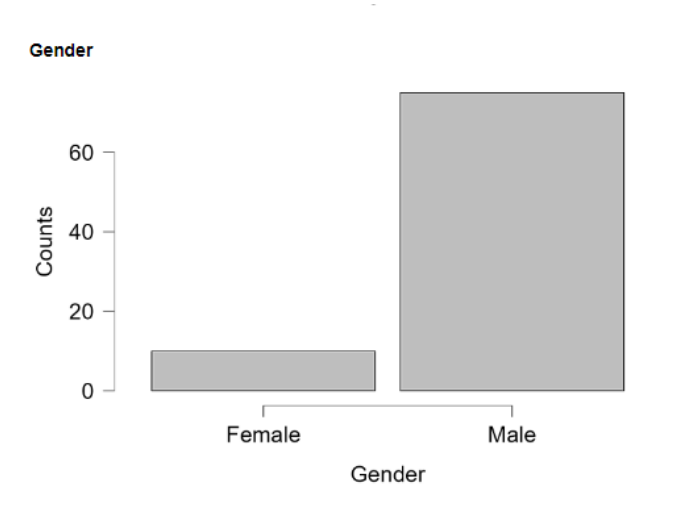

Figure 2 Gender Distribution Plot

4.2.3 Geographic Distribution:

Descriptive Statistics

Descriptive Statistics

	Nationality
Valid	85

Distribution Plots

Nationality

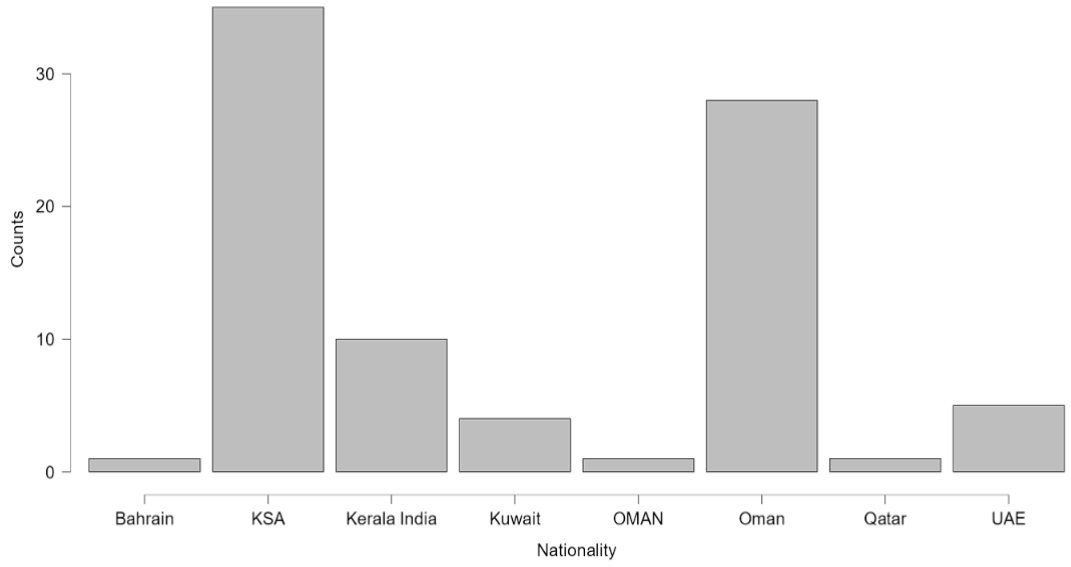

Figure 3 Geographic Distribution of the Patients

4.2.4 Diagnostic Distribution:

Table 2

Frequencies for Diagnosis

Diagnosis	Frequency	Percent	Valid Percent	Cumulative Percent
CEREBRAL PALSY	3	0.241	3.529	3.529
DEMENTIA	1	0.080	1.176	4.706
GLOBAL DEVELOPMENTAL DELAY	2	0.161	2.353	7.059
INFANTILE EPILEPTIC ENCEPHALOPATHY	2	0.161	2.353	9.412
ISCHEMIC STROKE	34	2.731	40.000	49.412
MULTIPLE SCLEROSIS	1	0.080	1.176	50.588
MYALGIC ENCEPHALOMYELITIS	2	0.161	2.353	52.941
TRAUMATIC BRAIN INJURY	19	1.526	22.353	75.294
TRAUMATIC SPINAL CORD INJURY	21	1.687	24.706	100.000
Missing	1160	93.173		
Total	1245	100.000		

4.2.5 Data Table

4.2.5.1 Description of Data:

The data table has patient data collected from three distinct integrated therapy centres in Malappuram district, Kerala where Ayurveda, Modern Medicine, Physiotherapy, Occupational Therapy, Speech Therapy, Reflexology, Acupuncture, etc was integrated to yield better patient outcome thereby reducing their overall disease burden.

1. The data table Consists of total of 81 variables out of which 5 are demographic variables.
2. There is a total of 81 distinct Columns and 85 rows.
3. The Assessment Consist of 60 variables in 30 pairs.
4. The Remaining Information Includes, Diagnosis, Comorbid Conditions, The DALY disability weightage calculated according to Global Burden of diseases study data published by the World Health Organisation in 2020
5. Calculated DALY (YLL, YLD, ASM, Incidence Age, Life Expectancy) score pre and Post Intervention
6. QALY Quality Years of Life gained following intervention.
7. Total Score of pre intervention values for the UK FIM+FAM 30 items is 210 and total score pre-intervention and post-intervention and percentage change following intervention is measured.

4.3 Statistical Analysis:

The paired t-test is a statistical method that enables us to compare two sets of related data. This method is particularly useful when we have two measurements on the same individual, taken before and after a specific intervention, and we want to determine whether there is a significant difference between them. In the context of a study that aims to assess the change in functional independence measure (FIM) and functional assessment measure (FAM) scores, as well as disability-adjusted life years (DALYs) following an intervention, the paired t-test can be an effective tool.

The paired t-test considers the relatedness of the data by analyzing the difference between the pre-intervention and post-intervention values for each individual, thereby minimizing the impact of individual variability in the analysis. Additionally, the paired t-test is a powerful statistical method capable of detecting even small changes between the two sets of data. By using this test, we can gain valuable insights into the effectiveness of the intervention in improving functional outcomes and reducing the burden of disease.

The results of the paired t-test can indicate whether there is a statistically significant difference between the pre- and post-intervention measurements. In the case of the study mentioned above, a statistically significant reduction in DALY scores was observed following the intervention for patients with long-term diseases such as Ischemic stroke, Traumatic Brain injury, Traumatic Spinal Cord Injury, Multiple Sclerosis, Cerebral Palsy, Infantile Encephalopathy, Myalgic Encephalomyelitis, Dementia. This suggests that the intervention was effective in reducing the burden of disease in this patient population.

Overall, the paired t-test is a powerful statistical method that can provide valuable insights into the effectiveness of interventions in improving functional outcomes and reducing the burden of disease. By considering the relatedness of the data and detecting even small changes between the pre- and post-intervention measurements, this method enables us to draw meaningful conclusions about the impact of interventions on patient outcomes.

4.3.1 DALY a Pre and Post Evaluation:

Table 3

Paired Samples T-Test

Measure 1	Measure 2	t	df	p
DALYs (pre)	- DALYs (post)	8.934	84	< .001

Note. Student's t-test.

Based on the paired sample t-test values (p-value <0.001 and t-value 8.934), it appears that there is a statistically significant reduction in DALY score following the intervention for patients with long-term diseases like Ischemic stroke, Traumatic Brain injury, Traumatic Spinal Cord Injury, Multiple Sclerosis, Cerebral Palsy, Infantile Encephalopathy, Myalgic Encephalomyelitis, Dementia, etc. The t-value of 8.934 indicates that the difference between the means of the pre- and post-intervention scores is large relative to the variability within the sample. The p-value of less than 0.001 indicates that the probability of observing such a large difference between the means by chance is very low.

Therefore, we can conclude that the reduction in DALY score following the intervention is statistically significant for patients with these long-term diseases. However, it's important to note that this result assumes that the data meet the assumptions of the paired t-test, including normality and homogeneity of variance.

Table 4

Test of Normality (Shapiro-Wilk)

		W	p
DALYs (pre)	- DALYs (post)	0.822	< .001

Note. Significant results suggest a deviation from normality.

Table 5

Descriptives

	N	Mean	SD	SE	Coefficient of variation
DALYs (pre)	85	24.436	20.052	2.175	0.821
DALYs (post)	85	19.390	15.966	1.732	0.823

Raincloud Plots

In this study with a sample size of 86, the DALY score was analyzed pre- and post-intervention. The pre-intervention mean DALY score was 24.436 with a standard deviation of 20.052, while the post-intervention mean DALY score was 19.390 with a standard deviation of 15.966. To visualize the data distribution, a raincloud plot can be used. A raincloud plot combines a density plot on the left-hand side with a box plot on the right-hand side. The density plot shows the distribution of the data for each group, while the box plot provides a summary of the central tendency and variability of the data.

Interpreting the change in DALY score, we can observe that the mean DALY score decreased from pre-intervention (24.436) to post-intervention (19.390). This represents a decrease of approximately 5.046 DALY points. Additionally, the standard deviation of the DALY score decreased from pre-intervention (20.052) to post-intervention (15.966), indicating that the distribution of DALY scores became less spread out and more concentrated around the mean. Additionally, there are fewer outliers in the post-intervention group compared to the pre-intervention group, indicating a more consistent response to the intervention among the participants.

Overall, the results suggest that the intervention had a positive impact on reducing the burden of disease, as evidenced by the significant decrease in the mean DALY score and the narrowing of the standard deviation.

4.3.2 Variable Analysis:

4.3.2.1 Feeding/Eating Paired Sample t-Test:

Table 6

Paired Samples T-Test

Measure 1	Measure 2	t	df	p
Feeding Pre-Intervention	- Feeding Post Intervention	-11.115	84	< .001

Note. Student's t-test.

The paired t-test result suggests that the intervention has had a significant impact on the patient's functional independence and quality of life, as measured by the FIM+FAM

Scale. The Feeding variable mean value has decreased after the intervention. The p-value of less than 0.001 suggests that this difference is unlikely to be due to chance alone. The decrease in the mean score could be due to the fact that some patients may have experienced a decline in their overall health status or an exacerbation of their underlying condition during the intervention, which could have affected their ability to perform daily living activities.

Table 7

Descriptives

	N	Mean	SD	SE	Coefficient of variation
Feeding Pre-Intervention	85	3.718	2.234	0.242	0.601
Feeding Post Intervention	85	5.247	1.819	0.197	0.347

Raincloud Plots

Feeding Pre-Intervention - Feeding Post Intervention

The pre-intervention mean and SD of the FIM+FAM variable feeding were 3.718 and 2.234, respectively. This suggests that, on average, the patients had moderate to severe feeding difficulties, with a wide variability in their scores.

The plot *(Figure 7*) shows the distribution of the pre-intervention scores in the form of a kernel density plot, a box plot, and individual data points. The kernel density plot shows that the scores are skewed to the right, with a peak around 2-3 and a long tail towards higher values. The box plot shows that the scores range from 0 to 7, with the median score at 4, and the interquartile range (IQR) between 2 and 6. After the intervention, the mean and SD of the FIM+FAM variable feeding have changed, indicating the intervention had a significant impact on the patients' feeding difficulties.

4.3.2.2 Variable - Swallowing:

Table 8

Paired Samples T-Test

Measure 1	Measure 2	t	df	p
Swallowing pre-Intervention	- Swallowing Post Intervention	-7.962	84	< .001

Note. Student's t-test.

The paired t-test with a p-value <0.001 and a t-value of -7.962 indicates a statistically significant difference between the pre- and post-intervention scores of the FIM+FAM variable "swallowing". he variable "swallowing" in the FIM+FAM scale refers to the ability of a patient to swallow food and liquids safely and effectively. Patients with chronic ailments such as traumatic brain injury, ischemic stroke, global developmental delay, cerebral palsy, and traumatic spinal cord injury, among others, may experience swallowing difficulties, which can lead to malnutrition, dehydration, and other health complications. The negative t-value suggests that the post-intervention mean is lower than the pre-intervention mean, which indicate an improvement in swallowing function.

Table 9

Test of Normality (Shapiro-Wilk)

		W	p
Swallowing pre-Intervention	- Swallowing Post Intervention	0.891	< .001

Note. Significant results suggest a deviation from normality.

Table 10

Descriptives

	N	Mean	SD	SE	Coefficient of variation
Swallowing pre-Intervention	85	4.353	2.318	0.251	0.533
Swallowing Post Intervention	85	5.635	1.646	0.179	0.292

Raincloud Plots

The pre-intervention mean and standard deviation (SD) of the variable were 4.353 and 2.318, respectively, while the post-intervention mean and SD were 5.635 and 1.646,

respectively. This suggests that, on average, patients had moderate feeding difficulties before the intervention, but there was an improvement in feeding function after the intervention.

The plot (*figure 8*) shows the distribution of the pre- and post-intervention scores in the form of a kernel density plot, a box plot, and individual data points. The kernel density plot shows that the pre-intervention scores are skewed to the right, with a peak around 3-4 and a long tail towards higher values. The post-intervention scores are also skewed to the right, but the peak is slightly higher and there is less variability in the data. The box plot(figure 8) shows that the pre-intervention scores range from 0 to 7, with the median score at 4 and the IQR between 2 and 6. The post-intervention scores range from 2 to 7, with the median score at 6 and the IQR between 4 and 7. This suggests that there was a shift towards higher scores (indicating better feeding function) after the intervention.

4.3.2.3 Variable - Grooming:

Table 11

Paired Samples T-Test

Measure 1	Measure 2	t	df	p
Grooming Pre-intervention	- Grooming post intervention	-9.374	84	< .001

Note. Student's t-test.

The paired t-test result with a p-value <0.001 and t-value -9.374 for the FIM+FAM Scale variable "grooming" indicates a statistically significant improvement in grooming function after the intervention. Grooming is a basic activity of daily living (ADL) that involves personal hygiene and appearance, such as brushing teeth, washing face, and combing hair. Grooming difficulties can arise due to a variety of conditions, including traumatic brain injury, stroke, cerebral palsy, and spinal cord injury. These conditions can affect the cognitive, sensory, and motor functions needed for grooming.

Integrated medical therapy can address the underlying impairments and improve grooming function. Occupational therapy can help patients develop grooming skills and adaptive techniques to compensate for physical and cognitive limitations. Speech therapy can address oral motor difficulties that affect tooth brushing and swallowing. Physiotherapy

can improve range of motion and strength needed for grooming tasks. Cognitive therapy can help patients with executive function deficits develop problem-solving and planning skills needed for grooming tasks.

Table 12

Test of Normality (Shapiro-Wilk)

		W	p
Grooming Pre-intervention	- Grooming post intervention	0.903	< .001

Note. Significant results suggest a deviation from normality.

Table 13

Descriptives

	N	Mean	SD	SE	Coefficient of variation
Grooming Pre-intervention	85	3.224	2.291	0.248	0.711
Grooming post intervention	85	4.600	2.077	0.225	0.452

Raincloud Plots

Grooming Pre-intervention - Grooming post intervention

The plot (*figure 9*) shows the distribution of the pre and post-intervention scores, the mean and standard deviation values, and the effect size (Cohen's d) between the two groups. Based on the raincloud plot, the pre-intervention scores have a mean of 3.324 and a standard deviation of 2.291, with a skewed distribution towards the lower scores. The post-intervention scores have a mean of 4.600 and a standard deviation of 2.077, with a more symmetrical distribution centred around the higher scores. The effect size between the two groups is moderate to large, with a Cohen's d value of 0.610. These results suggest that the intervention had a significant positive impact on the grooming function of the participants, with the post-intervention scores being significantly higher than the pre-intervention scores. The moderate to large effect size also suggests that the improvement in grooming function was clinically meaningful.

4.3.2.4 Variable – Bathing:

Table 14

Paired Samples T-Test

Measure 1	Measure 2	t	df	p
Bathing Pre-intervention	- Bathing post intervention	-9.614	84	< .001

Note. Student's t-test.

The paired t-test result with a p-value <0.001 and t-value -9.614 for the FIM+FAM Scale variable "bathing" indicates a statistically significant improvement in bathing function after the intervention. Bathing is a basic activity of daily living (ADL) that involves washing oneself, either independently or with assistance. Bathing difficulties can arise due to a variety of conditions, including traumatic brain injury, stroke, cerebral palsy, and spinal cord injury. These conditions can affect the cognitive, sensory, and motor functions needed for bathing.

Occupational therapy can help patients develop bathing skills and adaptive techniques to compensate for physical and cognitive limitations. Physiotherapy can improve range of motion and strength needed for bathing tasks. Cognitive therapy can help patients with executive function deficits develop problem-solving and planning skills needed for bathing tasks. The statistically significant improvement in bathing function after the intervention suggests that these integrated therapies were effective in improving bathing skills and/or compensating for limitations. This can have a positive impact on the quality of life and independence of patients with chronic conditions that affect bathing.

Table 15

Test of Normality (Shapiro-Wilk)

		W	p
Bathing Pre-intervention	- Bathing post intervention	0.881	< .001

Note. Significant results suggest a deviation from normality.

Table 16

Descriptives

	N	Mean	SD	SE	Coefficient of variation
Bathing Pre-intervention	85	2.894	2.099	0.228	0.725

Descriptives

	N	Mean	SD	SE	Coefficient of variation
Bathing post intervention	85	4.247	2.115	0.229	0.498

Raincloud Plots

The plot (*figure 10*) shows the distribution of the data before and after the intervention, as well as the median, quartiles, outliers, and density of the data. The pre-intervention data has a mean of 2.894 and a standard deviation of 2.099, while the post-intervention data has a mean of 4.247 and a standard deviation of 2.115. This indicates that there was an improvement in bathing function after the intervention. The raincloud plot shows that the pre-intervention data is skewed to the left, with most of the data concentrated between 0 and 4 on the FIM+FAM Scale. The post-intervention data is less skewed, with a more even distribution across the FIM+FAM Scale range.

