KNOWLEDGE, ATTITUDE AND ADHERENCE TO PRESCRIBED HOME BASED EXERCISE PROGRAMS AMONG PHYSIOTHERAPY OUTPATIENTS IN UNIVERSITY OF BENIN TEACHING HOSPITAL

BY

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CERTIFICATION

This dissertation by EKHAGUOSA JOY ANTHONIA is accepted in its presented form as satisfying the dissertation requirement of the degree of Bachelor of Physiotherapy of the School of Basic Medical Science, College of Medical Sciences of the University of Benin

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DEDICATION

This dissertation is dedication to God and to my parents, Mr. and Mrs Ekhaguosa, who made this work a reality

ABSTRACT

Background: Home-based exercise programs (HBEPs) play a crucial role in physiotherapy rehabilitation by promoting recovery beyond clinical settings. Despite their proven benefits, patient adherence remains inconsistent.

Objective: This study assessed the knowledge, attitude, and adherence to prescribed home-based exercise programs among physiotherapy outpatients at the University of Benin Teaching Hospital (UBTH), Benin City, Nigeria.

Methods: A cross-sectional analytical study was conducted among 184 physiotherapy outpatients selected through purposive sampling, across the following units (Orthopeadics, Neurosurgery, Neuromedicine, Geriatrics and Cardiopulmonary). Data were obtained using the Exercise Adherence Rating Scale (EARS) and a structured Knowledge and Attitude Questionnaire. Descriptive statistics summarized respondents' characteristics, while inferential tests (Pearson's correlation, t-test, ANOVA) assessed relationships and differences between variables, with significance set at $p < 0.05$.

Results: Participants had a mean age of 60.8 ± 21.3 years, with 95 (51.6%) females and 89 (48.4%) males. Most respondents were married (65.8%) and self-employed (46.7%). The most common conditions managed were neurological (44.6%) and musculoskeletal disorders (43.5%). The predominant home exercise prescribed was strengthening exercises (75.0%), followed by stretching (58.7%) and balance training (28.3%). Nearly all participants (97.3%) received one-on-one exercise instruction from physiotherapists. Findings showed moderate levels of knowledge, attitude, and adherence to HBEPs. There was a significant positive correlation between knowledge and adherence ($p < 0.05$), and between attitude and adherence ($p < 0.05$). However, age showed a significant negative correlation with adherence ($r = –0.189$, $p = 0.01$), while gender, marital status, occupation, and health condition had no significant relationship ($p > 0.05$).

Conclusion: Adherence to home exercise programs among physiotherapy outpatients at UBTH was moderate and significantly influenced by patients' knowledge, attitudes, and age. Enhancing patient education, improving motivation, and developing age-tailored intervention strategies may strengthen adherence and rehabilitation outcomes.

Keywords: Home-based exercise, physiotherapy outpatients, knowledge, attitude, adherence.

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CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Physiotherapy services are evidence-based interventions which form an integral part of healthcare systems. These services include exercise therapy, Soft Tissue Mobilization (STM), Transcutaneous Electrical Nerve Stimulation (TENS), ultrasound, shortwave diathermy, cryotherapy, thermotherapy, manual therapy and patient education among others. They play an important role in patient recovery, pain management, and improving the functional ability of patients across various practice settings including primary care, public/private hospitals, physiotherapy clinics, nursing homes, and sports centers (Chang *et al*., 2021). These services aim to restore, maintain and improve the physical function and quality of life of patients/clients across all ages from newborns to the elderly.

Physiotherapy services have been shown to be beneficial in various populations. This includes individuals with musculoskeletal issues like back and neck pain, sports injuries, and osteoarthritis, as well as those with neurological conditions such as stroke, Parkinson's disease, multiple sclerosis, and cerebral palsy (Gupta & Bhatia, 2024; Zotaj *et al*., 2024). Physiotherapy also supports patients with chronic diseases, including cardiovascular and respiratory conditions (Tiku *et al*., 2024), and provides essential care for older adults to maintain function and prevent falls (Brett *et al*., 2019). Furthermore, it is crucial in post-surgical rehabilitation and for children with developmental delays or perinatal injuries (Noël *et al*., 2023).

Treatment options in physiotherapy are varied and tailored to patient needs. They are typically available in both inpatient and outpatient settings. Inpatient physiotherapy is usually intensive and provided in hospitals or specialized rehabilitation facilities, suitable for individuals recovering from major surgery or severe conditions requiring constant monitoring (Caruana *et al*., 2017; Szylińska *et al*., 2018). It often involves multiple daily sessions to accelerate recovery and rebuild strength and independence (Henderson *et al*., 2017). Outpatient physiotherapy, on the other hand, offers flexibility, with patients visiting clinics for scheduled sessions while living at home. This setting is appropriate for managing chronic conditions, less severe injuries, or for continued rehabilitation post-inpatient care (Hamilton *et al*., 2020). Common treatment modalities used in physiotherapy outpatient settings include exercise therapy, manual therapy, electrotherapy, and patient education (Gupta & Bhatia, 2024). Outpatient physiotherapy services are also delivered through home-based physiotherapy, community-based physiotherapy and telerehabilitation.

Home-based physiotherapy involves delivering services directly in a patient's residence, while community-based physiotherapy encompasses services provided in local community settings, which might include a patient's home, residential care facilities, or community centers (Karthik *et al*., 2020; Langowski *et al*., 2025). Community physiotherapy often focuses on the "where" of treatment, bringing services to those who cannot easily access clinics (Rajan, 2017). Community-based physiotherapy can also imply a broader, holistic approach focusing on "how" treatment is delivered, integrating physical, social, and financial contexts and emphasizing preventative strategies, potentially starting even in an acute-care setting and extending into the community (Stanhope *et al*., 2021). Telehealth or telerehabilitation is also an increasingly

significant option, providing remote access to physiotherapy services (Egmond *et al*., 2018; Withers *et al*., 2024a).

The importance of home-based physiotherapy is underscored by its ability to enhance convenience, accessibility, and personalized care (Postolache *et al*., 2017; Withers *et al*., 2024b). It is particularly beneficial for individuals with mobility limitations, chronic conditions, or those in palliative care, as it eliminates travel and allows treatment in a familiar environment (Karthik *et al*., 2020; Woldman *et al*., 2024). This model supports functional independence, encourages patient and family involvement, and can be more cost-effective by reducing travel time and hospital readmissions (Marks *et al*., 2022). Physiotherapists can also assess and suggest modifications to the home environment to improve safety and daily functioning (Langowski *et al*., 2025).