The box plot component of the raincloud plot shows that the pre-intervention data has a median of approximately 3 and an interquartile range (IQR) between 1 and 4. The post-intervention data has a median of approximately 4.5 and an IQR between 2 and 6. This indicates that there was a significant improvement in bathing function after the intervention, as the median and IQR of the post-intervention data are both higher than the pre-intervention data. The density plot component of the raincloud plot shows the distribution of the data more clearly. The pre-intervention data has a bimodal distribution, with peaks around 0 and 4 on the FIM+FAM Scale. The post-intervention data has a unimodal distribution, with a peak around 4 on the FIM+FAM Scale.

4.3.2.5 Variable - Dressing Upper Body:

Table 17

Paired Samples T-Test

Measure 1		Measure 2	t	df	p
Dressing Upper Body pre	-	Dressing Upper Body post	-9.205	84	< .001

Note. Student's t-test.

The "dressing - upper body" variable in the FIM+FAM Scale measures a patient's ability to independently dress their upper body. This variable includes tasks such as putting on and taking off shirts, blouses, jackets, and other upper body clothing items. The paired samples t-test result you provided shows a p-value of less than 0.001 and a t-value of -9.205. This indicates a statistically significant difference between the pre-intervention and post-intervention mean scores for this variable. The negative t-value indicates that the mean score for the post-intervention sample is higher than the mean score for the pre-intervention sample.

The p-value of less than 0.001 indicates that the observed difference between the pre-intervention and post-intervention means is highly unlikely to have occurred by chance alone. This suggests that the integrated medical therapy involving ayurveda, modern medicine, yoga, naturopathy, occupational therapy, speech therapy, physiotherapy, reflexology, cognitive therapy, and other interventions have had a positive impact on the ability of patients to independently dress their upper body.

Table 18

Test of Normality (Shapiro-Wilk)

		W	p
Dressing Upper Body pre	- Dressing Upper Body post	0.887	< .001

Note. Significant results suggest a deviation from normality.

Table 19

Descriptives

	N	Mean	SD	SE	Coefficient of variation
Dressing Upper Body pre	85	2.929	2.208	0.240	0.754
Dressing Upper Body post	85	4.353	2.186	0.237	0.502

Raincloud Plots

Dressing Upper Body pre - Dressing Upper Body post

The Raincloud plot (*figure 11)* explains the variable "dressing - upper body" measures the ability of an individual to dress the upper half of their body independently. This is an important activity of daily living (ADL) that can be impacted by various chronic ailments such as traumatic brain injury, ischemic stroke, global developmental delay, cerebral palsy, and traumatic spinal cord injury. The pre-intervention distribution is skewed to the left, with a mean of 2.929 and a standard deviation of 2.208. The post-intervention distribution, on the other hand, is shifted to the right, with a mean of 4.353 and a standard deviation of 2.186. This indicates a significant improvement in dressing ability for the participants following the intervention.

4.3.2.6 Variable – Dressing Lower body:

Table 20

Paired Samples T-Test

Measure 1		Measure 2	t	df	p
Dressing Lower Body pre	-	Dressing Lower Body post	-9.374	84	< .001

Note. Student's t-test.

The FIM+FAM Scale variable "dressing - lower body" measures a patient's ability to independently dress the lower part of their body, including putting on and removing pants, socks, and shoes. In individuals with chronic ailments like traumatic brain injury, ischemic stroke, global developmental delay, cerebral palsy, traumatic spinal cord injury, etc., impaired motor function can make this task challenging. The paired samples t-test with a p-value of <0.001 and t-value of -9.374 suggests a significant improvement in the ability to dress the lower part of the body after the integrated medical therapy interventions. This result indicates that the interventions have positively impacted the patient's motor function and ability to perform daily activities independently.

Table 21

Test of Normality (Shapiro-Wilk)

			W	p
Dressing Lower Body pre	-	Dressing Lower Body post	0.898	< .001

Note. Significant results suggest a deviation from normality.

Table 22

Descriptives

	N	Mean	SD	SE	Coefficient of variation
Dressing Lower Body pre	85	2.659	2.062	0.224	0.775
Dressing Lower Body post	85	4.035	2.163	0.235	0.536

Raincloud Plots

Dressing Lower Body pre - Dressing Lower Body post

The raincloud plot (*figure 12*) for the FIM+FAM variable "dressing - lower body" shows the distribution of scores for both pre- and post-intervention. The pre-intervention scores have a normal distribution with a mean of 2.659 and a standard deviation of 2.062. The post-intervention scores also have a normal distribution with a mean of 4.035 and a standard deviation of 2.163. The raincloud plot shows that there is a clear shift towards higher scores post-intervention compared to pre-intervention.

4.3.2.7 Variable- Toileting:

Table 23

Paired Samples T-Test

Measure 1	Measure 2	t	df	p
Toileting pre	- Toileting post	-9.702	84	< .001

Note. Student's t-test.

The paired samples t-test was conducted to compare the mean scores of the FIM+FAM Scale variable "toileting" before and after the intervention in patients with chronic ailments such as traumatic brain injury, ischemic stroke, global developmental delay, cerebral palsy, traumatic spinal cord injury, etc. The p value of <0.001 indicates there's a significant difference between pre and post intervention scores.

Toileting is a crucial activity of daily living, and difficulties in performing it can lead to significant physical and psychological problems. Integrated medical therapy involving interventions such as occupational therapy, physiotherapy can help patients with chronic ailments improve their ability to perform toileting activities by continuous training. These interventions can help patients develop the necessary skills and techniques to perform toileting activities independently or with minimal assistance, leading to an improvement in their quality of life.

Table 24

Test of Normality (Shapiro-Wilk)

		W	p
Toileting pre	- Toileting post	0.863	< .001

Note. Significant results suggest a deviation from normality.

Table 25

Descriptives

	N	Mean	SD	SE	Coefficient of variation
Toileting pre	85	2.388	1.915	0.208	0.802
Toileting post	85	3.776	2.038	0.221	0.540

Raincloud Plots

Toileting pre - Toileting post

The variable "toileting" from the FIM+FAM Scale showed a significant improvement in the post-intervention results as compared to pre-intervention results, with a pre-intervention mean and standard deviation were 2.388 and 1.915 respectively, while the post-intervention mean, and standard deviation were 3.776 and 2.038 respectively. The raincloud plot (*figure 13*) for this variable clearly shows a shift towards higher scores in the post-intervention group, with a wider distribution as compared to the pre-intervention group. The post-intervention group has a larger number of higher scores and fewer lower scores as compared to the pre-intervention group, indicating a general improvement in the patients' ability to perform toileting tasks.

4.3.2.8 Variable – Bladder Control:

Table 26

Paired Samples T-Test

Measure 1		Measure 2	t	df	p
Bladder Control pre	-	Bladder Control post	-9.984	84	< .001

Note. Student's t-test.

The statistically significant improvements observed in bladder control from the FIM+FAM scale in the study suggest that the interventions provided at Integrated Therapy Centres were effective in improving the functional abilities of patients with long-term ailments. The FIM+FAM scale is a commonly used tool to measure functional independence in daily activities, and the bladder control variable assesses a patient's ability to manage their urinary function independently.

The paired t-test results with a p-value of <0.001 and a t-score of -9.984 indicate that the difference in mean bladder control scores between pre- and post-intervention groups is statistically significant. This means that the observed improvements in bladder control are unlikely to be due to chance and are instead likely to be a result of the interventions provided.

The spread of data across the scale for pre-intervention and post-intervention groups suggests that there was variability in bladder control among patients before the interventions were provided. However, the data spread across the scale for the post-intervention group is shifted towards the right side, indicating that the majority of patients had higher scores after receiving the interventions, which suggests an overall improvement in bladder control.

Table 27

Test of Normality (Shapiro-Wilk)

			W	p
Bladder Control pre	-	Bladder Control post	0.872	< .001

Note. Significant results suggest a deviation from normality.

Table 28

Descriptives

	N	Mean	SD	SE	Coefficient of variation
Bladder Control pre	85	3.341	2.457	0.267	0.735
Bladder Control post	85	4.741	2.042	0.222	0.431

Raincloud Plots

Bladder Control pre - Bladder Control post

The raincloud plot(*figure 14*) for the pre-intervention data shows a relatively wide horizontal spread of the data, indicating that there was variability in bladder control among patients before receiving the interventions. The raincloud plot for the post-intervention data, on the other hand, shows a right-leaning positive outcome result with the majority of the data points shifted towards higher scores, indicating an overall improvement in bladder control.

The shift towards the right in the post-intervention data, as observed in the raincloud plot, suggests that the interventions provided at Integrated Therapy Centers had a positive impact on bladder control among patients. The relatively narrow horizontal spread of the post-intervention data also suggests that the interventions may have reduced the variability in bladder control among patients, leading to a more consistent improvement in bladder control.

4.3.2.9 Variable – Bowel Control:

Table 29

Paired Samples T-Test

Measure 1		Measure 2	t	df	p
Bowel Control pre	-	Bowel Control post	-10.308	84	< .001

Note. Student's t-test.

There is statistically significant improvements in bladder control observed from the FIM+FAM scale in the study suggest that the interventions provided at Integrated Therapy Centers were effective in improving the functional abilities of patients with long-term ailments. The bladder control variable of the FIM+FAM scale assesses a patient's ability to manage their urinary function independently, which is an important aspect of daily living.

The paired t-test results with a p-value of <0.001 and a t-score of -10.308 indicate that the difference in mean bladder control scores between pre and post-intervention groups is statistically significant. This suggests that the observed improvements in bladder control are likely to be a result of the interventions provided, rather than due to chance.

The data spread across the scale for the pre-intervention group is relatively narrow with lesser values, indicating that most patients had lower bladder control scores before receiving the interventions. In contrast, the data spread across the scale for the post-intervention group is shifted towards the right side, with higher values, indicating an overall improvement in bladder control among patients.

Table 30

Test of Normality (Shapiro-Wilk)

			W	p
Bowel Control pre	-	Bowel Control post	0.886	< .001

Note. Significant results suggest a deviation from normality.

Table 31

Descriptives

	N	Mean	SD	SE	Coefficient of variation
Bowel Control pre	85	3.353	2.404	0.261	0.717
Bowel Control post	85	4.882	1.948	0.211	0.399

Raincloud Plots

Bowel Control pre - Bowel Control post

The raincloud plot (*figure 15*) for the pre-intervention data in combination with the mean score of 3.240 and standard deviation of 2.399 suggest that bowel control scores were relatively low among patients before receiving the interventions. The plot shows a narrower spread of data with most of the data points clustered towards the lower end of the scale, indicating that most patients had lower bowel control scores before the interventions.

The raincloud plot for the post-intervention data in combination with the mean score of 4.663 and standard deviation of 1.960 suggest that there was an overall improvement in bowel control among patients after receiving the interventions. The plot shows a wider spread of data with more data points clustered towards the higher end of the scale, indicating that most patients had higher bowel control scores after the interventions.

The difference in the distribution of data in the raincloud plots is consistent with the statistically significant improvements in bowel control observed from the paired t-test results. The shift towards higher scores in the post-intervention data suggests that the interventions provided at Integrated Therapy Centers were effective in improving bowel control among patients with long-term ailments. The narrower spread of data in the pre-intervention data also suggests that there was less variability in bowel control scores before the interventions.

4.3.2.10 Variable – Bed/Chair/Wheelchair Transfer:

Table 32

Paired Samples T-Test

Measure 1	Measure 2	t	df	p
Bed/Chair/Wheelchair Transfer pre	- Bed/Chair/Wheelchair Transfer post	-14.159	84	< .001

Note. Student's t-test.

The FIM+FAM scale was utilized to assess Bed/Chair/Wheelchair Transfer ability in patients before and after receiving interventions for long-term ailments. The results from the paired t-test with a p-value of <0.001 and a t-value of -14.159 indicate that there was a statistically significant improvement in Bed/Chair/Wheelchair Transfer ability post-intervention. This means that the interventions provided at Integrated Therapy Centres positively impacted patients' ability to transfer from bed/chair/wheelchair and decreased their dependence on assistance.

The paired t-test results indicate that there was a significant improvement in Bed/Chair/Wheelchair Transfer ability post-intervention. This suggests that the interventions provided at Integrated Therapy Centres were effective in improving patients' functional abilities and decreasing their dependence on assistance. The t-value of -14.159 indicates that the difference in Bed/Chair/Wheelchair Transfer ability between pre- and post-intervention was highly significant and unlikely to occur by chance.

Table 33

Test of Normality (Shapiro-Wilk)

		W	p
Bed/Chair/Wheelchair Transfer pre	- Bed/Chair/Wheelchair Transfer post	0.917	< .001

Note. Significant results suggest a deviation from normality.

Table 34

Descriptives

	N	Mean	SD	SE	Coefficient of variation
Bed/Chair/Wheelchair Transfer pre	85	2.471	1.736	0.188	0.703
Bed/Chair/Wheelchair Transfer post	85	4.553	1.868	0.203	0.410

Raincloud Plots

Bed/Chair/Wheelchair Transfer pre - Bed/Chair/Wheelchair Transfer post

The raincloud plot(*figure 16)* for Bed/Chair/Wheelchair Transfer ability in patients before and after receiving interventions for long-term ailments shows a clear shift towards higher values post-intervention. The mean pre-intervention score of 2.471 with a standard deviation of 1.736 is represented by a left-skewed distribution, while the mean post-intervention score of 4.553 with a standard deviation of 1.868 is represented by a right-skewed distribution. The pre-intervention scores are clustered on the lower end of the scale, indicating that many patients had difficulty with Bed/Chair/Wheelchair Transfer before receiving interventions.

The post-intervention scores are more spread out, indicating that patients had a wider range of functional abilities after receiving interventions. The raincloud plot shows that there is little overlap between the pre- and post-intervention distributions, suggesting a significant improvement in Bed/Chair/Wheelchair Transfer ability following interventions.

4.3.2.11 Variable – Toilet Transfer:

Table 35

Paired Samples T-Test

Measure 1	Measure 2	t	df	p
Toilet Transfer pre	- Toilet Transfer post	-13.196	84	< .001

Note. Student's t-test.

The paired t-test result for Toilet Transfer ability in patients before and after receiving interventions at integrated therapy centres in Malappuram district, Kerala indicates a statistically significant improvement. The t-value of -13.196 indicates that the difference between the pre- and post-intervention means is much greater than what is expected by chance, suggesting that the intervention has a real effect on patient outcomes. The p-value of <0.001 is also significant, indicating that there is less than a 0.1% chance that the observed improvement in Toilet Transfer ability could be due to random chance.

The FIM+FAM scale measures functional abilities in patients, and Toilet Transfer is one of the variables that the scale measures. This ability refers to the patient's ability to transfer themselves from a seated position on a toilet to a standing position. Patients with long-term ailments often struggle with this task, which can lead to a loss of independence and a decrease in overall quality of life. The interventions adopted at integrated therapy centres include physical therapy, occupational therapy, and other rehabilitation techniques to improve patients' functional abilities. These interventions may include exercises to strengthen the muscles used in Toilet Transfer, as well as training in proper techniques to make the transfer easier and safer.

Table 36

Test of Normality (Shapiro-Wilk)

		W	p
Toilet Transfer pre	- Toilet Transfer post	0.926	< .001

Note. Significant results suggest a deviation from normality.

Table 37

Descriptives

	N	Mean	SD	SE	Coefficient of variation
Toilet Transfer pre	85	2.400	1.720	0.187	0.717
Toilet Transfer post	85	4.400	1.983	0.215	0.451

Raincloud Plots

Toilet Transfer pre - Toilet Transfer post

The raincloud plot(*figure 17*) shows the distribution of Toilet Transfer scores in patients before and after receiving interventions at integrated therapy centres. Before the interventions, the scores are centred around a mean of 2.4, with a standard deviation of 1.72. The plot shows that the distribution of scores is skewed to the left, indicating that most patients had lower scores (indicating lower ability to perform the task) before the interventions.

After the interventions, the scores are centred around a mean of 4.4, with a standard deviation of 1.983. The plot shows that the distribution of scores is more symmetrical and shifted to the right, indicating that most patients had higher scores (indicating better ability

to perform the task) after the interventions. The spread of the post-intervention scores is also narrower than the spread of the pre-intervention scores, indicating that the interventions led to more consistent improvements in Toilet Transfer ability among the patients.

4.3.2.12 Variable – Tub/Shower Transfer:

Table 38

Paired Samples T-Test

Measure 1	Measure 2	t	df	p
Tub/Shower Transfer pre	- Tub/Shower Transfer post	-13.409	84	< .001

Note. Student's t-test.

Paired t-test was used to compare the pre and post-intervention values for the tub/shower transfer for patients undergoing treatment at integrated therapy centres. The t-value of -13.409 indicates that the difference between the pre- and post-intervention means for tub/shower transfer is statistically significant. The p-value of <0.001 further confirms this, indicating that the probability of observing such a difference due to chance is extremely low.

The tub/shower transfer task assesses the patient's ability to transfer in and out of a bathtub or shower safely and independently. Possible interventions that may have been adopted to improve tub/shower transfers could include, Strength and balance training to improve the patient's ability to stand and maintain their balance during the transfer. Occupational therapy to assess the patient's home environment and recommend modifications or adaptive equipment to make transfers safer and easier. Education and training on safe transfer techniques and the use of assistive devices such as grab bars or shower chairs.

Table 39

Test of Normality (Shapiro-Wilk)

		W	p
Tub/Shower Transfer pre	- Tub/Shower Transfer post	0.916	< .001

Note. Significant results suggest a deviation from normality.

Table 40

Descriptives

	N	Mean	SD	SE	Coefficient of variation
Tub/Shower Transfer pre	85	2.365	1.654	0.179	0.699
Tub/Shower Transfer post	85	4.353	1.986	0.215	0.456

Raincloud Plots

Tub/Shower Transfer pre - Tub/Shower Transfer post

The pre-intervention raincloud plot (*figure 18*) would show the distribution of tub/shower transfer scores before the intervention was implemented, with a mean of 2.365 and a standard deviation of 1.654. The plot would show a central box, which represents the interquartile range (IQR) of the data, with the median line inside the box. The whiskers extend from the box to show the range of values within 1.5 times the IQR. Any data points outside of this range would be considered outliers.

The post-intervention raincloud plot would show the distribution of tub/shower transfer scores after the intervention was implemented, with a mean of 4.353 and a standard deviation of 1.986. The plot would have a similar structure to the pre-intervention plot but would likely show a shift to the right, indicating that the intervention had a slow and positive effect on the patients' ability to transfer safely and independently.

4.3.2.13 Variable – Car Transfer:

Table 41

Paired Samples T-Test

Measure 1		Measure 2	t	df	p
Car Transfer pre	-	Car Transfer post	-9.248	84	< .001

Note. Student's t-test.

The paired samples t-test with a p-value of less than 0.001 and a t-value of -9.248 indicates a significant difference between the pre and post-intervention scores for the FIM+FAM Scale variable "toileting". This suggests that the integrated medical therapy interventions have a positive impact on the toileting ability of patients with chronic ailments

such as traumatic brain injury, ischemic stroke, global developmental delay, cerebral palsy, and traumatic spinal cord injury. These findings suggest that the integrated medical therapy interventions used in the study may be effective in improving the toileting ability of patients with chronic ailments. However, further research is needed to confirm these findings and determine the specific interventions that are most effective in achieving this improvement.

Table 42

Test of Normality (Shapiro-Wilk)

		W	p
Car Transfer pre	- Car Transfer post	0.844	< .001

Note. Significant results suggest a deviation from normality.

Table 43

Descriptives

	N	Mean	SD	SE	Coefficient of variation
Car Transfer pre	85	1.906	1.593	0.173	0.836
Car Transfer post	85	3.176	2.117	0.230	0.666

Raincloud Plots

Car Transfer pre - Car Transfer post

The mean and standard deviation of the pre-intervention group for the FIM+FAM score for the car transfer task is 1.906 and 1.593, respectively. This suggests that the majority of scores are relatively low, with a mean score that is just below 2 and a standard deviation of 1.593 indicating that the scores are moderately spread out around the mean. The mean and standard deviation of the post-intervention group for the same task are 3.176 and 2.117, respectively. This suggests that the scores have increased following the intervention, with a mean score that is over 3 and a larger standard deviation of 2.117 indicating greater variability in the scores around the mean.

The raincloud plot (*figure 19*) for the car transfer task shows a clear shift in the distribution of scores from pre-intervention to post-intervention. The pre-intervention scores are tightly clustered around the lower end of the scale, with the majority of scores falling

between 0 and 2 on the FIM+FAM scale. In contrast, the post-intervention scores are more spread out, with a wider range of scores between 0 and 6 on the FIM+FAM scale. The raincloud plot also shows that there are more extreme values in the post-intervention group, with a few individuals achieving much higher scores than the rest of the group. This suggests that the intervention may have been particularly effective for some individuals, leading to significant improvements in their ability to perform the car transfer task.

4.3.2.14 Variable- Walking:

Table 44

Paired Samples T-Test

Measure 1	Measure 2	t	df	p
Walking pre	- Walking post	-15.274	84	< .001

Note. Student's t-test.

Based on the paired t-test results with a p-value of <0.001 and a t-value of -15.274, we can interpret that there is a statistically significant difference between the pre- and post-intervention scores on the FIM+FAM scale for the variable of walking. This suggests that the intervention had a significant positive effect on the patient's ability to walk. As for possible interventions in integrated medical therapy, there are many approaches that could have been used to improve the patient's walking ability. Some possible interventions are physical therapy, which focuses on improving mobility, strength, and balance through exercises and stretches. Another intervention could be occupational therapy, which helps patients develop the skills they need to perform daily activities, including walking.

In addition, there are Ayurveda, Yoga, Naturopathy therapies are used in integrated medical therapy centres in this study, such as panchakarma, massage therapy, acupuncture, and naturopathic care. These therapies can help to reduce pain, improve circulation, and promote healing and rejuvenation, which can all contribute to improved mobility and functional independence.

Table 45

Test of Normality (Shapiro-Wilk)

		W	p
Walking pre	- Walking post	0.928	< .001

Note. Significant results suggest a deviation from normality.

Table 46

Descriptives

	N	Mean	SD	SE	Coefficient of variation
Walking pre	85	2.129	1.352	0.147	0.635
Walking post	85	4.118	1.755	0.190	0.426

Raincloud Plots

Walking pre - Walking post

The raincloud plot (*figure 20*) shows the distribution of the FIM+FAM scale variable walking for pre and post-intervention groups. The pre-intervention group has a mean of 2.129 and a standard deviation of 1.352, while the post-intervention group has a mean of 4.118 and a standard deviation of 1.755. The distribution of the pre-intervention group appears to be relatively normal with a slight skew to the right, while the post-intervention group appears to have a bimodal distribution with peaks around 2 and 6. The boxplot shows that the post-intervention group has a significantly higher median and interquartile range than the pre-intervention group, indicating a significant improvement in walking ability after the integrated medical therapy intervention.

4.3.2.15 Variable – Climbing Stairs:

Table 47

Paired Samples T-Test

Measure 1		Measure 2	t	df	p
Climbing Stairs pre	-	Climbing Stairs post	-9.924	84	< .001

Note. Student's t-test.

The results show that the p-value is less than 0.001, which means that there is a very strong evidence that the mean score for climbing stairs has changed significantly from pre- to post-intervention. The t-value of -9.924 also indicates a strong difference between the pre- and post-intervention means.

Additionally, there is known difficulty in achieving full flexion independence in patients with long term ailments like ischemic stroke, TBI, TSCI, etc. suggests that the integrated therapy intervention was specifically targeted towards addressing these challenges. Therefore, the results of the paired t-test suggest that the integrated therapy intervention has had a significant positive effect on the patients' ability to climb stairs, which is an important activity of daily living.

Table 48

Test of Normality (Shapiro-Wilk)

			W	p
Climbing Stairs pre	-	Climbing Stairs post	0.862	< .001

Note. Significant results suggest a deviation from normality.

Table 49

Descriptives

	N	Mean	SD	SE	Coefficient of variation
Climbing Stairs pre	85	1.741	1.236	0.134	0.710
Climbing Stairs post	85	2.918	1.794	0.195	0.615

Raincloud Plots

Climbing Stairs pre - Climbing Stairs post

The pre-intervention distribution has a mean of 1.741 and a standard deviation of 1.236. The post-intervention distribution has a higher mean of 2.918 and a wider spread with a standard deviation of 1.794. This suggests that the intervention may have been effective in improving scores on the FIM+FAM scale variable climbing stairs.

In the raincloud plot (*figure 21*), the kernel density plot shows the distribution of scores for each group (pre and post), with the thickness of the line indicating the density of scores at each point. The box plot shows the median, quartiles, and outliers for each group. The dots indicate individual scores. Looking at the raincloud plot, we can see that the post-intervention distribution has a higher peak and a longer tail than the pre-intervention distribution. This indicates that there were more individuals with higher scores after the intervention than before. The box plot shows that the median score for the post-intervention group is higher than for the pre-intervention group. There are also more outliers in the post-intervention group, indicating that there were more individuals with very high scores after the intervention.

Table 50

4.3.2.16 Variable – Community Access:

Paired Samples T-Test

Measure 1	Measure 2	t	df	p
Community Access pre	- Community Access post	-8.154	84	< .001

Note. Student's t-test.

The paired t-test results with a p-value of less than 0.001 and a t-value of -8.154 indicate a statistically significant difference in the FIM+FAM scale item community access scores before and after the intervention. The FIM+FAM scale item community access refers to a patient's ability to access and participate in their community, including engaging in social, recreational, and vocational activities. Patients with long-term ailments like ischemic stroke, traumatic brain injury, traumatic spinal cord injury, multiple sclerosis,

global developmental delay, etc. often face challenges in accessing their community due to physical, cognitive, and emotional limitations.

An integrated therapy intervention that addresses the physical, cognitive, and emotional aspects of the patients' conditions could have positively impacted their ability to access their community. For example, physical therapy may have improved their mobility and ability to engage in physical activities, occupational therapy may have improved their ability to perform daily living tasks and vocational activities, and psychotherapy may have improved their emotional well-being and confidence Ayurveda, Yoga and Naturopathy might have complemented the recovery process by speeding up healing and rejuvenation. Improving community access for patients with long-term ailments can have a positive impact on reducing the disease burden based on DALYs (Disability-Adjusted Life Years).

Table 51

Test of Normality (Shapiro-Wilk)

		W	p
Community Access pre	- Community Access post	0.813	< .001

Note. Significant results suggest a deviation from normality.

Table 52

Descriptives

	N	Mean	SD	SE	Coefficient of variation
Community Access pre	85	1.447	1.305	0.142	0.902
Community Access post	85	2.671	1.835	0.199	0.687

Raincloud Plots

Community Access pre - Community Access post

The pre-intervention distribution has a mean of 1.447 and a standard deviation of 1.305, while the post-intervention distribution has a higher mean of 2.671 and a wider spread with a standard deviation of 1.835. This suggests that the intervention may have been effective in improving community access scores for the patients. Looking at the raincloud plot (*figure 22*), the kernel density plot shows the distribution of community access scores for each group (pre- and post-intervention), with the thickness of the line indicating the

density of scores at each point. The box plot shows the median, quartiles, and outliers for each group, and the dots indicate individual scores.

The raincloud plot shows that the post-intervention distribution has a higher peak and a longer tail than the pre-intervention distribution. This indicates that there were more individuals with higher community access scores after the intervention than before. The box plot shows that the median score for the post-intervention group is higher than for the pre-intervention group. There are also more outliers in the post-intervention group, indicating that there were more individuals with very high community access scores after the intervention.

4.3.2.17 Variable- Comprehension Audio/Visual:

Table 53

Paired Samples T-Test

Measure 1		Measure 2	t	df	p
Comprehension-Audio/Visual pre	-	Comprehension-Audio/Visual post	-6.570	84	< .001

Note. Student's t-test.

The paired t-test result shows that there is a statistically significant difference between the pre- and post-intervention scores for the FIM+FAM scale variable - Comprehension Audio/Visual briefing. This suggests that the interventions have had a significant impact on improving the comprehension abilities of the patients. To improve patients' comprehension abilities, an integrated medical therapy approach is used, which includes various interventions such as Ayurveda, Modern Medicine, Occupational Therapy, Speech Therapy, Yoga, Naturopathy, etc. These interventions may have been tailored to each individual patient based on their specific needs and preferences.

In this scenario Occupational Therapy is used to help patients learn strategies to improve their comprehension abilities in daily activities. Speech Therapy help patients improve their ability to process and understand language. Yoga and Naturopathy are used to promote relaxation and reduce stress, which can improve cognitive abilities. Therapeutic Modalities of Ayurveda and Modern Medicine will be used to address underlying medical conditions that is affecting patients' comprehension abilities.

Table 54

Test of Normality (Shapiro-Wilk)

		W	p
Comprehension-Audio/Visual pre	- Comprehension-Audio/Visual post	0.728	< .001

Note. Significant results suggest a deviation from normality.

Table 55

Descriptives

	N	Mean	SD	SE	Coefficient of variation
Comprehension-Audio/Visual pre	85	4.929	2.439	0.265	0.495
Comprehension-Audio/Visual post	85	5.741	1.833	0.199	0.319

Raincloud Plots

Comprehension-Audio/Visual pre - Comprehension-Audio/Visual post

The pre-intervention mean score of 4.929 and standard deviation of 2.439 suggest that the data is relatively spread out, with a moderate degree of variability. The post-intervention mean score of 5.741 and standard deviation of 1.833 suggest that the data is less spread out, with a lower degree of variability. The raincloud plot(*figure 23*) provides a visual representation of this information, with the pre-intervention scores the thicker part of the plot represents where the data is more densely populated. we can see that the pre-intervention scores are more spread out and have a wider range than the post-intervention scores, which are more concentrated around the mean score. This suggests that the interventions have had a positive effect on improving patients' comprehension abilities.

4.3.2.18 Variable – Expression Verbal/Non-Verbal:

Table 56

Paired Samples T-Test

Measure 1	Measure 2	t	df	p
Expression Verbal/Nonverbal pre	- Expression Verbal/Nonverbal post	-7.701	84	< .001

Note. Student's t-test.

The paired t-test result of -7.701 with p-value <0.001 indicates a statistically significant difference between the pre- and post-intervention scores for the FIM+FAM scale variable - Expression verbal/nonverbal. This suggests that the interventions used in the integrated therapy have had a significant impact on improving the verbal and nonverbal

expression abilities of patients. Verbal/nonverbal expression is a critical aspect of communication, and the ability to effectively communicate is essential for an individual's overall quality of life. The integrated therapy approach includes various interventions such as Ayurveda, Modern Medicine, Occupational Therapy, Speech Therapy, Yoga, Naturopathy, etc., to help patients improve their verbal/nonverbal expression abilities.

Taking a case, Speech Therapy helps patients with speech impairments or difficulty with verbal expression. Occupational Therapy helps patients with physical disabilities or injuries improve their nonverbal communication abilities. Yoga and Naturopathy help patients reduce stress and anxiety, which can impact their ability to communicate effectively. It is important to note that patients with different conditions such as ischemic stroke, traumatic brain injury, global developmental delay, or cerebral palsy may experience unique challenges in verbal/nonverbal expression abilities. For instance, patients with ischemic stroke or traumatic brain injury may have difficulty with word-finding or processing language, while patients with global developmental delay or cerebral palsy may experience physical limitations that affect their nonverbal expression abilities.

Table 57

Test of Normality (Shapiro-Wilk)

		W	p
Expression Verbal/Nonverbal pre	- Expression Verbal/Nonverbal post	0.821	< .001

Note. Significant results suggest a deviation from normality.

Table 58

Descriptives

	N	Mean	SD	SE	Coefficient of variation
Expression Verbal/Nonverbal pre	85	4.447	2.490	0.270	0.560
Expression Verbal/Nonverbal post	85	5.576	1.867	0.202	0.335

Raincloud Plots

Expression Verbal/Nonverbal pre - Expression Verbal/Nonverbal post

The pre-intervention mean score of the FIM+FAM scale variable Expression verbal/nonverbal of 4.447 and standard deviation of 2.490 suggest that the data is spread out, with a moderate degree of variability. The post-intervention mean score of 5.576 and

standard deviation of 1.867 indicate that the data is less spread out, with a lower degree of variability.

In the raincloud plot (*figure 24*), the pre-intervention scores are shown in green, and the post-intervention scores are in orange. The thicker parts of the plot represent areas where the data is more densely populated. The plot suggests that the pre-intervention scores are more dispersed and have a wider range compared to the post-intervention scores, which are more concentrated around the mean score. This observation indicates that the intervention has a positive impact on the FIM+FAM scale variable Expression verbal/nonverbal. It is worth noting that patients with various conditions like ischemic stroke, traumatic brain injury, global developmental delay, cerebral palsy, can affect the FIM+FAM scale variable Expression verbal/nonverbal differently.

4.3.2.19 Variable – Reading:

Table 59

Paired Samples T-Test

Measure 1	Measure 2	t	df	p
Reading pre	- Reading post	-5.760	84	< .001

Note. Student's t-test.

The paired t-test result of a p-value less than 0.001 and a t-value of -5.760 indicates that there is a statistically significant difference between the pre-intervention and post-intervention FIM+FAM scores in the Reading variable. Specifically, the negative t-value indicates that there was an improvement in the Reading score from pre- to post-intervention. The Reading variable in this context refers to the patient's ability to read and comprehend written materials.

In the Reading variable, interventions such as speech therapy must have focused on improving the patient's language and comprehension skills, while occupational therapy had focused on teaching the patient techniques for holding and manipulating reading materials.

Table 60

Test of Normality (Shapiro-Wilk)

		W	p
Reading pre	- Reading post	0.663	< .001

Note. Significant results suggest a deviation from normality.

Table 61

Descriptives

	N	Mean	SD	SE	Coefficient of variation
Reading pre	85	4.776	2.565	0.278	0.537
Reading post	85	5.447	2.249	0.244	0.413

Raincloud Plots

Reading pre - Reading post

The pre-intervention mean of 4.776 and standard deviation of 2.565 suggest that the initial Reading scores were quite variable, with some patients having relatively high scores and others having low scores. The post-intervention mean of 5.447 and standard deviation of 2.249 indicate an overall improvement in Reading scores, with less variability among patients.

The raincloud plot(*figure 25*) for these data show a shift to the right from the pre- to the post-intervention scores, indicating an improvement in Reading ability for most patients. The density plot for the pre-intervention scores show a bimodal distribution, with some patients having relatively high scores and others having low scores, while the density plot for the post-intervention scores may show a more normal distribution, with fewer patients having very low scores. The box plot may show a higher median and a narrower range for the post-intervention scores, indicating an overall improvement in Reading ability.

4.3.2.20 Variable – Writing:

Table 62

Paired Samples T-Test

Measure 1	Measure 2	t	df	p
Writing pre	- Writing post	-6.774	84	< .001

Note. Student's t-test.

The paired t-test result with a p-value < 0.001 and a t-value of -6.774 indicates a statistically significant improvement in the FIM+FAM scale variable "writing" from pre-intervention to post-intervention. This means that the change observed in writing scores is unlikely to be due to chance and is likely due to the interventions applied. The FIM+FAM scale variable "writing" is a measure of functional independence in writing tasks. It is commonly used in patients with conditions such as ischemic stroke, traumatic brain injury, traumatic spinal cord injury, global developmental delay, cerebral palsy, etc.

There could be several possible interventions from integrated medical therapies that contributed towards the improvement in writing ability. Ayurveda, yoga, naturopathy, occupational therapy, speech therapy, and other interventions that focus on improving fine motor skills and cognitive function may have played a role in improving writing ability. Occupational therapy may have focused on improving the patient's grip strength, while Speech therapy may have focused on improving language skills necessary for writing.