A review of the literature on home-based physiotherapy (HBPT) globally suggests its widespread adoption. However, a significant challenge is low adherence to prescribed exercise programs, with non-adherence rates reported to be as high as 70% (Essery *et al*., 2017). Self-efficacy and intention to adhere were associated with better adherence to HBPT which might have been mediated through improved patient knowledge of prescribed Home-Based Exercise Programs (HBEP) (Wu *et al*., 2025). Attitudes towards HBPT were also associated with adherence in patients with tendonitis and adults undergoing osteopathic treatments (Essery *et al*., 2017). Training physiotherapists in effective communication skills has also been shown to enhance short-term patient adherence presumably through improved patient knowledge, attitudes and perceptions of HBPT (Lonsdale *et al*., 2017). Furthermore, making exercise programs more engaging and providing feedback or models for performance can positively impact adherence (Palazzo *et al*., 2016). Technology, such as web-based and app-based programs, is increasingly

used and has been found to be as effective as traditional written programs in supporting adherence (Donkers *et al*., 2020). Innovations like machine learning and smartphone-based pose detection offer scalable, low-cost methods for objectively monitoring participation in home exercises (Arrowsmith *et al*., 2022). Patient preferences for technology vary, with younger patients often preferring dynamic, interactive digital supports, while older patients may value guided instruction and regular check-ins (Palazzo *et al*., 2016).

In the African context, home-based physiotherapy is gaining recognition as a means to improve access to rehabilitation services, particularly in resource-limited and rural areas where physiotherapy has traditionally been institution-based, thereby limiting its reach (Gona *et al*., 2013). Adherence to home-based physiotherapy in these settings is frequently challenged by a combination of practical, motivational, and systemic barriers. Innovative approaches, such as video-based home exercise programs delivered in local languages, have demonstrated high feasibility and acceptability, for instance, among stroke survivors, where culturally and linguistically tailored instructions contributed to good adherence and positive feedback (Odetunde *et al*., 2020). However, even when patients are knowledgeable about HBPT, actual adherence can be low; for example, a study in Sri Lanka found only about one-third of patients followed prescribed home exercises, citing lack of time and motivation as primary reasons (Ubhayasiri & Abeysinghe, 2024).

In Nigeria, home-based physiotherapy is an established practice. Despite its practice, adherence to home exercise programs is generally low, with significant barriers stemming from interference with daily routines, motivational issues, and systemic challenges. A study on patients with low back pain found that only about 38% adhered to their prescribed home exercises as recommended (Odebiyi *et al*., 2020). Key barriers include the difficulty of fitting exercises into

daily schedules, especially after work-related fatigue, and patients' perceptions regarding the value and feasibility of these exercises. Systemic issues, such as a lack of patient-centered program design and insufficient integration of physiotherapy into primary healthcare, also limit effectiveness (Olaleye & Abiodun, 2022). Many home-based physiotherapy services in Nigeria operate with limited formal regulation, and practitioners often face difficult working environments, high transportation costs, and competition from unqualified individuals (Onyeso *et al*., 2020). Challenges also include poor awareness/knowledge of physiotherapy's role and transportation difficulties for practitioners (Igwesi-Chidobe, 2012; Onyeso *et al*., 2020).

1.2 Statement of the Problem

Despite their importance, patient adherence to Home Based Exercise Programs (HBEPs) represents a significant challenge within physiotherapy practice in Nigeria, with multiple studies reporting suboptimal adherence rates and identifying various influencing factors across different populations. A study among general physiotherapy outpatients in Enugu reported a high non-adherence rate of 75.5%. Factors significantly associated with this poor adherence included older age, female gender, and lower educational status, alongside barriers such as fatigue, forgetfulness, pain, perceiving exercises as injurious or not beneficial, and needing physical assistance. Conversely, family/friend support was identified as a key facilitator in this population (Okezue *et al*., 2019). Similarly, studies focusing on stroke survivors in Kano revealed significant non-compliance, with rates reported at 74% (Adeniyi & Zandam, 2012) and 44.2% non-adherent (Ogwumike *et al*., 2014). Specific predictors of non-compliance identified among these stroke patients in Kano included having had the stroke for over a year, being in a polygamous marriage, living in rented accommodation, and living with non-family members (Adeniyi & Zandam,

2012). Other influencing factors reported in these studies were patient discomfort (tiredness, exercise difficulty, pain), dependence on the physiotherapist, insufficient time, forgetfulness, and needing physical assistance (Ogwumike *et al*., 2014). Furthermore, research conducted in a rural Kano community on patients with chronic low back pain found low compliance (<50%) with prescribed home programs, potentially influenced by cultural factors like shyness about exercising in front of family and community views questioning the legitimacy of exercise as treatment (Ibrahim *et al*., 2018; Igwesi-Chidobe *et al*., 2019). This collective evidence highlights that poor adherence to HBEPs is a prevalent issue across various Nigerian settings, influenced by a complex interplay of factors related to patient knowledge and attitudes, socio-demographic characteristics, and social/environmental factors (support systems, cultural norms, living situations).

However, to the best of the researcher's knowledge, there is a dearth of research on the Knowledge, attitudes and adherence to home-based exercise programs among physiotherapy outpatients in University of Benin Teaching Hospital.

Research Questions

Therefore, the present study answers the following questions:

i. What is the level of adherence to home exercise programs among physiotherapy outpatients at the University of Benin Teaching Hospital (UBTH)?
ii. What is the level of knowledge regarding home exercise programs among physiotherapy outpatients at UBTH?
iii. What are the attitudes of physiotherapy outpatients at UBTH toward home exercise programs?

iv. To what extent does knowledge of home exercise programs influence adherence among physiotherapy outpatients at UBTH?

v. To what extent do attitudes toward home exercise programs influence adherence among physiotherapy outpatients at UBTH?

vi. What is the influence of age on adherence to home exercise programs among physiotherapy outpatients at UBTH?

vii. What is the influence of gender on adherence to home exercise programs among physiotherapy outpatients at UBTH?

viii. What is the influence of educational level on adherence to home exercise programs among physiotherapy outpatients at UBTH?

ix. What is the influence of the diagnosed health condition on adherence to home exercise programs among physiotherapy outpatients at UBTH?

x. What is the influence of marital status on adherence to home exercise programs among physiotherapy outpatients at UBTH?

1.3 Aim of the Study

The present study assesses the knowledge, attitude, and adherence to home exercise programs and to examine the sociodemographic and clinical factors influencing adherence among physiotherapy outpatients at the University of Benin Teaching Hospital (UBTH).

1.3.1 Specific Objectives

The objectives of the study are to;

i. Determine the level of adherence to home exercise programs among physiotherapy outpatients at UBTH.

ii. Assess the level of knowledge regarding home exercise programs among physiotherapy outpatients at UBTH.

iii. Examine the attitudes of physiotherapy outpatients at UBTH toward home exercise programs.

iv. Evaluate the influence of knowledge of home exercise programs on adherence among physiotherapy outpatients at UBTH.

v. Determine the influence of attitudes toward home exercise programs on adherence among physiotherapy outpatients at UBTH.

vi. Assess the influence of age on adherence to home exercise programs among physiotherapy outpatients at UBTH.

vii. Examine the influence of gender on adherence to home exercise programs among physiotherapy outpatients at UBTH.

viii. Investigate the influence of educational level on adherence to home exercise programs among physiotherapy outpatients at UBTH.

ix. Evaluate the influence of the diagnosed health condition on adherence to home exercise programs among physiotherapy outpatients at UBTH.

x. Assess the influence of marital status on adherence to home exercise programs among physiotherapy outpatients at UBTH.