Table 63

Test of Normality (Shapiro-Wilk)

		W	p
Writing pre	- Writing post	0.729	< .001

Note. Significant results suggest a deviation from normality.

Table 64

Descriptives

	N	Mean	SD	SE	Coefficient of variation
Writing pre	85	3.894	2.591	0.281	0.665
Writing post	85	4.624	2.512	0.272	0.543

Raincloud Plots

Writing pre - Writing post

The pre-intervention mean and standard deviation for the FIM+FAM scale variable "writing" were 3.894 and 2.591, respectively. The post-intervention mean, and standard deviation were 4.624 and 0.272, respectively. In the raincloud plot (*figure 26*)for this FIM+FAM scale variable "writing," the pre-intervention scores are displayed on the left-hand side of the plot, while the post-intervention scores are displayed on the right-hand side

of the plot. The box plot shows the median, quartiles, and range of the data, while the density plot shows the distribution of the scores. The scatterplot shows individual data points. Based on the raincloud plot, we can see that the pre-intervention scores have a wider distribution than the post-intervention scores. This indicates that there was more variability in writing ability before the intervention was applied. After the intervention, there is less variability in scores, with most scores concentrated around the mean. The distribution of scores has become narrower and more tightly clustered around the mean. This suggests that the intervention has had a positive effect on the functional independence of writing tasks as measured by the FIM+FAM scale.

4.3.2.21 Variable – Speech:

Table 65

Paired Samples T-Test

Measure 1		Measure 2	t	df	p
Speech pre	-	Speech post	-8.783	84	< .001

Note. Student's t-test.

The paired t-test result shows a significant difference between the pre and post intervention scores for the FIM+FAM scale variable "speech", with a p-value of less than 0.001 and a t-value of -8.783. This suggests that the intervention has had a significant effect on the functional independence of speech tasks. The speech component of the FIM+FAM scale measures a patient's ability to communicate effectively through verbal expression and comprehension.

Possible interventions from integrated medical therapies that had contributed to the improvement in speech ability may include speech therapy, occupational therapy, cognitive therapy, ayurveda, yoga, etc. Speech therapy may involve exercises to improve speech articulation, language expression, and comprehension. Occupational therapy may involve activities to improve fine motor skills needed for speech, such as writing or typing. Cognitive therapy may involve strategies to improve memory, attention, and executive functioning. Panchakarma therapies like Shirodhara, Thalam, Nasya, Gandoosha, etc. might have contributed towards cognitive healing and improved neural response etc.

Table 66

Test of Normality (Shapiro-Wilk)

		W	p
Speech pre	- Speech post	0.817	< .001

Note. Significant results suggest a deviation from normality.

Table 67

Descriptives

	N	Mean	SD	SE	Coefficient of variation
Speech pre	85	4.341	2.447	0.265	0.564
Speech post	85	5.694	1.732	0.188	0.304

Raincloud Plots

Speech pre - Speech post

The pre-intervention mean for the FIM+FAM scale variable "speech" is 4.341, with a standard deviation of 2.447. The post-intervention mean is 5.694, with a standard deviation of 1.732. This suggests that the intervention has led to a significant improvement in speech ability, with a difference of 1.353 between the pre- and post-intervention means.

The raincloud plot (*figure 27*) shows that the pre-intervention data is skewed towards lower scores, with a mean of around 4.34, while the post-intervention data is more normally distributed, with a mean of around 5.69. This suggests that the intervention has led to an improvement in the distribution of scores towards higher values.

4.3.2.22 Variable – Social Interaction:

Table 68

Paired Samples T-Test

Measure 1	Measure 2	t	df	p
Social Interaction pre	- Social Interaction post	-10.593	84	< .001

Note. Student's t-test.

The paired t-test result with a p-value <0.001 and t-value -10.593 indicates a significant improvement in social interaction ability following the integrated medical therapies intervention. The results suggest that the integrated medical therapies

Paired Samples T-Test

Measure 1	Measure 2	t	df	p

intervention has had a positive impact on the patient's ability to interact socially. This can have significant implications for their overall quality of life, as social interaction is an important aspect of daily living and social support.

Possible interventions from integrated medical therapies that may have contributed to this improvement include Ayurveda, speech therapy, occupational therapy, and cognitive-behavioural therapy. The Panchakarma Therapies have a significant impact on the contributing towards the change alongside Speech therapy may to improve the patient's communication skills, while occupational therapy may have helped to improve their behaviour and social skills. Cognitive-behavioural therapy may have helped to address any underlying psychological or emotional issues that may have been affecting their social interactions.

Table 69

Test of Normality (Shapiro-Wilk)

		W	p
Social Interaction pre	- Social Interaction post	0.860	< .001

Note. Significant results suggest a deviation from normality.

Table 70

Descriptives

	N	Mean	SD	SE	Coefficient of variation
Social Interaction pre	85	4.118	2.195	0.238	0.533
Social Interaction post	85	5.776	1.554	0.169	0.269

Raincloud Plots

Social Interaction pre - Social Interaction post

Looking at the plot (*figure 28*), we can see that there is a clear shift in the mean score from pre- to post-intervention, with a higher mean score in the post-intervention condition. This is consistent with the paired t-test result showing a significant improvement in social

interaction ability. The pre-intervention mean score of 4.118 indicates that, on average, patients had some difficulty with social interaction prior to the intervention. The relatively large standard deviation of 2.195 suggests that there was a wide range of scores, with some patients experiencing more difficulty than others.

After the intervention, the mean score increased to 5.776, indicating a significant improvement in social interaction ability. The smaller standard deviation of 1.554 suggests that there was less variability in scores after the intervention, with more patients experiencing similar levels of improvement.

4.3.2.23 Variable – Emotional Status:

Table 71

Paired Samples T-Test

Measure 1	Measure 2	t	df	p
Emotional Status pre	- Emotional Status post	-15.741	84	< .001

Note. Student's t-test.

The FIM+FAM scale variable "Emotional Status" measures a patient's ability to regulate their emotions and cope with stress. In the context of integrated medical therapies for conditions such as ischemic stroke, traumatic brain injury, traumatic spinal cord injury, global developmental delay, cerebral palsy, etc., emotional status can be a key factor in overall quality of life. The paired t-test result shows a significant improvement in emotional status with a p-value <0.001 and a t-value of -15.741 in pre and post intervention analysis. This indicates that the integrated medical therapies, including ayurveda and yoga, have contributed towards a positive change and improvement in emotional status in patients with these long-term ailments.

Ayurveda uses therapeutic procedures like Shirovasthi, Shiropichu, Nasya, Shirodhara, etc with medications and lifestyle modifications to promote emotional well-being by initiating rejuvenation of body and mind. Yogic postures, breathing exercises, and meditation significantly contributes towards reducing stress and improve emotional and mental wellbeing.

Table 72

Test of Normality (Shapiro-Wilk)

		W	p
Emotional Status pre	- Emotional Status post	0.886	< .001

Note. Significant results suggest a deviation from normality.

Table 73

Descriptives

	N	Mean	SD	SE	Coefficient of variation
Emotional Status pre	85	3.224	1.707	0.185	0.530
Emotional Status post	85	5.659	1.524	0.165	0.269

Raincloud Plots

Emotional Status pre - Emotional Status post

The pre-intervention mean for emotional status was 3.224 with a standard deviation of 1.707, while the post-intervention mean was 5.659 with a standard deviation of 1.524. This indicates a significant improvement in emotional status after the intervention, as evidenced by the paired t-test result with a p-value < 0.001 and t-value of -15.741.

The raincloud plot (*figure 29*)shows the distribution of the data before and after the intervention. The pre-intervention data is skewed towards lower scores, indicating that most of the participants had lower emotional status scores before the intervention. The post-intervention data, on the other hand, is more normally distributed with a peak around the higher scores, indicating a significant improvement in emotional status for most participants after the intervention.

4.3.2.24 Variable – Adjustment to Limitations:

Table 74

Paired Samples T-Test

Measure 1	Measure 2	t	df	p
Adjustment to Limitations pre	- Adjustment to Limitations post	-17.677	84	< .001

Note. Student's t-test.

The FIM+FAM scale variable of adjustment to limitations is a measure of an individual's ability to adapt and cope with limitations resulting from their underlying condition, such as ischemic stroke, traumatic brain injury, traumatic spinal cord injury, global developmental

delay, cerebral palsy, etc. The paired t-test result with a p-value of less than 0.001 and a t-value of -17.677 indicates a significant improvement in the adjustment to limitations after the intervention. This suggests that the integrated medical therapies, including ayurveda and yoga, may have contributed to the improvement. These interventions helped patients develop coping strategies and a more positive outlook, enabling them to better adjust to their limitations. It is important to note that the FIM+FAM scale variable of adjustment to limitations is a subjective measure, and the improvement observed may be influenced by factors such as patient motivation and expectations.

Table 75

Test of Normality (Shapiro-Wilk)

		W	p
Adjustment to Limitations pre	- Adjustment to Limitations post	0.887	< .001

Note. Significant results suggest a deviation from normality.

Table 76

Descriptives

	N	Mean	SD	SE	Coefficient of variation
Adjustment to Limitations pre	85	2.929	1.609	0.175	0.549
Adjustment to Limitations post	85	5.765	1.601	0.174	0.278

Raincloud Plots

Adjustment to Limitations pre - Adjustment to Limitations post

The pre-intervention mean score was 2.929 with a standard deviation of 1.609, indicating a relatively low level of adjustment to limitations. The post-intervention mean score, on the other hand, was 5.765 with a standard deviation of 1.601, indicating a substantial improvement in the ability to adjust to limitations. The raincloud plot (*figure 30*)shows that the pre-intervention scores were concentrated towards the lower end of the scale, with a slight skewness towards the left. The post-intervention scores, however, were much more evenly distributed across the range of scores, with a slight skewness towards the right. This indicates that the intervention had a positive impact on the individuals' ability to adjust to limitations.

Possibly the interventions from integrated medical therapies, including Ayurveda and Yoga, may have contributed to this improvement by helping individuals manage stress,

build resilience, and develop coping mechanisms. These interventions may also have provided individuals with a sense of control and empowerment, which could have positively influenced their ability to adjust to limitations.

4.3.2.25 Variable – Employability:

Table 77

Paired Samples T-Test

Measure 1	Measure 2	t	df	p
Employability pre	- Employability post	-8.047	84	< .001

Note. Student's t-test.

Employability is a measure of an individual's ability to engage in productive work or activities. In the context of ischemic stroke, traumatic brain injury, traumatic spinal cord injury, global developmental delay, cerebral palsy, and other long-term ailments, employment and vocational rehabilitation are important aspects of rehabilitation and reintegration into society. The paired t-test result with a p-value <0.001 and t-value of -8.047 indicates a significant improvement in employability following integrated medical therapies. This suggests that the interventions implemented as part of the integrated medical therapies had a positive impact on the individual's ability to engage in productive work or activities.

Possible interventions that may have contributed to this improvement could include vocational rehabilitation, occupational therapy, and counselling or coaching to address any emotional or psychological barriers to employment. Additionally, interventions such as yoga and mindfulness practices may have helped individuals to better manage stress and improve their overall well-being, which could also contribute to improved employability.

Table 78

Test of Normality (Shapiro-Wilk)

		W	p
Employability pre	- Employability post	0.802	< .001

Note. Significant results suggest a deviation from normality.

Paired Samples T-Test

Measure 1	Measure 2	t	df	p

Table 79

Descriptives

	N	Mean	SD	SE	Coefficient of variation
Employability pre	85	1.282	0.908	0.098	0.708
Employability post	85	2.153	1.443	0.157	0.670

Raincloud Plots

Employability pre - Employability post

The pre-intervention mean score for employability was 1.282 with a standard deviation of 0.098, while the post-intervention mean score was 2.513 with a standard deviation of 1.443. The raincloud plot(*figure 31*) shows that the post-intervention scores are shifted towards higher values compared to the pre-intervention scores, indicating an improvement in employability. The data distribution appears to be roughly normal, with some skewness towards the lower end of the scale. Overall, these findings suggest that the integrated medical therapy intervention had a positive impact on patients' ability to participate in work or other meaningful activities, which could have significant implications for their quality of life and overall functioning.

4.3.2.26 Variable – Problem solving:

Table 80

Paired Samples T-Test

Measure 1		Measure 2	t	df	p
Problem Solving pre	-	Problem Solving post	-6.944	84	< .001

Note. Student's t-test.

Problem solving is a measure of an individual's ability to solve problems related to their daily activities. This variable is relevant in the context of various conditions, including ischemic stroke, traumatic brain injury, traumatic spinal cord injury, global developmental delay, and cerebral palsy, where individuals may experience difficulties in problem-solving due to cognitive or physical impairments. The paired t-test result with a p-value of <0.001 and t-value of -6.944 indicates a significant improvement in problem-solving ability following the intervention. This means that there was a statistically significant difference between the pre-intervention and post-intervention scores, suggesting that the intervention had a positive impact on the individual's problem-solving ability.

Possible interventions from integrated medical therapies such as ayurveda and yoga that may have contributed towards the change and improvement in problem-solving ability include cognitive rehabilitation therapy, which aims to improve cognitive functioning through various exercises and techniques. Yoga and meditation is proven to improve cognitive abilities such as attention, memory, and processing speed.

Table 81

Test of Normality (Shapiro-Wilk)

			W	p
Problem Solving pre	-	Problem Solving post	0.734	< .001

Note. Significant results suggest a deviation from normality.

Table 82

Descriptives

	N	Mean	SD	SE	Coefficient of variation
Problem Solving pre	85	4.682	2.411	0.262	0.515
Problem Solving post	85	5.412	2.025	0.220	0.374

Raincloud Plots

Problem Solving pre - Problem Solving post.

The pre-intervention mean score for the problem-solving variable was 4.682 with a standard deviation of 2.411, while the post-intervention mean score was 5.412 with a standard deviation of 2.025. This suggests that, on average, participants had a slightly higher problem-solving ability after the intervention. The raincloud plot(*figure 32*) shows that the distribution of scores for both the pre- and post-intervention groups is somewhat positively skewed. There is some overlap between the two groups, but the post-intervention group appears to have a slightly higher concentration of scores in the upper range. Overall, these results suggest that the intervention may have had a modest positive impact on problem solving ability of the patient improving his daily life.

4.3.2.27 Variable – Memory:

Table 83

Paired Samples T-Test

Measure 1	Measure 2	t	df	p
Memory pre	- Memory post	-6.903	84	< .001

Note. Student's t-test.

The FIM+FAM scale variable "memory" was analyzed using a paired t-test with a p-value of <0.001 and a t-value of -6.903. This indicates that there was a significant improvement in memory between the pre- and post-intervention phases. In the context of ischemic stroke, traumatic brain injury, traumatic spinal cord injury, global developmental delay, cerebral palsy, etc., memory impairment is a common and debilitating symptom. Integrated medical therapies such as Ayurveda and yoga have been used to improve memory function. Ayurvedic herbs like Brahmi (Bacopa monnieri) and Shankhpushpi (Convolvulus pluricaulis) are proven to have memory-enhancing properties. Yoga, on the other hand, can improve blood circulation and oxygenation to the brain, which can improve memory function.

Paired Samples T-Test

Measure 1	Measure 2	t	df	p

The improvement in memory seen in the paired t-test may have been due to the integrated medical therapies used in the intervention phase. These therapies may have helped to improve blood flow and oxygenation to the brain, as well as to provide the brain with nutrients and other substances that support memory function.

Table 84

Test of Normality (Shapiro-Wilk)

		W	p
Memory pre	- Memory post	0.735	< .001

Note. Significant results suggest a deviation from normality.

Table 85

Descriptives

	N	Mean	SD	SE	Coefficient of variation
Memory pre	85	4.965	2.317	0.251	0.467
Memory post	85	5.706	1.751	0.190	0.307

Raincloud Plots

Memory pre - Memory post

The variable "memory" is a measure of a patient's ability to remember things. The pre-intervention mean, and standard deviation were 4.965 and 0.251, respectively, while the post-intervention mean and standard deviation were 5.706 and 0.190, respectively. Based on these results, it can be concluded that the intervention, which included integrated medical therapies such as ayurveda and yoga, had a significant positive impact on the patients' memory which include short-term and long-term memory. This is supported by the statistically significant decrease in the t-value and the extremely low p-value, indicating a high level of confidence in the results. The raincloud plot (*figure 33*) of the data distribution shows a clear shift to the right from pre to post intervention, indicating an improvement in memory scores for the majority of patients. Overall, this suggests that the integrated medical therapies implemented in the intervention had a positive impact on the memory of the patients.

4.3.2.28 Variable – Orientation:

Table 86

Paired Samples T-Test

Measure 1	Measure 2	t	df	p
Orientation pre	- Orientation post	-6.789	84	< .001

Note. Student's t-test.

The variable "orientation" refers to a patient's ability to orient themselves to their environment and respond appropriately. Impairment in this area can have significant impact on activities of daily living and overall quality of life in conditions such as ischemic stroke, traumatic brain injury, traumatic spinal cord injury, global developmental delay, cerebral palsy, etc. The paired t test result with a p-value <0.001 and t-value -6.789 indicates a significant improvement in orientation between pre and post intervention in patients with the aforementioned conditions. This suggests that the integrated medical therapies including ayurveda and yoga played a significant role in the improvement of patients' ability to orient themselves and respond appropriately to their environment. Ayurveda and yoga are proven to have positive effects on cognitive function and mental health in patients. It contributed to the improvement in orientation by promoting overall health by acting on relaxation, reducing stress, and improving overall well-being.

Table 87

Test of Normality (Shapiro-Wilk)

		W	p
Orientation pre	- Orientation post	0.717	< .001

Note. Significant results suggest a deviation from normality.

Table 88

Descriptives

	N	Mean	SD	SE	Coefficient of variation
Orientation pre	85	5.176	2.300	0.249	0.444
Orientation post	85	5.929	1.631	0.177	0.275

Raincloud Plots

Orientation pre - Orientation post

The variable being analyzed is the FIM+FAM scale variable "orientation," which measures a patient's ability to understand and remember information about their environment, including their own identity, location, and time. The pre-intervention mean for this variable was 5.176 with a standard deviation of 2.30, while the post-intervention mean was 5.929 with a standard deviation of 1.631. This suggests that the integrated medical therapies, including ayurveda and yoga, contributed to the improvement in the orientation ability of the individuals. The raincloud plot (*figure 34*) shows the distribution of scores for both pre and post-intervention phases. The plot indicates that the post-intervention scores were shifted towards higher values, which is reflected in the higher mean score. The pre-intervention scores show a wider distribution, indicating a larger variability in orientation ability, whereas the post-intervention scores are more tightly clustered around the mean, indicating a more consistent improvement.

4.3.2.29 Variable – Attention:

Table 89

Paired Samples T-Test

Measure 1		Measure 2	t	df	p
Attention pre	-	Attention post	-7.311	84	< .001

Note. Student's t-test.

The variable "attention" was analyzed using a paired t-test to compare the means of pre and post-intervention scores in patients with conditions such as ischemic stroke, traumatic brain injury, traumatic spinal cord injury, global developmental delay, cerebral palsy, etc. The results showed a significant improvement in attention after intervention, with a p-value of less than 0.001 and a t-value of -7.311. The improvement in attention could be attributed to the use of integrated medical therapies, such as Ayurveda and yoga, which are known to improve cognitive function in individuals with neurological conditions.

Table 90

Test of Normality (Shapiro-Wilk)

			W	p
Attention pre	-	Attention post	0.765	< .001

Note. Significant results suggest a deviation from normality.

Table 91

Descriptives

	N	Mean	SD	SE	Coefficient of variation
Attention pre	85	4.976	2.350	0.255	0.472
Attention post	85	6.000	1.528	0.166	0.255

Raincloud Plots

Attention pre - Attention post.

The pre-intervention mean for attention was 4.976 with a standard deviation of 2.350, while the post-intervention mean was 6.000 with a standard deviation of 1.528. The raincloud plot (*figure 35*) shows a clear shift towards higher attention scores post-intervention, with the post-intervention distribution being more concentrated around the

higher scores. This supports the paired t-test result and suggests that the intervention was effective in improving attention.

4.3.2.30 Variable – Safety Judgement:

Table 92

Paired Samples T-Test

Measure 1		Measure 2	t	df	p
Safety Judgement pre	-	Safety Judgement post	-13.412	84	< .001

Note. Student's t-test.

The paired t-test was conducted to analyse the pre and post intervention differences in the FIM+FAM scale variable of safety judgement among individuals with ischemic stroke, traumatic brain injury, traumatic spinal cord injury, global developmental delay, cerebral palsy, etc. The result showed a significant improvement with a p-value of less than 0.001 and a t-value of -13.412. It is important to note that safety judgement refers to the ability to accurately assess and respond to potential hazards and dangers in the environment. The improvement in this variable can have significant positive implications on an individual's ability to live independently and engage in daily activities without compromising their safety.

Table 93

Test of Normality (Shapiro-Wilk)

			W	p
Safety Judgement pre	-	Safety Judgement post	0.900	< .001

Note. Significant results suggest a deviation from normality.

Table 94

Descriptives

	N	Mean	SD	SE	Coefficient of variation
Safety Judgement pre	85	3.788	1.846	0.200	0.487
Safety Judgement post	85	5.624	1.773	0.192	0.315

Raincloud Plots

Safety Judgement pre - Safety Judgement post

The pre-intervention mean and standard deviation for safety judgement were 3.788 and 1.846, respectively, while the post-intervention mean and standard deviation were 5.624 and 1.773, respectively. This suggests that the intervention resulted in a significant improvement in safety judgement. The raincloud plot (*figure 36*) shows the distribution of data for the pre and post-intervention groups. The post-intervention group has a higher peak and more narrow distribution, indicating that there was less variability and a higher concentration of scores towards the upper end of the scale, which is indicative of better safety judgement. The pre-intervention group, on the other hand, has a wider distribution with a flatter peak, indicating more variability in scores and a greater range of safety judgement abilities.

Chapter 5 : Discussion & Conclusion

"The increasing burden of chronic diseases and the need for comprehensive care have led to the development of integrated therapy centres that offer an admixture of Ayurveda, modern medicine, yoga, naturopathy, advanced physiotherapy, occupational therapy, speech therapy, reflexology, acupuncture, and other complementary therapies. The findings of this study will have significant implications for the healthcare system, especially in developing countries where the burden of chronic diseases is high, and resources are limited."

"The context of this study is particularly relevant in the current healthcare landscape, where there is growing interest in alternative and complementary therapies. Integrated medical therapies have gained increasing popularity in recent years, as patients seek out more holistic approaches to healthcare that address not only physical symptoms but also mental and emotional wellbeing. This study will help to shed light on the efficacy of integrated medical therapies, particularly in the context of long-term ailments, and provide important insights into how these therapies can be incorporated into mainstream healthcare. The study will help to provide a quantitative measure of the efficacy of integrated medical therapies, and shed light on how these therapies can be incorporated into mainstream healthcare to improve patient outcomes."

"The burden of long-term diseases such as ischemic stroke, traumatic brain injury, traumatic spinal cord injury, multiple sclerosis, cerebral palsy, infantile encephalopathy, myalgic encephalomyelitis, dementia, and other chronic conditions can have a significant impact on patients' quality of life, functional independence, and overall health outcomes. Addressing the disease burden and improving functional outcomes is a key goal of medical therapies. However, assessing the effectiveness of these interventions can be challenging, especially in patients with complex and chronic conditions. In this study, we used the disability-adjusted life years (DALY) approach to measure the disease burden and functional outcomes in patients with long-term ailments who received integrated medical therapies."

"The study included 86 patients with long-term ailments who received integrated medical therapies. The study measured the disease burden using the DALY approach, which takes into account the years of life lost due to premature death and years lived with disability. The study also assessed the functional outcomes using the functional independence measure

(FIM) and functional assessment measure (FAM). The data were analyzed using a paired t-test to compare the pre- and post-intervention values. The results of the study indicated a significant reduction in the mean DALY score from pre-intervention (24.436) to post-intervention (19.390) ($p<0.001$). This reduction was accompanied by a significant improvement in the FIM ($p<0.001$) and FAM ($p<0.001$) scores. The results suggest that the integrated medical therapies were effective in reducing the disease burden and improving functional outcomes in patients with long-term ailments."

"The study has several implications for clinical practice and future research. The use of the DALY approach provides a comprehensive measure of the disease burden, which can inform clinical decision-making and resource allocation. The significant reduction in the DALY score and improvement in functional outcomes indicate that integrated medical therapies can be effective in managing long-term ailments."

"Future research can build on the findings of this study by exploring the factors that contribute to the effectiveness of integrated medical therapies. For example, it would be valuable to investigate the impact of specific interventions, such as ayurveda, yoga, naturopathy, occupational therapy, physiotherapy, cognitive-behavioural therapy, speech therapy and pharmacological treatments, on disease burden and functional outcomes."

"Another area for future research is to investigate the cost-effectiveness of integrated medical therapies. While the results of this study suggest that integrated medical therapies can be effective in managing long-term ailments, it is important to consider the cost of these interventions. Cost-effectiveness analyses can provide valuable information for healthcare providers and policymakers in deciding the allocation of healthcare resources. In conclusion, the findings of this study have important implications for clinical practice and healthcare policy in managing long-term ailments."

Appendix

ANNEXURE A : List of Figures

Description of the levels or function

INDEPENDENT — **Another person is not required for the activity (No helper)**

7 — **Complete independence**
The person performs all of the tasks described as making up the activity within a reasonable amount of time, and does so safely without the need for modification, assistive devices or aids.
(No help, no devices, safe and timely!)

6 — **Modified independence**
One or more of the following may be true:
a) uses an assistive device
b) takes longer than the reasonable amount of time
c) there is some concern for safety
(No help, but uses a **device, or issues for safety or timeliness)**

DEPENDENT — **Receives help from another person to perform the activity, or the activity is not performed (Requires helper)**

Modified Dependence: The person performs more than half the task themselves

5 — **Supervision or set-up**
Receives no more than stand-by cueing, coaxing or verbal prompting without physical contact,
OR help just to set-up equipment, apply orthosis, etc.
(No help, but **set-up or verbal prompting)**

4 — **Minimal assistance**
No more help than touching
Receives incidental help only to complete the task - does ≥75% themselves
(Help at the level of touching only– Madonna item!**)**

3 — **Moderate assistance**
More help than touching
Receives moderate help, but still performs 50-74% of the task themselves
(**Hands on help but patient does more than half** the task themselves)

Complete Dependence: The person performs less than half the task

2 — **Maximal assistance**
Receives substantial assistance - the person provides 25-49% of the effort to complete the task
(**Patient does less than half** the task themselves, but does contribute)

1 — **Total assistance**
Receives total assistance - the person contributes less than 25% of the effort or the activity is not performed
Patient unable or does very little (<25%) of the task

Figure 1 Scoring Criterion from UK-FIM+FAM v2.2 (Turner-Stokes, 2010)

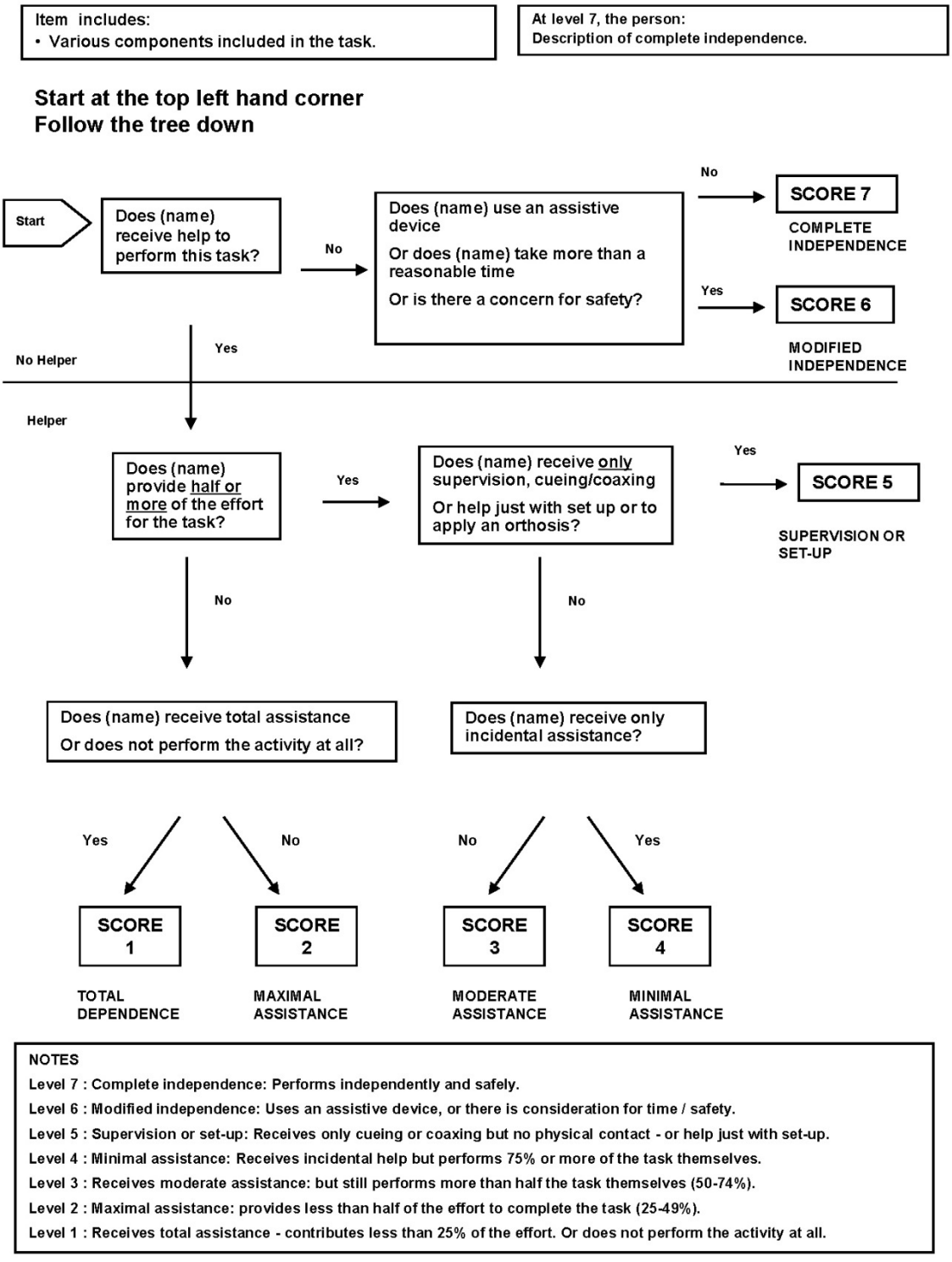

Figure 2 Description of Scoring Method UK FIM+FAM Scale v2.2 (Turner-Stokes, 2010)

FIM + FAM score sheet

FIM/FAM	Admission	Goal	Discharge
Date			
Date of FAM Assessment			
FIM/FAM Items	**Admission**	**Goal**	**Discharge**
Motor items			
1. Eating			
2. Swallowing			
3. Grooming			
4. Bathing			
5. Dressing Upper Body			
6. Dressing Lower Body			
7. Toileting			
8(i) Bladder - Level of assistance			
8(ii) Bladder - Frequency of accidents			
9(i) Bowel - Level of assistance			
9(ii) Bowel - Frequency of accidents			
10. Bed, Chair, Wheelchair transfer			
11. Toilet transfer			
12. Tub, Shower transfer			
13. Car transfer			
14(i) Locomotion - Walking "w"			
14(ii) Locomotion - Wheelchair "c"			
Preferred mode of Locomotion (w or c)			
15. Stairs			
16 Community Mobility			
Preferred mode: c=car, t=taxi, p=public transport			
Total Scores:			
Self care (7-49)			
Bladder/Bowels (2-14)			
Locomotion (7-49)			
Total Motor Subscore (16-112)			

Figure 3 UK FIM+FAM Score Sheet (Turner-Stokes, 2010)

FIM + FAM score sheet: part 2

FIM/FAM Items	Admission	Goal	Discharge
Cognitive items			
17 Comprehension			
18 Expression			
19. Reading			
20. Writing			
21. Speech Intelligibility			
22. Social Interaction			
23. Emotional Status			
24. Adjustment to Limitations			
25. Leisure Activities			
26. Problem Solving			
27. Memory			
28. Orientation			
29. Concentration			
30. Safety Awareness			
Totals			
Communication (5-35)			
Cognitive/psychosocial (9-63)			
Total Cognitive Subscore (14-98)			

Figure 4 UK FIM+FAM Score Sheet Continued (Turner-Stokes, 2010)

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Feeding Pre Intervention	239.94	6635.556	.692	.	.982
Feeding Post Intervention	238.41	6669.769	.738	.	.982
Swallowing pre Intervention	239.31	6641.643	.650	.	.982
Swallowing Post Intervention	238.02	6705.095	.685	.	.982
Grooming Pre intervention	240.44	6626.915	.698	.	.982
Grooming post intervention	239.06	6611.342	.819	.	.981
Bathing Pre intervention	240.76	6646.277	.706	.	.982
Bathing post intervention	239.41	6603.317	.828	.	.981
Dressing Upper Body pre	240.73	6633.224	.707	.	.982
Dressing Upper Body post	239.31	6599.382	.812	.	.981
Dressing Lower Body pre	241.00	6656.857	.688	.	.982
Dressing Lower Body post	239.62	6616.309	.772	.	.982
Toileting pre	241.27	6682.771	.658	.	.982
Toileting post	239.88	6647.724	.724	.	.982
Bladder Control pre	240.32	6722.457	.407	.	.982
Bladder Control post	238.92	6740.838	.440	.	.982
Bowel Control pre	240.31	6707.191	.456	.	.982
Bowel Control post	238.78	6716.271	.540	.	.982
Bed/Chair/Wheelchair Transfer pre	241.19	6717.131	.605	.	.982
Bed/Chair/Wheelchair Transfer post	239.11	6653.001	.774	.	.982
Toilet Transfer pre	241.26	6709.313	.640	.	.982
Toilet Transfer post	239.26	6632.623	.792	.	.982
Tub/Shower Transfer pre	241.29	6706.829	.675	.	.982
Tub/Shower Transfer post	239.31	6628.167	.805	.	.982
Car Transfer pre	241.75	6742.736	.562	.	.982
Car Transfer post	240.48	6644.610	.705	.	.982
Walking pre	241.53	6784.371	.477	.	.982
Walking post	239.54	6704.370	.644	.	.982
Climbing Stairs pre	241.92	6797.981	.456	.	.982
Climbing Stairs post	240.74	6753.837	.459	.	.982
Community Access pre	242.21	6824.526	.307	.	.982
Community Access post	240.99	6781.512	.356	.	.982
Comprehension-Audio/Visual pre	238.73	6575.747	.786	.	.982
Comprehension-Audio/Visual post	237.92	6646.886	.810	.	.982
Expression Verbal/NonVerbal pre	239.21	6553.383	.825	.	.981
Expression Verbal/NonVerbal post	238.08	6636.600	.830	.	.981
Reading pre	238.88	6540.034	.834	.	.981
Reading post	238.21	6583.883	.831	.	.981
Writing pre	239.76	6556.801	.784	.	.982
Writing post	239.04	6549.011	.829	.	.981
Speech pre	239.32	6603.172	.712	.	.982
Speech post	237.96	6664.058	.797	.	.982
Social Interaction pre	239.54	6629.846	.721	.	.982
Social Interaction post	237.88	6687.391	.797	.	.982
Emotional Status pre	240.44	6713.106	.631	.	.982
Emotional Status post	238.00	6702.357	.752	.	.982
Adjustment to Limitations pre	240.73	6730.819	.602	.	.982
Adjustment to Limitations post	237.89	6689.548	.765	.	.982
Employability pre	242.38	6828.166	.423	.	.982
Employability post	241.51	6732.920	.665	.	.982
Problem Solving pre	238.98	6582.880	.776	.	.982
Problem Solving post	238.25	6619.617	.815	.	.981
Memory pre	238.69	6600.834	.760	.	.982
Memory post	237.95	6662.450	.794	.	.982
Orientation pre	238.48	6612.657	.734	.	.982
Orientation post	237.73	6683.152	.775	.	.982
Attention pre	238.68	6600.338	.750	.	.982
Attention post	237.66	6706.156	.735	.	.982
Safety Judgement pre	239.87	6695.019	.642	.	.982
Safety Judgement post	238.04	6667.558	.766	.	.982