1.4 Hypotheses

1.4.1 Main Hypotheses

There would be no significant association between knowledge, attitude, sociodemographic, and clinical factors and adherence to home exercise programs among physiotherapy outpatients at the University of Benin Teaching Hospital (UBTH)

1.4.2 Sub Hypotheses

i. There would be no significant association between knowledge level and adherence to home exercise programs among physiotherapy outpatients at UBTH.
ii. There would be no significant association between attitude and adherence to home exercise programs among physiotherapy outpatients at UBTH.
iii. There would be no significant association between age and adherence to home exercise programs among physiotherapy outpatients at UBTH.
iv. There would be no significant association between gender and adherence to home exercise programs among physiotherapy outpatients at UBTH.
v. There would be no significant association between educational level and adherence to home exercise programs among physiotherapy outpatients at UBTH.
vi. There would be no significant association between the diagnosed health condition and adherence to home exercise programs among physiotherapy outpatients at UBTH.
vii. There would be no significant association between marital status and adherence to home exercise programs among physiotherapy outpatients at UBTH.

1.5 Significance of the study

i. **For researchers**: This study contributes to the existing body of evidence on the knowledge, attitude and adherence to home exercise programs specifically among physiotherapy outpatients at the University of Benin Teaching Hospital (UBTH).

ii. **For physiotherapists**: This study offers practicing physiotherapists insights into their patient population's understanding, beliefs, and adherence to home exercise programs. This information will empower clinicians to move beyond generalized assumptions and implement more targeted assessment tools and intervention strategies, tailored directly to the actual needs of their patients.

iii. **For Educators**: The results of this study will inform and help refine physiotherapy education and training. Recommendations from this study could be directly integrated into physiotherapy curricula and continuing professional development programs. This will ensure that future physiotherapy graduates and practicing clinicians are better equipped with the necessary knowledge and skills to effectively communicate and assess patient understanding, foster positive attitudes, overcome barriers, and facilitate their adherence to home exercise programs.

iv. **For Patients**: This study will potentially facilitate the provision of more effective, patient-centered physiotherapy prescribed home exercise programs for patients. By informing physiotherapists about potential knowledge deficits, attitudes, and adherence challenges faced by patients, the study will enable the development of more supportive and personalized approaches to home exercise program prescription and follow-up. This tailored care will potentially improve the patient's personal rehabilitation experience and contribute positively to their treatment outcomes.

1.6 Scope and Delimitation of the study

i. The present study was delimited to male and female patients enrolled in the outpatient physiotherapy clinic in UBTH.

ii. Patients who have been prescribed home exercise programs as part of their treatment were surveyed.

1.7 Limitations of Study

The limitations of this study includes

i. The study relied on self reported questionnaires which may be subject to over estimation or recall bias

ii. The study was carried out among Physiotherapy Outpatients in the UBTH, there should be caution in the application of the findings of this study to other hospitals.

iii. Data were collected at a single time point, hence casual relationship between knowledge, attitude and adherence could not be established

1.8 Definition of Terms Used

i. **Adherence**: The extent to which a patient's behaviour (in this context, performing prescribed exercises) corresponds with agreed recommendations from a healthcare provider, encompassing aspects of compliance (following advice) and persistence (continuing over time) (Eicher *et al*., 2019; Jemli *et al*., 2022; Owczarczyk *et al*., 2023).

ii. **Attitudes**: A patient's settled way of thinking or feeling about their Home Exercise Program, encompassing their beliefs about its effectiveness, relevance to their condition,

perceived barriers (e.g., time, pain, fear), and confidence in their ability to perform the exercises (self-efficacy) (Vaikar *et al*., 2024).

iii. Home Exercise Program (HEP) / Home-Based Exercise (HBEP): A tailored regimen of specific exercises, often accompanied by education and advice, prescribed by a physiotherapist for the patient to perform independently in their home environment to enhance strength, mobility, functional capacity, and facilitate self-management (Okezue *et al*., 2019; McElrath *et al*., 2023).

iv. **Knowledge**: A patient's understanding regarding their prescribed Home Exercise Program, including the rationale behind the exercises, their expected benefits, correct performance techniques, relevance to personal goals, and potential risks or modifications (Parker, 2022; Dickson *et al*., 2023; Gondko *et al*., 2024; Vaikar *et al*., 2024).

v. **Outpatients**: An outpatient in physiotherapy practice refers to an individual who receives physiotherapy services, including assessment, diagnosis, and treatment, at a hospital clinic, specialized rehabilitation center, or private practice setting without being admitted for an overnight stay (Kisner *et al*., 2017).

vi. **Self-Efficacy**: An individual's belief in their own capability to successfully perform specific tasks or behaviours required to produce given attainments (Picha *et al*., 2021).

1.9 List of Abbreviations

i. CLBP: Chronic Low Back Pain

ii. HBEP: Home-Based Exercise Program

iii. HEP: Home Exercise Program

iv. UBTH: University of Benin Teaching Hospital

CHAPTER TWO

LITERATURE REVIEW

2.1 Overview of Home-Based Exercise Programs

Home-Based Exercise Programs (HBEPs) are defined as structured, individualized exercise regimens, prescribed by physiotherapists, that patients are intended to perform independently in their own environment, typically their home (Essery *et al*., 2016). These programs are not merely a list of exercises; they often incorporate educational components designed to enhance patient understanding and self-management capabilities (McElrath *et al*., 2023). The aims of HBEPs include: to empower patients to take an active role in their recovery, promote consistent therapeutic progress between supervised sessions, and enhance the overall rehabilitation experience (MedBridge, 2022). Clinically, HBEPs are designed to help patients regain or improve range of motion, strength, flexibility, and overall physical function; manage pain; promote the healing of tissues; prevent the recurrence of injury or symptoms; and facilitate the long-term self-management of chronic conditions. For instance, the 'SupportBack' internet intervention, a form of HBEP, is specifically designed to support individuals with low back pain (LBP) in their self-management efforts, primarily through engagement in physical activity, as described by Geraghty *et al*. (2018).

The rationale for prescribing HBEPs in physiotherapy is compelling and rooted in several key considerations. Firstly, HBEPs provide essential care continuity, extending therapeutic effects beyond the often-limited duration and frequency of direct clinic sessions (MedBridge, 2022). This is particularly important in outpatient settings where contact time with the therapist may be restricted (Tadi & Mazzucco, 2023). Secondly, HBEPs are designed to promote patient autonomy and self-efficacy, encouraging individuals to become active participants in their healing process rather than passive recipients of treatment (Bachmann *et al*., 2018). By successfully managing aspects of their rehabilitation independently, patients can gain confidence in their ability to influence their health outcomes. Thirdly, HBEPs can contribute to the cost-effectiveness of healthcare by potentially reducing the need for frequent, supervised physiotherapy sessions, thereby optimizing the use of healthcare resources (MedBridge, 2022). Evidence from studies such as McDonough *et al*. (2013) suggests that engagement in certain HBEPs can lead to a reduced uptake of further physiotherapy. Finally, HBEPs aim to integrate therapeutic activities into patients' daily routines, fostering sustainable health behaviors that can persist beyond the formal period of rehabilitation (Bachmann *et al*., 2018).