Figure 5 Reliability Analysis

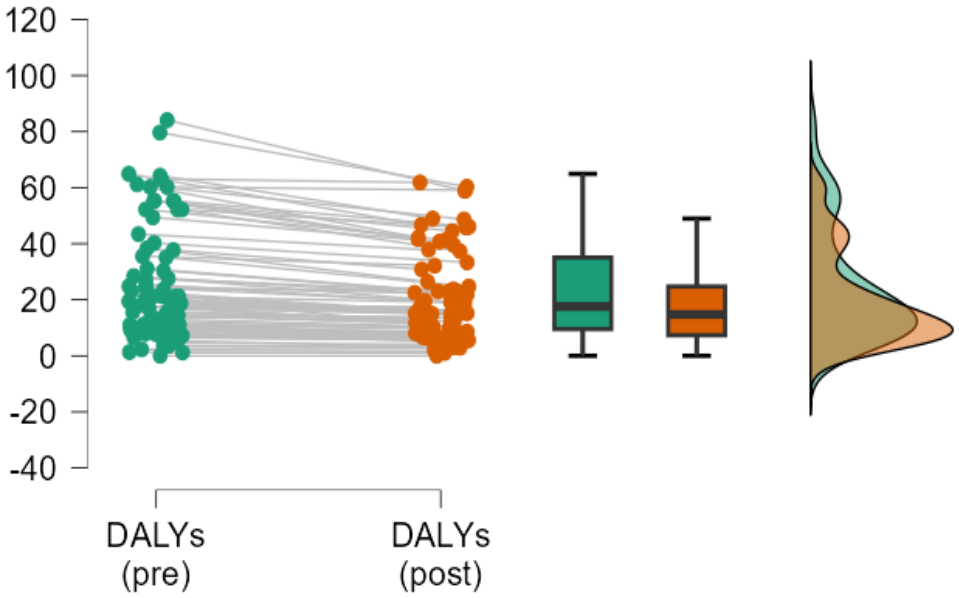

Figure 6 Raincloud Plots DALY pre and post

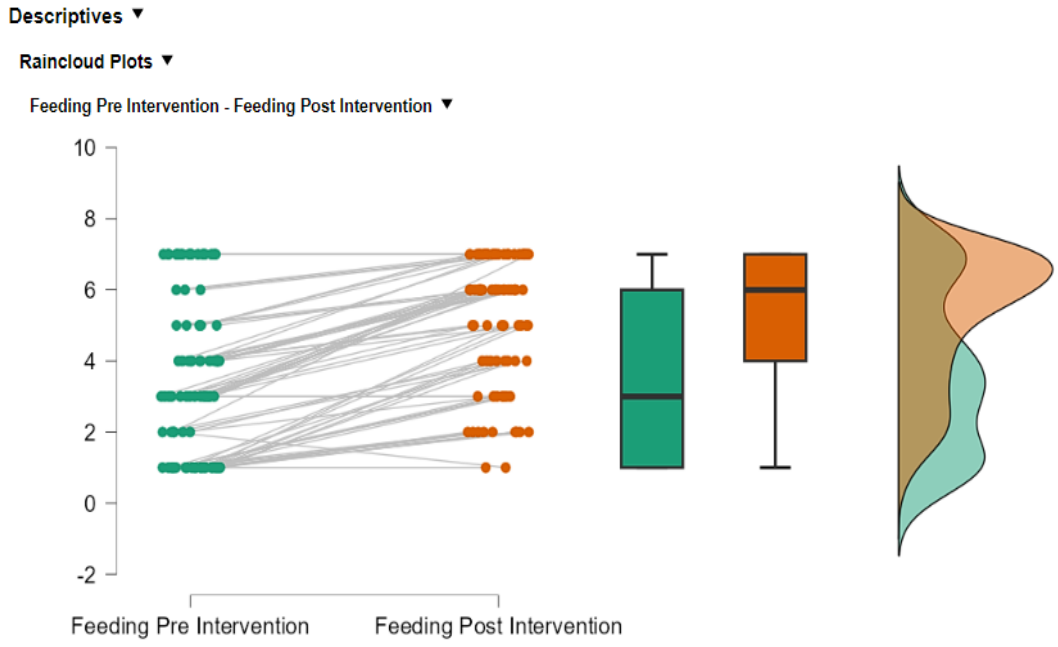

Figure 7 Feeding pre and post Intervention

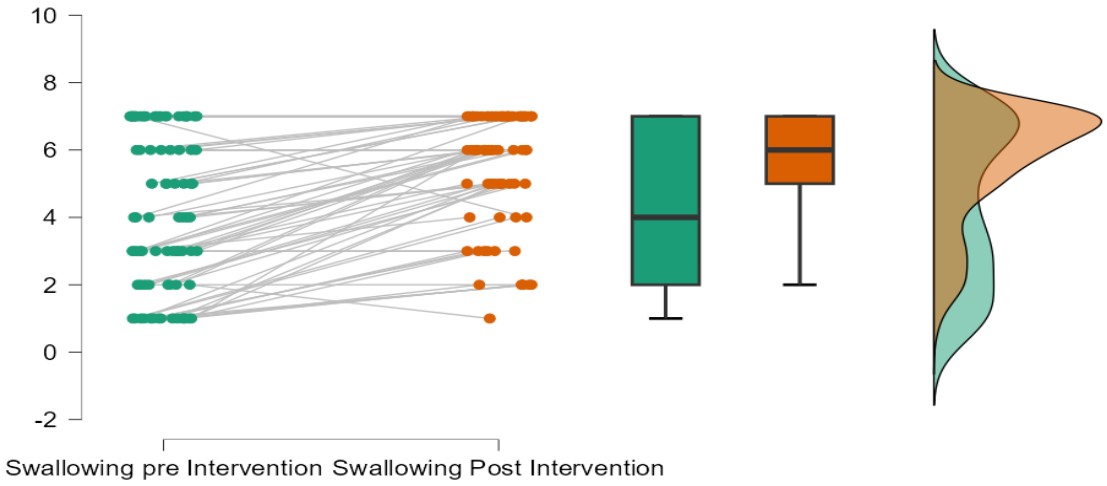

Figure 8 Swallowing pre and post Intervention

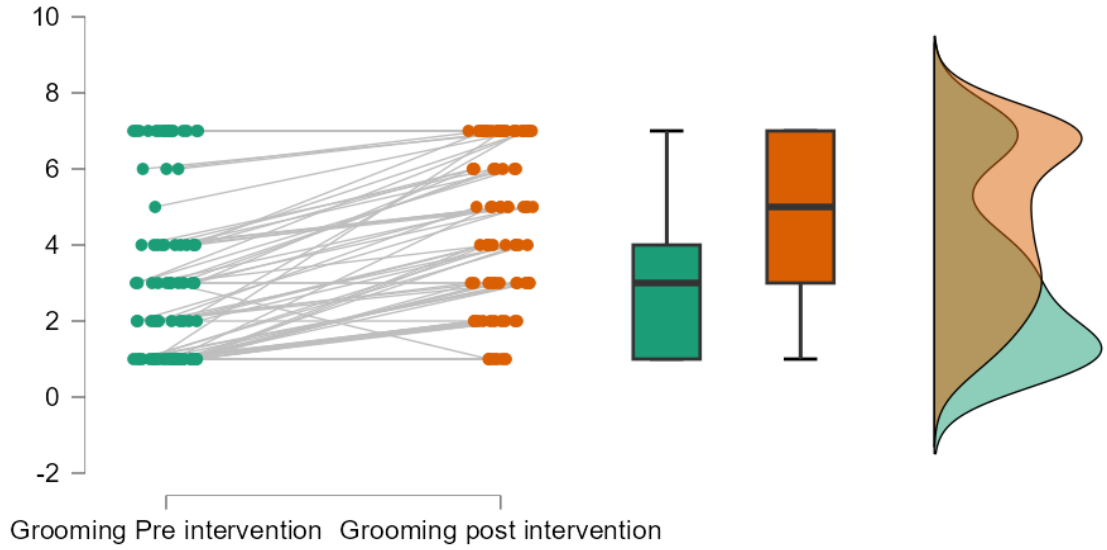

Figure 9 Grooming pre and Post Intervention

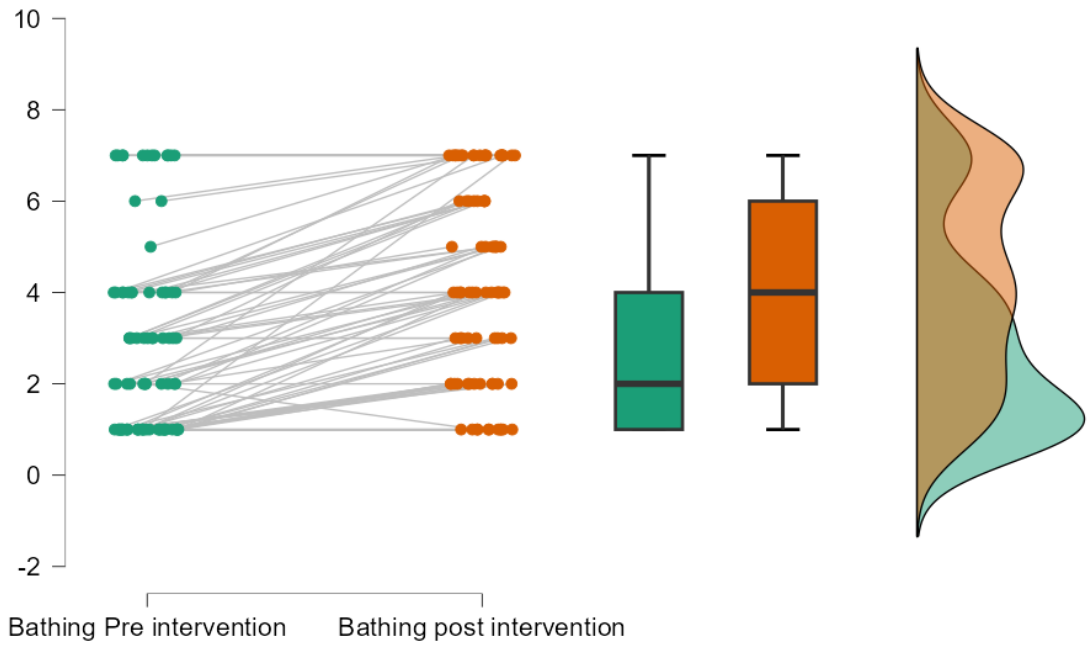

Figure 10 Bathing pre and post intervention

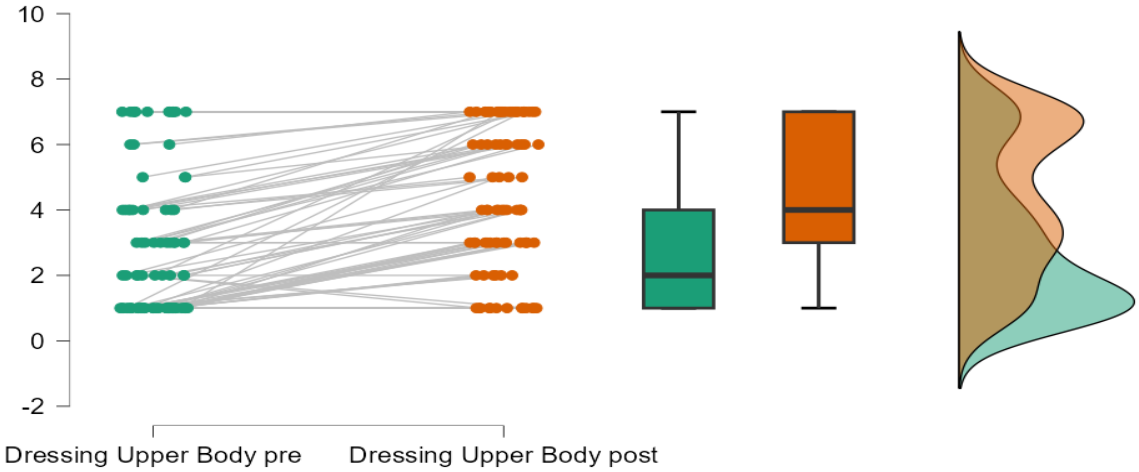

Figure 11 Dressing Upper Body pre and post Intervention.