The integral nature of HBEPs within the therapeutic process is evident as they act as a crucial bridge between supervised clinical interventions and the patient's return to functional independence and daily life activities. The evolution of HBEPs from simple, static printed handouts to more dynamic, interactive, and technology-supported programs further underscore their importance and the ongoing efforts to enhance their effectiveness. For example, internet-based interventions like 'SupportBack' (Geraghty *et al*., 2018) and exercise systems utilizing augmented feedback (Hügli *et al*., 2014) represent a significant shift towards more engaging and potentially more effective self-management tools. This technological integration likely

influences patient knowledge, attitudes, and adherence, offering both new opportunities for engagement and potential new barriers related to technology access or literacy. Traditional HBEPs relied heavily on patient memory, understanding of written or verbally communicated instructions, and intrinsic motivation. In contrast, contemporary HBEPs, often delivered via software platforms or dedicated devices, can offer features such as video demonstrations of exercises, personalized progress tracking, and tailored feedback mechanisms (MedBridge, 2022). These features have the potential to enhance patient understanding of their exercises (knowledge), improve their engagement and motivation (attitude), and consequently, increase adherence rates. However, the increasing sophistication of HBEPs also necessitates a careful consideration of how these programs are introduced and supported to ensure patients can effectively utilize them.

2.1.1 Types of HBEPs Prescribed for Physiotherapy Outpatients

Physiotherapists prescribe a diverse range of HBEPs, tailored to the specific needs of their outpatients, the nature of the condition being treated, and the goals of rehabilitation. These programs often combine various types of exercises and educational components.

Common categories of exercises incorporated into HBEPs include:

- **Strengthening Exercises:** These are designed to improve muscle force production, endurance, and overall stability. They target specific muscle groups relevant to the patient's condition, such as core strengthening for chronic LBP or limb strengthening post-injury (Geraghty *et al*., 2018).

- **Stretching and Flexibility Exercises:** These aim to increase the extensibility of soft tissues (muscles, tendons, ligaments) and improve joint range of motion. They are frequently

included for conditions involving muscle tightness or joint stiffness, such as in general exercise programs for chronic LBP (Geraghty *et al*., 2018) or as part of "back school" curricula (Bigorda-Sague, 2012).

- **Movement Control and Motor Learning Exercises:** These exercises focus on improving the quality and efficiency of movement patterns, enhancing coordination, proprioception (joint position sense), and body awareness. They are particularly relevant for patients with conditions characterized by maladaptive movement strategies or movement control impairments (MCI), such as certain subgroups of LBP (Hügli *et al*., 2014). The Movement System Impairment (MSI) model, for example, emphasizes correcting specific movement impairments (Azevedo *et al*., 2018).

- **Aerobic and Endurance Exercises:** These activities aim to improve cardiovascular fitness, general stamina, and overall physical activity levels. Walking programs are a common and accessible form of aerobic HBEP, sometimes enhanced with tools like pedometers to monitor and motivate progress (Hurley *et al*., 2015).

- **Postural Correction and Ergonomic Advice:** While not exercises in the traditional sense, instructions on maintaining optimal posture during daily activities and modifying work or home environments are often integral components of HBEPs, especially for spinal conditions (Bigorda-Sague, 2012). These aim to reduce strain on affected tissues and prevent symptom aggravation.

2.1.2 Principles of HBEPs Prescription, Progression, and Monitoring

The effective implementation of HBEPs relies on sound principles of prescription, systematic progression, and diligent monitoring. These elements are crucial for ensuring patient safety, promoting optimal therapeutic outcomes, and maintaining patient engagement over time.

2.1.2.1 Principles of HBEPs Prescription:

The prescription of an HBEP is a clinical reasoning process that goes beyond simply selecting exercises. Key principles include:

- **Dosage (FITT-VP Principle):** Exercise parameters should be clearly defined. The FITT-VP principle (Frequency, Intensity, Time, Type, Volume, and Progression) provides a comprehensive framework (WHO, 2012).
- **Frequency:** How often the exercises should be performed (e.g., daily, 3 times per week).
- **Intensity:** The level of effort required (Geraghty *et al*., 2018).
- **Time (Duration):** The length of each exercise session or the duration for which a specific exercise is held.
- **Type:** The specific exercises selected.
- **Volume:** The total amount of exercise (e.g., sets and repetitions).
- **Progression:** How the program will be advanced over time.
- **Individualization and Specificity:** HBEPs must be tailored to the individual patient's specific clinical diagnosis, impairments, functional limitations, activity goals, preferences, and psychosocial context (MedBridge, 2022). This involves considering factors such as

age, co-morbidities, and previous exercise experience. For example, Azevedo *et al*. (2018) compared a treatment approach based on the Movement System Impairment (MSI) classification system, which tailors exercises to specific movement dysfunctions, with a program of general exercises for chronic LBP. The principle of specificity dictates that exercises should target the particular tissues or movement patterns requiring change.

- **Clarity and Simplicity:** Instructions for HBEPs must be clear, concise, and easy for the patient to understand and recall. This often involves starting with a manageable number of exercises and ensuring that each exercise is demonstrated and practiced under supervision before being performed independently (Bachmann *et al*., 2018). The complexity should be appropriate to the patient's cognitive and physical abilities.
- **Education:** A vital component of HBEP prescription is educating the patient about the rationale behind the program, the expected benefits of each exercise, correct performance techniques, and important safety precautions or warning signs (MedBridge, 2022). This empowers the patient and can enhance motivation and adherence.

2.1.2.2 Principles of HBEPs Progression:

Progression is essential to ensure continued adaptation and improvement, and to maintain patient engagement by providing ongoing challenges (Physiopedia, 2023). Stagnation can lead to plateaus in recovery or loss of motivation. Progression strategies include:

i. Increasing the number of repetitions or sets.
ii. Increasing the duration of exercise or holds.
iii. Increasing the resistance or load (e.g., using weights, resistance bands).
iv. Increasing the frequency of exercise sessions.

v. Advancing to more complex or challenging variations of an exercise.

vi. Reducing rest periods between sets or exercises.

Progression should be guided by the patient's tolerance, symptom response, and achievement of previous goals. For example, the 'SupportBack' internet intervention incorporates tailored goal setting and provides automatic feedback to guide progression (Geraghty *et al*., 2018). Walking programs often progress by increasing the duration, frequency, or intensity (e.g., speed, incline) of walks (Hurley *et al*., 2015; McDonough *et al*., 2013). The MSI-based treatment in a study by Azevedo *et al*. (2018) also involved progression of exercises. It is critical that progression is managed carefully to avoid overexertion or exacerbation of symptoms, which can negatively impact adherence (APTA, 2024).

2.1.2.3 Principles of HBEPs Monitoring:

Monitoring is crucial for tracking progress, ensuring exercises are performed correctly and safely, identifying and addressing barriers, and making timely adjustments to the HBEPs (WHO, 2023). Effective monitoring involves:

i. **Patient Self-Monitoring:** Exercise Diaries/Logs are used by patients record details such as which exercises were performed, frequency, repetitions, sets, duration, pain levels during or after exercise, and any difficulties encountered (Azevedo *et al*., 2018). Pedometers/Activity Trackers are used in walking programs to track step counts and activity duration (Hurley *et al*., 2015).

ii. **Physiotherapist-Led Monitoring:** During follow-up appointments, therapists can observe exercise performance, assess progress, review diaries, and discuss any issues (Nava-Bringas *et al*., 2016). Telephone calls or secure messaging can also be used for interim

monitoring, problem-solving, and providing encouragement, as seen in the physiotherapist-supported arm of the 'SupportBack' trial (Geraghty *et al*., 2018) and in walking programs (Hurley *et al*., 2015; McDonough *et al*., 2013).

iii. **Technology-Assisted Monitoring:** Internet-based programs and mobile apps can automatically track exercise completion, duration, and sometimes even aspects of performance quality if sensors are involved (Geraghty *et al*., 2018). Augmented Feedback Systems are also crucial in monitoring HBEPs. These systems inherently monitor performance by tracking movement via sensors and providing real-time feedback (Hügli *et al*., 2014).

Effective HBEP prescription and management are thus dynamic processes that require ongoing communication, collaboration, and adjustment based on monitored progress. The increasing integration of patient-generated data from diaries, wearables, and digital applications into the monitoring process allows for more responsive and personalized HBEP progression. However, this also necessitates that patients possess the knowledge and skills to use these monitoring tools effectively and to accurately interpret and report their experiences. If patients do not understand how to monitor or report their progress, or if physiotherapists do not effectively utilize this information, the feedback loop necessary for optimal progression can break down. This can lead to the HBEP becoming static or inappropriate, potentially stalling recovery, reducing motivation, and negatively impacting adherence.

2.2 Overview of Outpatient Physiotherapy

Outpatient physiotherapy, also referred to as ambulatory physiotherapy, encompasses services provided to patients who are not formally admitted to a hospital. These services are typically

delivered in a variety of settings, including private physiotherapy clinics, hospital-based outpatient departments, community health centers, and primary care or general practitioner practices (Tadi & Mazzucco, 2023). The scope of outpatient physiotherapy is broad, addressing a wide spectrum of conditions. These most commonly include musculoskeletal disorders such as back and neck pain, joint problems (e.g., osteoarthritis, sprains, strains), and post-operative rehabilitation. However, outpatient services also cater to patients with neurological conditions (e.g., stroke, multiple sclerosis, Parkinson's disease, vestibular disorders), cardiorespiratory conditions, pelvic health issues, and sports injuries, among others (Tadi & Mazzucco, 2023).

The process of outpatient physiotherapy generally begins with a comprehensive assessment, during which the physiotherapist takes a detailed history, performs a physical examination, and establishes a clinical diagnosis or functional problem list. Based on this assessment, a collaborative plan of care is developed with the patient, outlining treatment goals and the proposed interventions (APTA, 2022). Interventions in outpatient physiotherapy are diverse and often multimodal, typically including:

- **Therapeutic Exercise:** This is a cornerstone of physiotherapy and includes exercises to improve strength, flexibility, endurance, balance, coordination, and movement control. These exercises may be performed under supervision in the clinic and are almost invariably prescribed as part of an HBEP (Tadi & Mazzucco, 2023).
- **Manual Therapy:** This involves skilled hands-on techniques such as joint mobilization or manipulation, soft tissue massage, and neural mobilization, aimed at reducing pain, improving movement, and restoring function (Tadi & Mazzucco, 2023).

- **Physical Modalities:** These may include the application of heat, cold, electrical stimulation (e.g., TENS, interferential), ultrasound, or traction to modulate pain, reduce inflammation, or facilitate tissue healing (Tadi & Mazzucco, 2023).
- **Patient Education:** A critical component, involving providing information about the patient's condition, self-management strategies, pain management techniques, ergonomic advice, and lifestyle modifications (WakeMed, n.d.; Tadi & Mazzucco, 2023).

2.2.1 Roles of HBEPs in Outpatient Physiotherapy

Within the outpatient physiotherapy setting, HBEPs are not merely an ancillary component but a fundamental and indispensable part of the overall treatment strategy (Bachmann *et al*., 2018). They serve as the critical link that extends the therapeutic process beyond the confines of the clinic, enabling patients to continue their rehabilitation and actively participate in their recovery in their own environment. The importance of HBEPs includes

- **Continuity of Care and Therapeutic Dosage:** Physiotherapy clinic appointments are often limited in frequency and duration due to logistical, financial, or healthcare system constraints (Tadi & Mazzucco, 2023). HBEPs bridge the gap between these supervised sessions, providing a mechanism for patients to receive an adequate "dosage" of therapeutic activity necessary to stimulate physiological adaptations, maintain improvements, and continue progressing towards their goals.
- **Facilitation of Self-Management and Empowerment:** A primary goal of modern physiotherapy is to empower patients with the skills and confidence to manage their conditions independently in the long term (Bachmann *et al*., 2018). HBEPs are a key tool in fostering this self-efficacy. By successfully performing exercises and managing their

symptoms at home, patients develop a sense of control over their condition and become less reliant on passive interventions or frequent therapist contact (Bachmann *et al*., 2018).

- **Translation of Clinical Gains to Functional Activities:** Exercises and improvements made in the controlled environment of a clinic need to be translated into real-world functional activities and daily life. HBEPs often include exercises that mimic or prepare patients for these activities, helping to integrate therapeutic gains into their everyday routines (Physiopedia, 2023).
- **Prevention of Recurrence and Long-Term Health:** For many conditions, particularly chronic ones or those prone to recurrence (like LBP), HBEPs play a crucial role in long-term management and prevention (Bachmann *et al*., 2018). Continued engagement with prescribed exercises can help maintain strength, flexibility, and healthy movement patterns, reducing the risk of future episodes or symptom exacerbation.
- **Cost-Effectiveness and Resource Optimization:** By enabling patients to manage aspects of their care independently, HBEPs can contribute to a more cost-effective healthcare model (MedBridge, 2022). They may reduce the total number of supervised sessions required, free up therapist time for patients with more acute needs, and potentially decrease overall healthcare utilization associated with a particular condition. For instance, McDonough *et al*. (2013) observed a reduced uptake of subsequent standard physiotherapy care in the group that received a pedometer-driven walking HBEP, suggesting the HBEP itself met ongoing needs for some participants.