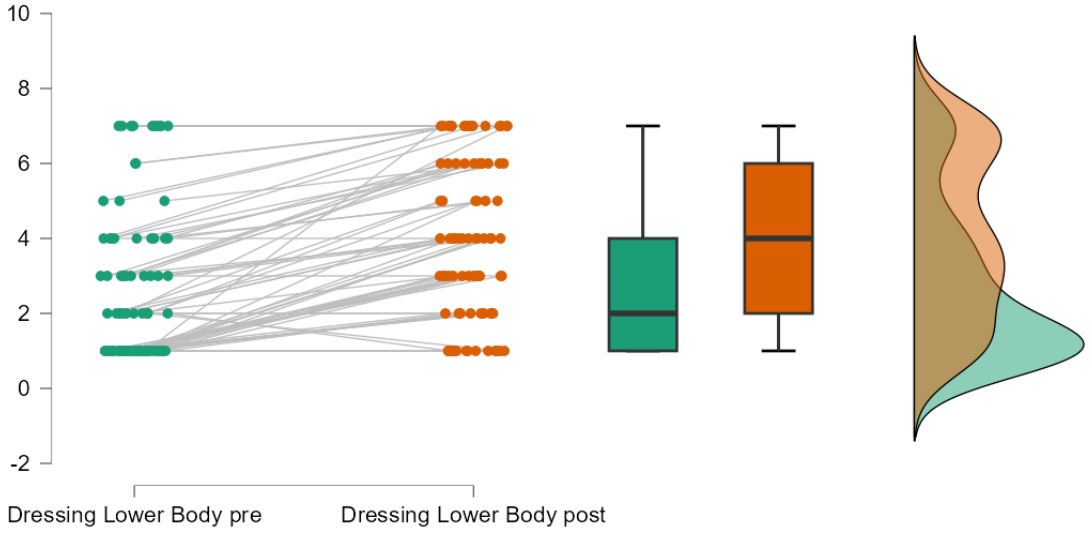

Figure 12 dressing lower body pre and post intervention

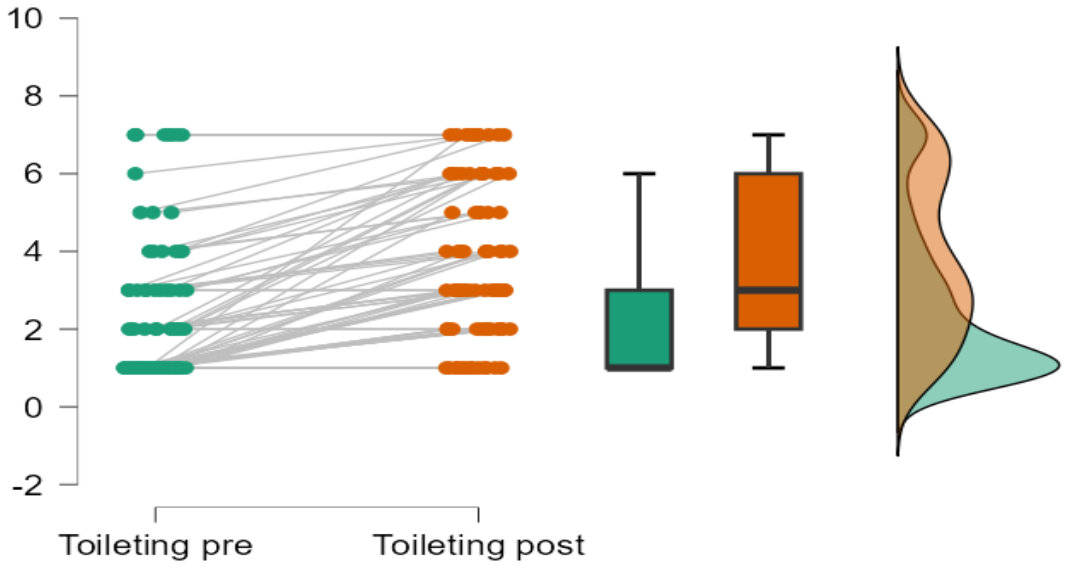

Figure 13 Toileting pre and post intervention

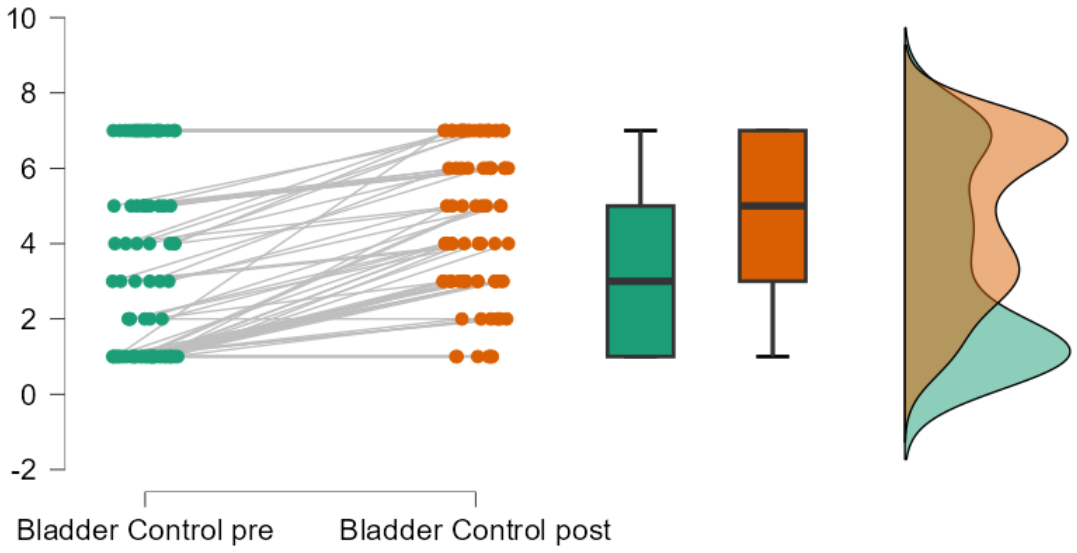

Figure 14 Bladder Control Pre and Post intervention

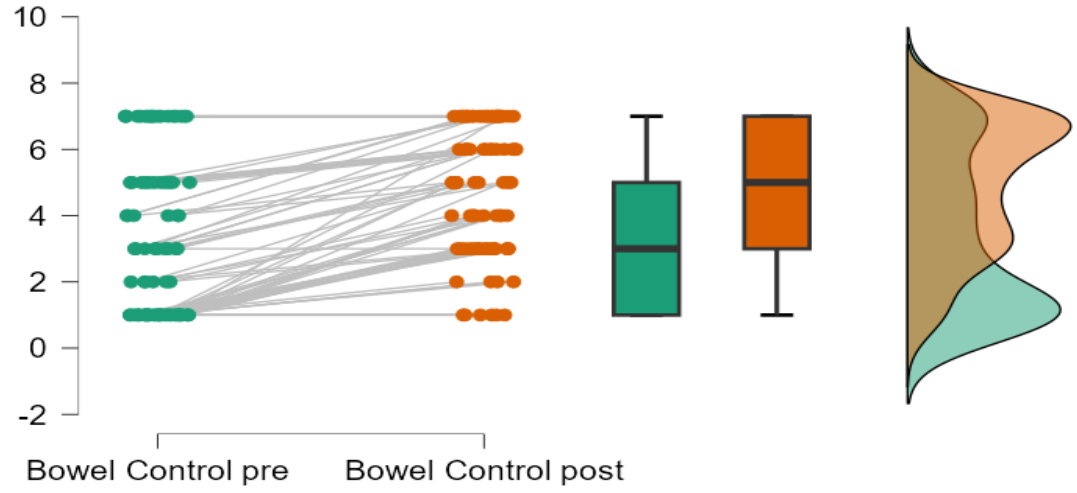

Figure 15 Bowel control pre and post intervention

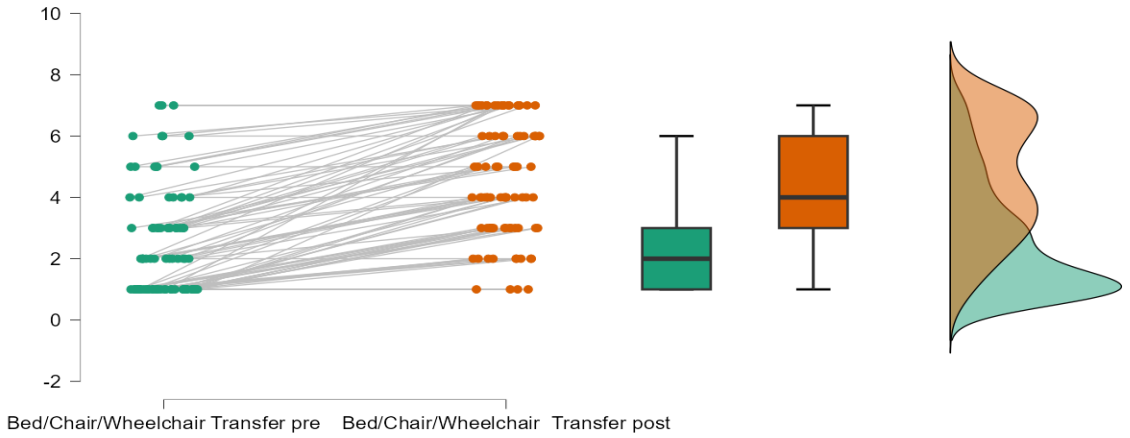

Figure 16 Bed/Wheelchair/Chair pre and post intervention.