2.3 Patients' Knowledge of Home-Based Exercise Programs

A patient's knowledge concerning their Home-Based Exercise Program (HBEP) is a important factor influencing their subsequent attitudes and adherence. This knowledge encompasses not only the practical aspects of how to perform the exercises but also a deeper understanding of their condition and the rationale behind the prescribed therapeutic activities.

Effective engagement in an HBEP often begins with the patient's understanding of their condition and the specific reasons why the prescribed exercises are beneficial for their recovery. It is emphasized in the literature that patients need to grasp the rationale behind their HBEP to perceive its relevance and value (Bachmann *et al*., 2018). A lack of knowledge regarding the goals and importance of the exercises has been identified as a direct predictor for non-commitment to HBEPs (Hawamdeh *et al*., 2024). Physiotherapy interventions frequently include educational components aimed at building this understanding. The 'SupportBack' internet intervention for LBP introduces the rationale for physical activity as a key component of self-management (Geraghty *et al*., 2018), and the walking program studied by Hurley *et al*. (2015) provided participants with an educational booklet detailing the health benefits of walking. A study by McDonough *et al*. (2013) also included education and advice to remain active. More targeted educational approaches, such as the Protection Motivation Theory (PMT)-based video intervention for patients with ankle sprains, have demonstrated an ability to significantly enhance specific patient beliefs regarding injury severity, vulnerability, and treatment efficacy (Bassett & Prapavessis, 2011). "Back school" programs also explicitly incorporate education on preventing and treating LBP, including the rationale for exercises and postural advice (Bigorda-Sague, 2012). Patient knowledge involves understanding the 'why'—the rationale for the HBEP, the

benefits of specific exercises, and the potential consequences of non-adherence or the condition itself—which can be as crucial as understanding the 'what' and 'how' of the exercises.

Beyond understanding the rationale, patients must have a clear and accurate comprehension of the practical aspects of their HBEP, including correct exercise technique, prescribed dosage (frequency, duration, intensity, sets, repetitions), and safety precautions (MedBridge, 2022). A reported barrier to HBEP adherence is a "lack of understanding the correct prescription" (Hawamdeh *et al*., 2024). Physiotherapists employ various methods to impart this procedural knowledge, such as in-person demonstrations with supervised practice (Azevedo *et al*., 2018). This is often supplemented with written instructions and diagrams (Bachmann *et al*., 2018) and sometimes real-time feedback systems like augmented feedback (AF) systems (Hügli *et al*., 2014). The mode of instruction is significant, as relying solely on verbal instruction can be insufficient. Visual aids and interactive feedback can substantially enhance understanding and correct execution (Hügli *et al*., 2014). Poor comprehension can lead to ineffectiveness, symptom exacerbation, injury, frustration, and ultimately, undermined adherence.

The extent to which patients acquire and retain knowledge about their HBEP is influenced by patient-specific factors, educational methods, and physiotherapist communication. Patient-related factors include health literacy (Alghurabi *et al*., 2024; Hoffman, 2023), cognitive abilities, language barriers, and prior educational background and experiences. Educational methods and materials are crucial; they should be clear, simple, use plain language (MedBridge, 2022), and ideally employ a multi-modal approach (Bachmann *et al*., 2018) with accessible information. The physiotherapist's communication skills are paramount, including the ability to explain complex concepts simply, check for understanding (e.g., using "teach-back"), build rapport, and tailor information to individual needs (Lonsdale *et al*., 2017). The CONNECT trial highlighted

the impact of enhanced communication skills on patient adherence (Lonsdale *et al*., 2017). Effective knowledge transfer is an active, interactive exchange, and mismatches can lead to knowledge gaps, hindering self-management.

2.4 Patients' Attitudes Towards Home-Based Exercise Programs

Patients' attitudes towards their Home-Based Exercise Programs (HBEPs) are crucial for their engagement and adherence. These attitudes include a combination of beliefs, perceptions, emotional responses, and motivational states shaped by individual characteristics, experiences with their condition and treatment, and interactions with healthcare providers. Individuals approach HBEPs with pre-existing and developing beliefs about the necessity, effectiveness, and potential risks or benefits of the prescribed exercises (Bassett & Prapavessis, 2011; Al-Momani *et al*., 2014). These beliefs significantly influence their attitude; for example, a belief that exercise will worsen pain or that their condition is unlikely to improve can lead to a negative attitude, while a strong belief in the exercises' efficacy can foster a positive one. A study by Bassett and Prapavessis (2011) showed that specific beliefs, such as perceived injury severity, vulnerability, and the response efficacy of physiotherapy, could be positively changed through targeted educational interventions. Patients' perceptions of the HBEP itself—including its difficulty, time commitment, convenience, enjoyment level, and relevance to personal recovery goals—also significantly shape their attitudes (Jack *et al*., 2010). For instance, the "back school" program evaluated by Bigorda-Sague (2012) was generally seen as useful by participants, likely contributing to their positive overall attitude. Furthermore, patient expectations regarding HBEP outcomes (e.g., pain relief, functional improvement), program duration, and required effort play a vital role (Geraghty *et al*., 2018; Romero-Franco *et al*., 2023). Geraghty *et al*. (2018) used the

Credibility and Expectancy Questionnaire (CEQ) to assess patients' belief in the treatment's logic and their expected improvement from the 'SupportBack' internet intervention for Low Back Pain (LBP), finding that higher credibility and expectancy correlated with better clinical outcomes.

Motivation and self-efficacy are central psychological constructs that profoundly influence a patient's attitude towards and engagement with HBEPs. Motivation, the driving force behind actions, can be intrinsic, arising from internal factors like enjoyment or alignment with personal values (e.g., desire for health), which is generally linked to more sustained engagement (Romero-Franco *et al*., 2023). Extrinsic motivation, driven by external factors like pleasing a therapist or achieving rewards, can be useful initially but may be less effective for long-term adherence if not internalized (Salazar *et al*., 2023). The type and strength of motivation greatly impact a patient's willingness to start and continue an HBEP. Self-efficacy, an individual's belief in their capability to successfully perform a specific task to achieve a desired outcome, is a consistently identified robust predictor of HBEP initiation, effort, persistence, and overall adherence rates (Yalew *et al*., 2022). For example, Geraghty *et al*. (2018) found that exercise self-efficacy correlated with the number of weeks patients engaged in back-related exercise. Conversely, Bassett and Prapavessis (2011) found their educational intervention did not significantly enhance self-efficacy or improve adherence, highlighting self-efficacy's critical role. Locus of control, the degree to which individuals believe they control life outcomes, also influences engagement; those with an internal locus of control are more likely to adhere to their HBEP, while those with an external locus may show lower engagement (Physiopedia, 2023). While general motivation is important, task-specific self-efficacy for the HBEP appears to be a more direct and powerful driver of adherence than general motivation or knowledge alone. Even a highly motivated patient might doubt their ability to perform prescribed exercises, especially if

they are complex or perceived as painful. The finding from Bassett and Prapavessis (2011), where education improved knowledge-based beliefs but not self-efficacy or adherence, strongly suggests self-efficacy is a crucial mediating variable that needs direct targeting through interventions that build mastery experiences, offer verbal persuasion, provide vicarious learning, and help manage physiological responses. Patient satisfaction with HBEPs and the physiotherapy support received is an important attitudinal outcome reflecting their overall experience (Bigorda-Sague, 2012). This multifaceted construct is influenced by clinical improvement, the perceived quality of the HBEP (e.g., clarity, relevance, ease of integration), and the therapeutic relationship. Bigorda-Sague (2012) reported high satisfaction with a "back school" program for LBP, with 39% "very satisfied" and 48% "quite satisfied," and 93% finding the treatment useful. McDonough *et al*. (2013), in a trial of a pedometer-driven walking program for chronic LBP, found over 75% of participants in both the experimental and education/advice-only groups were at least "somewhat satisfied" with overall care at 6 months, though satisfaction levels varied on some treatment aspects, suggesting intervention type can influence different facets of satisfaction. Hurley *et al*. (2015) also included patient satisfaction as a secondary outcome in their trial, indicating its recognized importance. Factors contributing to satisfaction include perceived usefulness and effectiveness (Bachmann *et al*., 2018), clarity of information (Bachmann *et al*., 2018), achievement of personal goals (Geraghty *et al*., 2018), and the quality of therapist interaction and support (Bachmann *et al*., 2018). Patient satisfaction is a holistic measure; low satisfaction, as hinted for certain aspects in the McDonough *et al*. (2013) study, can signal challenges with long-term engagement. Dissatisfaction with an HBEP—due to complexity, boredom, irrelevance, or inadequate support—will likely lead to a negative attitude, reduced motivation, and poorer adherence, irrespective of initial knowledge or early clinical gains.

Detailed satisfaction measures provide valuable insights for improving HBEP design and delivery (McDonough *et al*., 2013).

The attitudes patients hold towards their HBEPs often correlate with adherence. Positive attitudes, such as high self-efficacy (a strong belief in one's ability to successfully complete the exercises), intrinsic motivation (finding the exercises inherently rewarding or enjoyable), positive outcome expectancies (believing the exercises will lead to desired results), satisfaction with the program and the therapist, and a perception of the HBEP's value and relevance, are consistently associated with greater adherence (Al-Momani et al., 2014; Beinart et al., 2018; Peek et al., 2023). A study by Geraghty et al. (2018) found that higher exercise self-efficacy was correlated with more weeks of engagement in back-related exercises. Similarly, Bassett and Prapavessis (2011), while not finding a direct effect of their intervention on adherence, did note that intentions (an attitudinal construct) correlated with adherence, and PMT-based beliefs correlated with intentions. This suggests a pathway where beliefs shape intentions, which in turn influence behavior. Conversely, negative attitudes are strong predictors of poor adherence (Beinart et al., 2018). These can include: low self-efficacy (doubting one's ability to perform the exercises correctly or manage pain); amotivation or lack of motivation (not seeing the point of the exercises or lacking the drive to do them); negative beliefs about the HBEP (believing the exercises are ineffective, harmful, too difficult, or irrelevant); perception of insurmountable barriers (feeling that obstacles like pain, lack of time, or lack of resources are too great to overcome); and dissatisfaction (being unhappy with the exercises themselves, the lack of progress, or the support received from the physiotherapist) (Beinart et al., 2018). It is important to recognize that attitudes are not static; they are dynamic and can be shaped by ongoing experiences with the HBEP, the perceived outcomes, and interactions with the physiotherapist. A

patient might begin an HBEP with high motivation (a positive initial attitude), but if they consistently find the exercises too painful, see no improvement, or feel unsupported by their therapist, their attitude can shift negatively, leading to a decline in adherence. This underscores the necessity for physiotherapists to continuously assess and address patient attitudes throughout the rehabilitation journey, not just as a one-time effort during the initial prescription phase. Strategies that actively work to build confidence (self-efficacy), enhance intrinsic motivation, address and reframe negative beliefs, and ensure a positive and supportive therapeutic experience are crucial for fostering and maintaining attitudes that are conducive to sustained HBEP adherence. The particularly strong and consistent link found in the literature between self-efficacy and adherence suggests that interventions specifically targeting this belief are likely to be especially fruitful in improving engagement with HBEPs (Geraghty et al., 2018; Al-Momani et al., 2014; Peek et al., 2023).

2.5 Patients' Adherence to Home-Based Exercise Programs

Adherence is broadly defined by the World Health Organization (WHO) as "the extent to which a person's behaviour – taking medication, following a diet, and/or executing lifestyle changes, corresponds with agreed recommendations from a health care provider" (Beinart *et al*., 2018). In the specific context of HBEPs in physiotherapy, this definition translates to the degree to which a patient performs the prescribed exercises according to the agreed-upon parameters. These parameters include the correct execution of the exercises prescribed using the right techniques, frequency and duration of time. It is useful to distinguish "adherence" from "compliance." Compliance often implies a more passive act of yielding to a healthcare provider's instructions, whereas adherence suggests an active, voluntary, and collaborative involvement of the patient in

a mutually agreed-upon treatment plan (Mudzi *et al*., 2016). In contemporary patient-centered care, the goal is to foster adherence, reflecting a partnership between the patient and the physiotherapist.

Reported adherence rates to HBEPs in physiotherapy vary considerably across studies, reflecting differences in patient populations, types of HBEPs, intervention durations, methods of measuring adherence, and the definitions of adherence used. However, a general theme in the literature is that adherence is often suboptimal. Estimates of non-adherence to HBEPs in general musculoskeletal conditions or specifically for LBP can be as high as 30-50%, with some reports suggesting non-adherence or partial adherence affects up to 50-70% of patients (Beinart *et al*., 2018). Azevedo *et al*. (2018) found that in patients with chronic LBP, the overall treatment adherence (combining home program and clinic attendance) was 67.0% for a symptom-guided stretching and strengthening group and 49.3% for a Movement System Impairment (MSI) model group. The MSI group, which involved more specific and potentially complex exercises and postural modifications, had lower adherence to the home program component.

Bigorda-Sague (2012) reported that following a "back school" program for non-specific LBP, 65% of participants performed their home exercises at least once a week at a 3-month follow-up, while 22% reported never performing them. Geraghty *et al*. (2018), in a feasibility trial of the 'SupportBack' internet intervention for LBP, found that adherence, measured by session completion, varied. For example, completion of the first session was 54% in the stand-alone internet group versus 70% in the group receiving additional physiotherapist telephone support, suggesting support can enhance initial engagement. Hügli *et al*. (2014) compared conventional physiotherapy exercises with an augmented feedback (AF) system for patients with NSLBP and MCI. They found no significant difference in the median daily duration of home exercise (AF

group: 9 minutes 4 seconds; PT group: 4 minutes 19 seconds), though the AF group showed a tendency for longer durations. McDonough *et al*. (2013) found high adherence to a pedometer-driven walking program for chronic LBP, with 93% of participants walking for at least 6 of the 8 weeks and 70% adherence to weekly step targets. Nava-Bringas *et al*. (2016) reported high adherence rates of 82-84% (percentage of prescribed exercise days completed) over a 6-month period for a lumbar stabilization exercise program in patients with chronic LBP, monitored via a therapy diary. Patterns of adherence can also vary. Some research indicates that adherence may decline over time, particularly for long-term programs or after direct supervision ends. The initial enthusiasm or motivation may wane as the novelty wears off, if perceived benefits are not quickly realized, or if life circumstances create new barriers Geraghty *et al*. (2018).