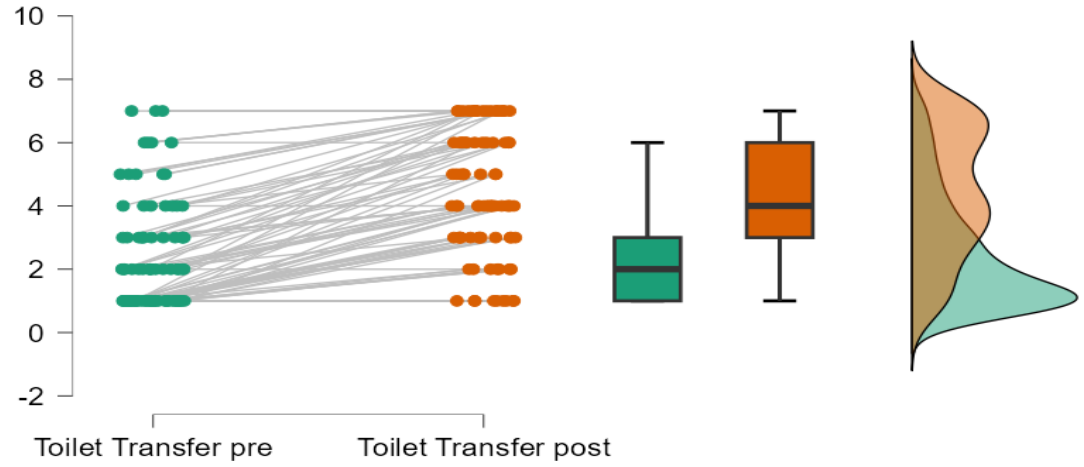

Figure 17 Toilet Transfer pre and post intervention

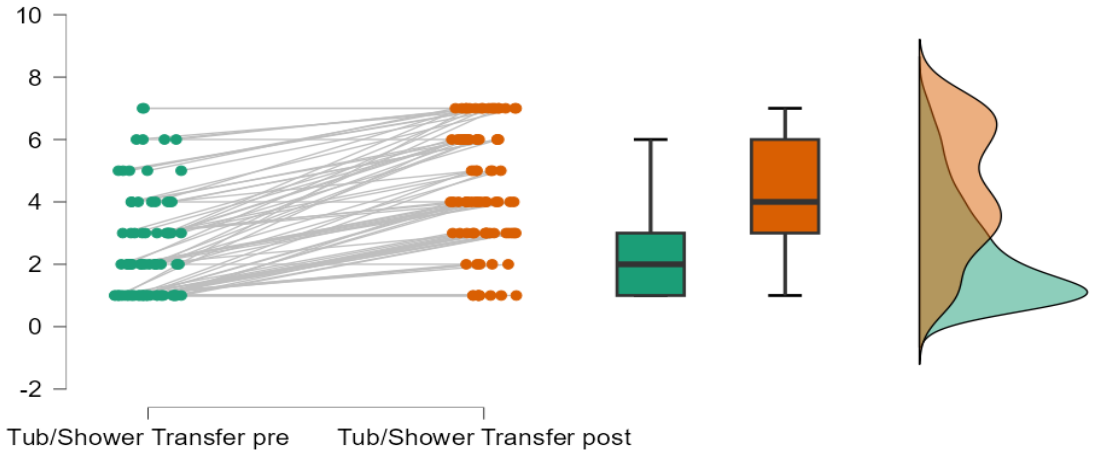

Figure 18 Tub/Shower Transfer pre and post intervention

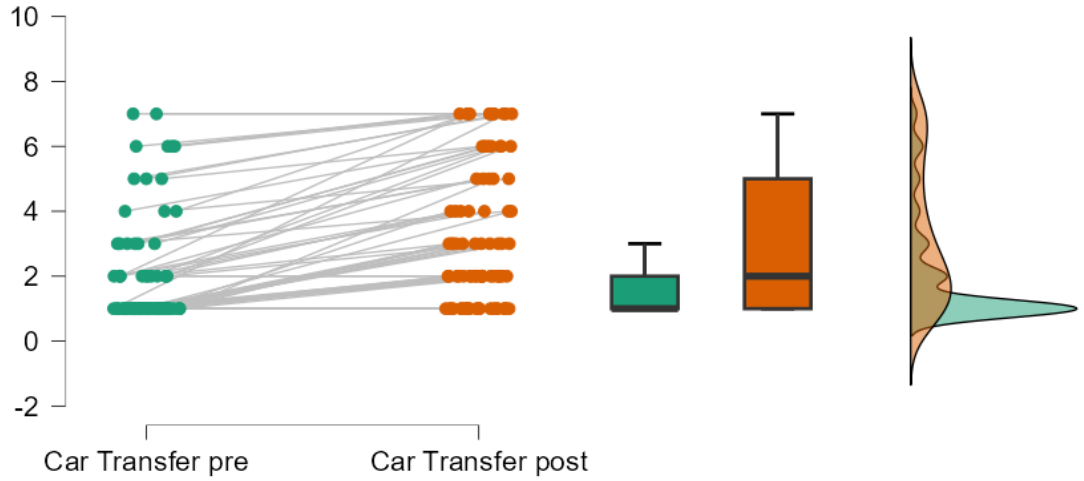

Figure 19 Car Transfer pre and post intervention

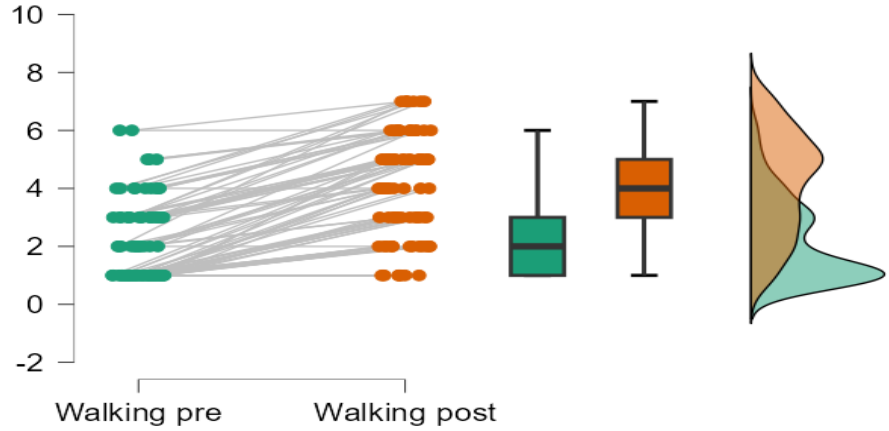

Figure 20 walking pre and post intervention

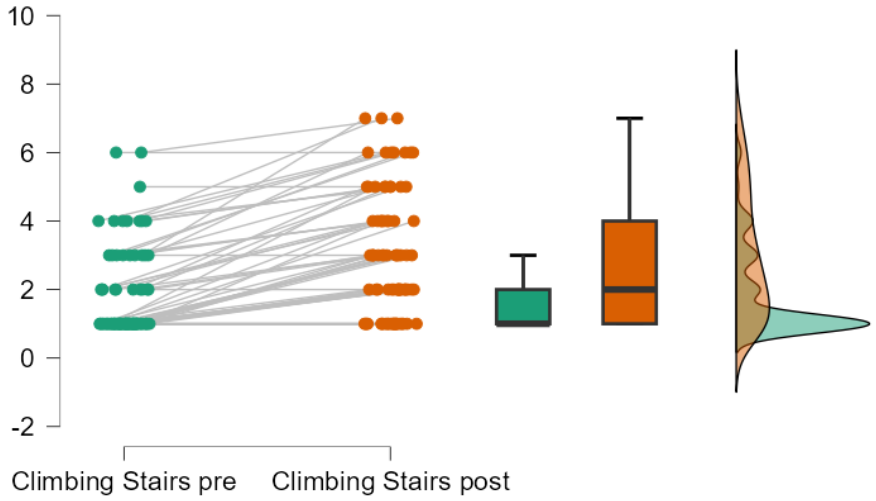

Figure 21 climbing stairs pre and post intervention

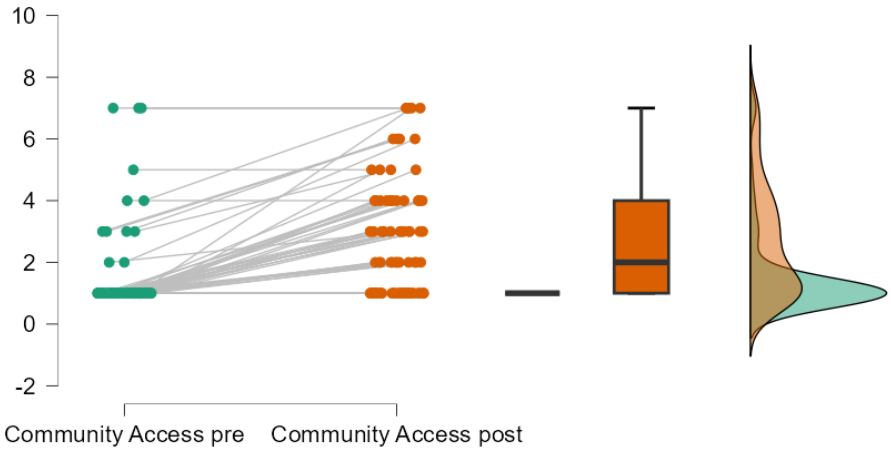

Figure 22 community access pre and post intervention

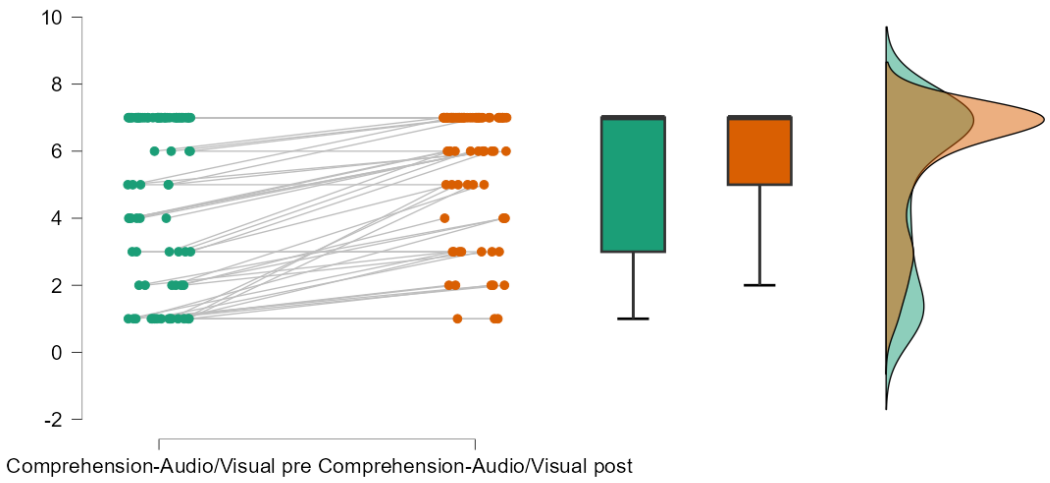

Figure 23 comprehension audio/visual pre and post intervention

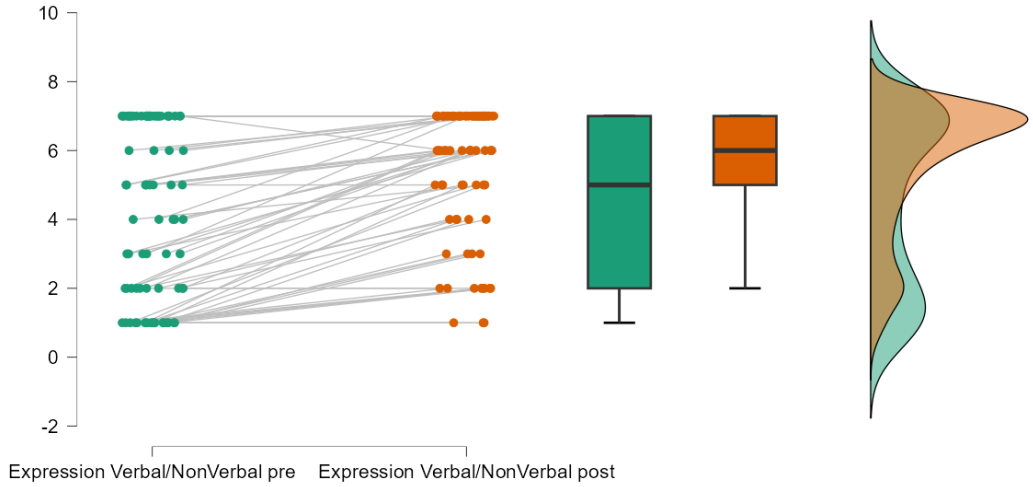

Figure 24 expression verbal/nonverbal pre and post intervention

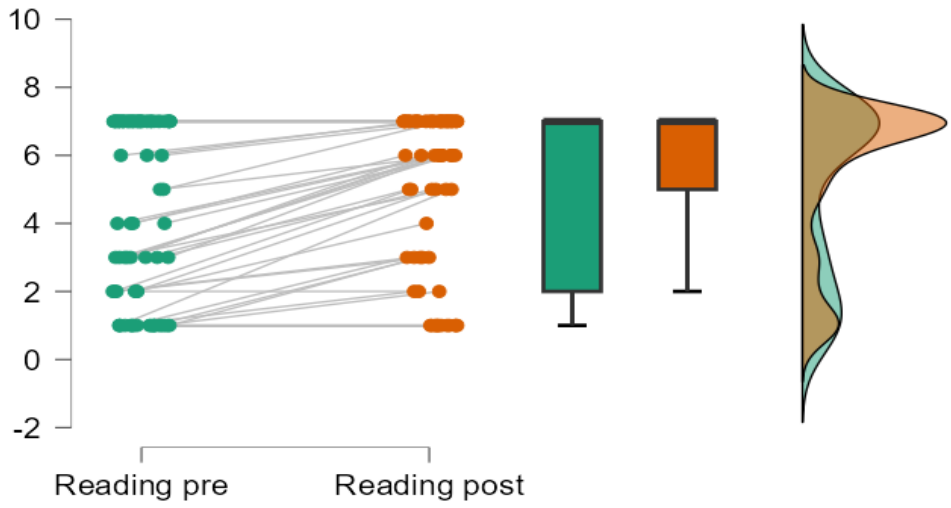

Figure 25 reading pre and post intervention

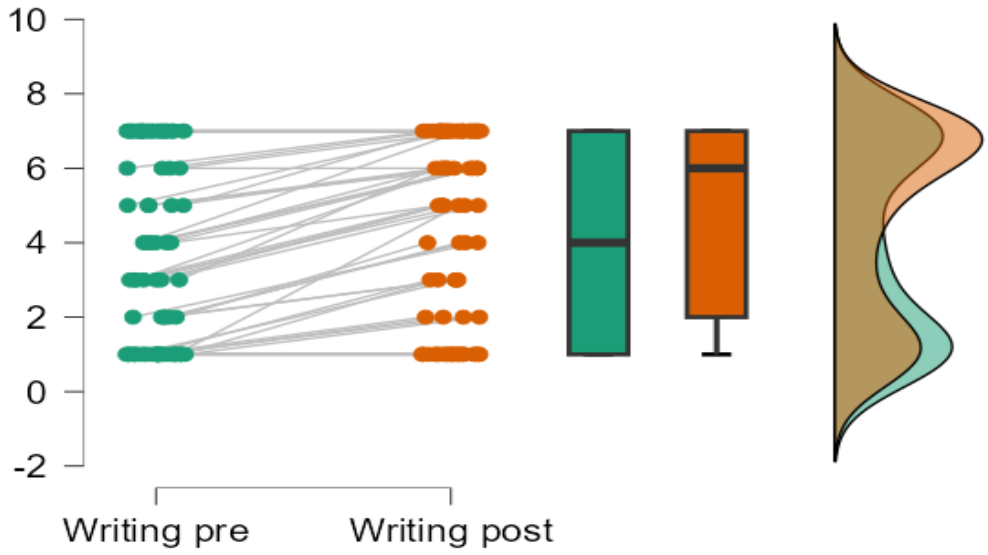

Figure 26 writing pre and post intervention

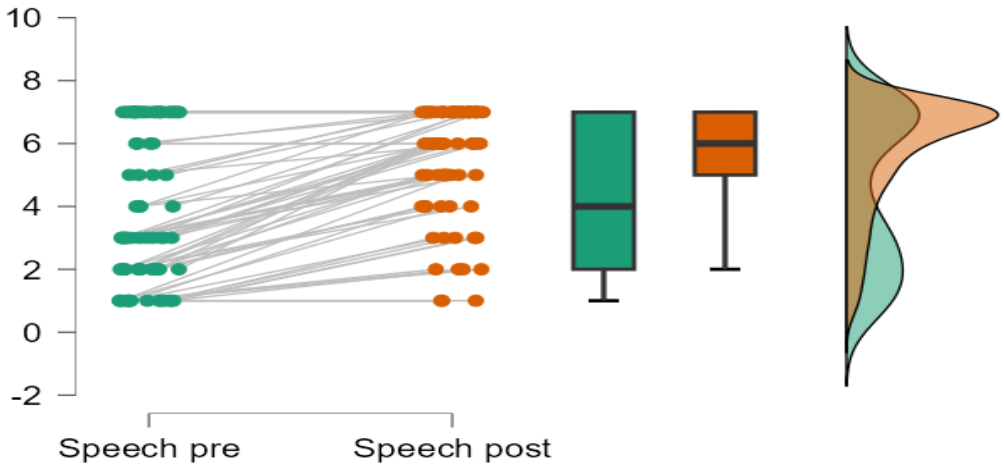

Figure 27 speech pre and post intervention

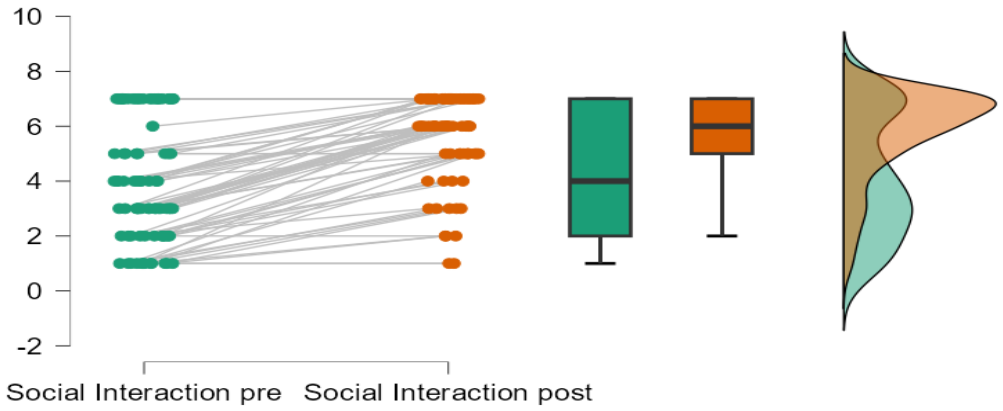

Figure 28 social interaction pre and post intervention

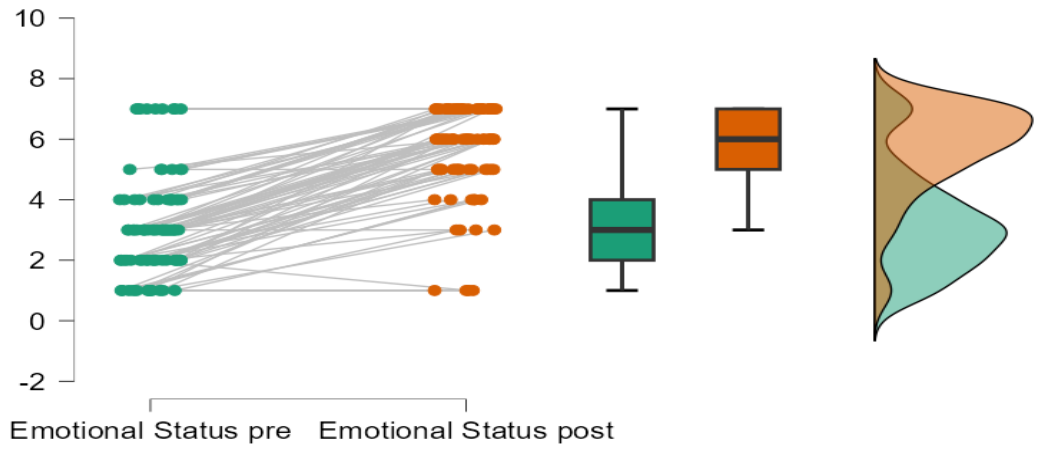

Figure 29 emotional status pre and post intervention

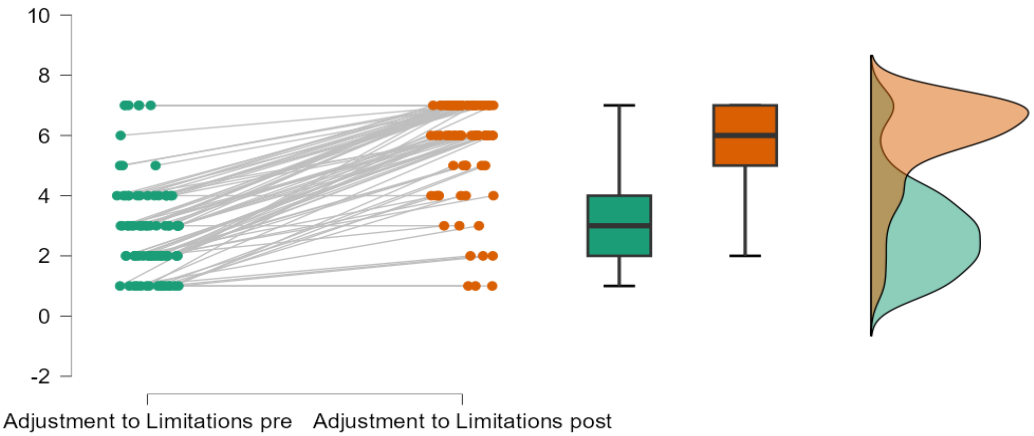

Figure 30 Adjustment to limitations pre and post intervention

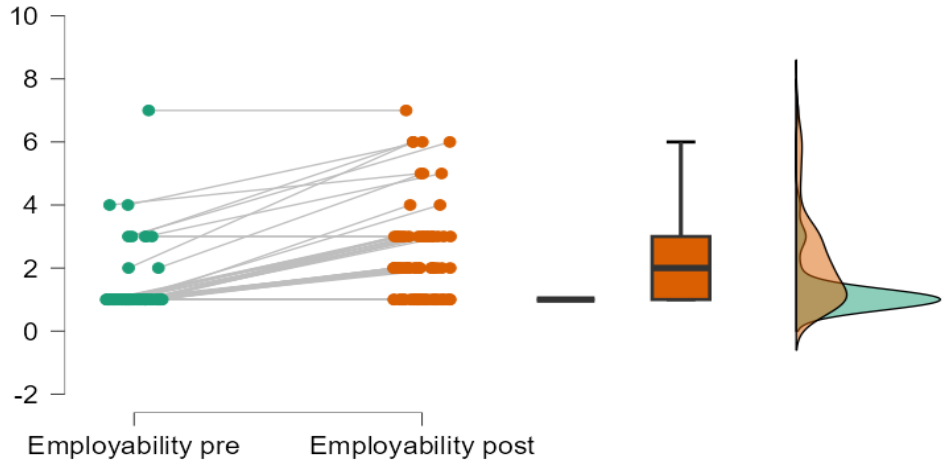

Figure 31 employability pre and post intervention

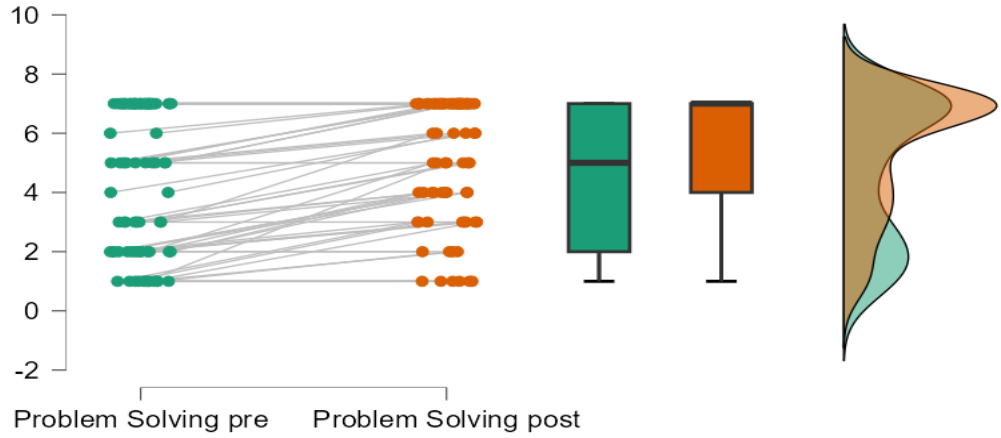

Figure 32 problem solving pre and post intervention.

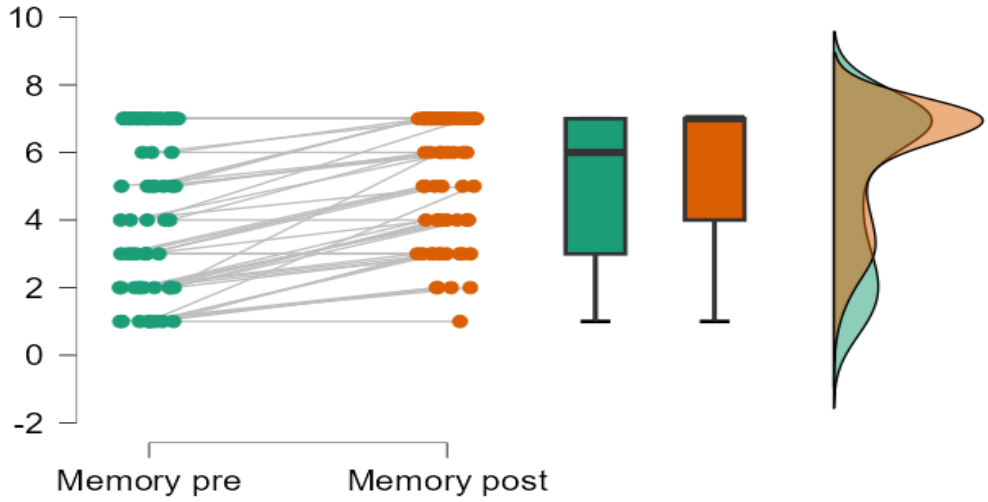

Figure 33 memory pre and post intervention

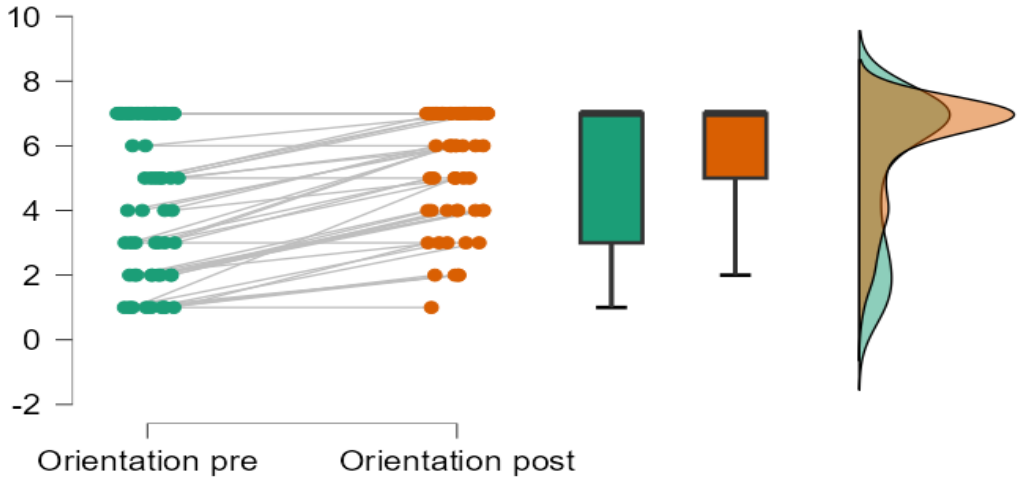

Figure 32 orientation pre and post intervention

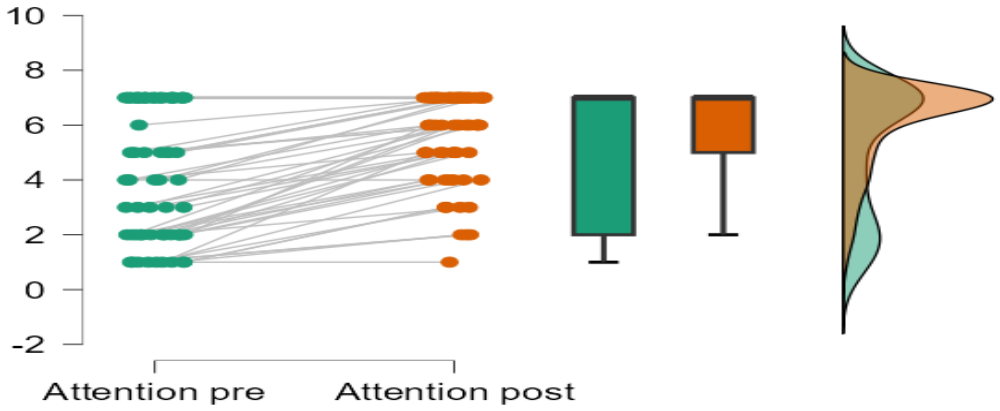

Figure 35 attention pre and post intervention

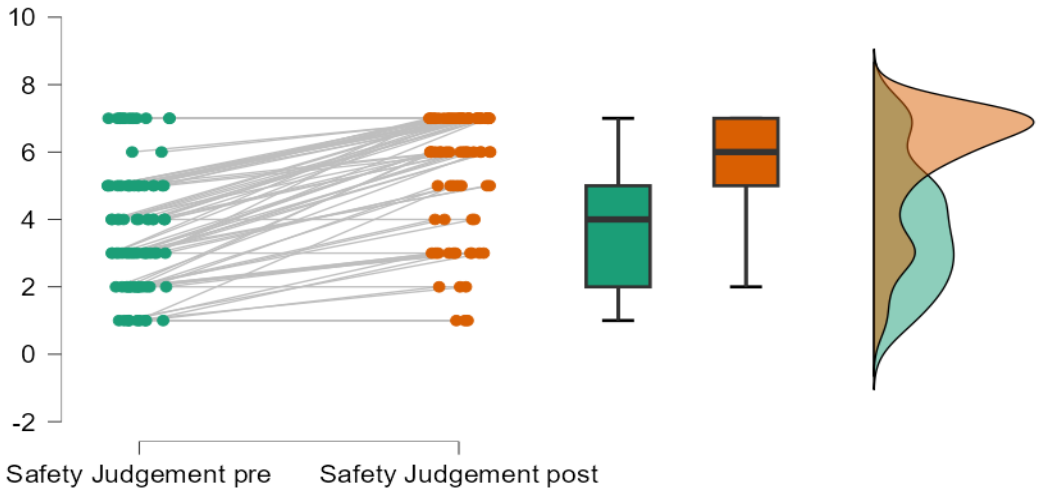

Figure 36 safety judgment pre and post intervention

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