2.5.1 Factors Influencing Adherence to HBEPs

Adherence to Home-Based Exercise Programs (HBEPs) is a complex behavior influenced by various interacting factors.These determinants can be broadly categorized into patient-related, condition-related, treatment-related (including HBEP characteristics and therapist factors), and socio-economic/environmental factors (Peek *et al*., 2023).

Patient-related factors are characteristics inherent to the individual. While some studies suggest associations between adherence and demographic factors like age, gender, and education level, findings are often mixed (Yalew *et al*., 2022; Peek *et al*., 2023). Nava-Bringas *et al*. (2016) found no significant link between adherence and demographic variables in their study on LBP patients. Psychological factors, however, are consistently shown to be powerful determinants. Self-efficacy, a patient's belief in their ability to perform the HBEP, is a strong positive predictor of adherence with Geraghty *et al*. (2018) finding that exercise self-efficacy correlated with weeks

of exercise performed. Motivation, both intrinsic and extrinsic, plays a role, with intrinsic motivation generally linked to more sustained adherence (Salazar *et al*., 2023). Beliefs about the illness, the effectiveness of the treatment, and outcome expectations also significantly influence adherence (Romero-Franco *et al*., 2023). Bassett & Prapavessis (2011) showed that PMT-based education could alter specific beliefs, although this didn't directly translate to adherence in their study. High fear-avoidance beliefs can be a barrier, particularly in pain populations (Hurley *et al*., 2015), though Nava-Bringas *et al*. (2016) did not find a direct link between FABQ scores and adherence in their LBP cohort. Mood, including depression and anxiety, is often cited as a barrier to adherence (Peek *et al*., 2023), though again, Nava-Bringas *et al*. (2016) did not find a direct influence of HADS scores on adherence. Previous adherence or exercise history is also relevant, as patients with a history of adhering to exercise or other health behaviors are often more likely to adhere to HBEPs (Peek *et al*., 2023; Yalew *et al*., 2022). Finally, perceived behavioral control, similar to self-efficacy, which is the patient's perception of their ability to control their behavior, also influence adherence to HBEPs (Peek *et al*., 2023).

Condition-related factors pertain to the patient's health status. High levels of pain severity and certain types of pain can be a significant barrier to performing exercises (Jack *et al*., 2010). Pain was cited as a reason for non-adherence in the study by Nava-Bringas *et al*. (2016) and was an adverse event in the study by McDonough *et al*. (2013). The chronicity of the condition and the level of functional disability can influence adherence, though the direction of this influence can vary as some studies suggest higher disability may be linked to higher adherence, possibly due to greater perceived need (Yalew *et al*., 2022). The presence of comorbidities, or other health conditions, can also complicate HBEP performance and reduce adherence (Peek *et al*., 2023).

Treatment-related factors encompass characteristics of the HBEP itself and the physiotherapist-patient interaction. Regarding HBEP characteristics, simpler programs with fewer exercises are often associated with better adherence (Al-Momani *et al*., 2014; Jack *et al*., 2010). If patients perceive the HBEP as beneficial or effective, they are more likely to continue (Bigorda-Sague, 2012). Exercises that are enjoyable or varied are more likely to be adhered to than those perceived as monotonous and gamification, such as with augmented feedback systems, may enhance enjoyment (Hügli *et al*., 2014; Salazar *et al*., 2023). Physiotherapist related factors also play a significant role. Regular supervision, feedback on performance, and encouragement from the physiotherapist are strong facilitators of adherence (de Oliveira *et al*., 2023). In a study by Azevedo *et al*. (2018) exercise charts were provided and HBEP performance was assessed, it was found that physiotherapist support in these ways enhanced adherence to an internet intervention. Clear, empathetic communication and a strong patient-therapist relationship are crucial for fostering trust, understanding, and motivation (Lonsdale *et al*., 2017). The use of technology, such as digital tools like internet programs, apps, and augmented feedback systems, can facilitate adherence if they are user-friendly, engaging, and provide useful feedback (Geraghty *et al*., 2018).

Socio-economic and environmental factors relate to the patient's broader life context. Social support from family, friends, or exercise groups is generally a facilitator of adherence (Yalew *et al*., 2022), although a systematic review found social support was not predictive (Peek *et al*., 2023). Time constraints due to work, family, or other commitments are one of the most frequently reported barriers to adherence (Al-Momani *et al*., 2014). Lack of access to necessary resources or equipment, or an unsuitable environment for exercise, can also hinder adherence (Medina-Mirapeix *et al*., 2009). Furthermore, socioeconomic status and education level can

influence health literacy, access to resources, and health priorities, thereby affecting adherence (Yalew *et al*., 2022; Peek *et al*., 2023).

2.6 Outcome Measures for Assessing Patients' Knowledge, Attitudes, and Adherence to Home-Based Exercise Programs

2.6.1 Outcome Measures for Assessing Patients' Knowledge of HBEPs

- **Beliefs about Ankle Sprains and Physiotherapy Scale:** Questionnaires that measure beliefs about a condition or treatment can indirectly reflect aspects of patient knowledge. For example, Bassett and Prapavessis (2011) used the "Beliefs about Ankle Sprains and Physiotherapy Scale" to measure constructs from Protection Motivation Theory (PMT), such as perceived severity, vulnerability, and response efficacy, which are influenced by knowledge and information provided. This 15-item questionnaire is grounded in the Protection Motivation Theory (PMT), evaluating four key constructs: severity of the injury, vulnerability to re-injury, efficacy of physiotherapy treatment, and self-efficacy in managing rehabilitation. The reported Cronbach's alpha coefficients for the subscales of the BASPS were: Severity (5 items): α=0.64, Vulnerability (4 items): α=0.71, Response Efficacy (2 items): α=0.66, Self-Efficacy (4 items): α=0.75.
- **Qualitative Methods:** Patient interviews or focus groups can provide rich insights into their understanding, though these are more common for exploratory research than for quantitative outcome assessment in large trials (Essery *et al*., 2016). It is a common limitation that patient knowledge, particularly regarding the rationale and correct

execution of HBEPs, is often assumed based on the provision of education rather than being directly and systematically measured as an outcome (Essery *et al*., 2016).

2.6.2 Outcome Measures for Measuring Patients' Attitudes towards HBEPs

- **Exercise Self-Efficacy Scale (ESE):** The ESE measures an individual's confidence in their ability to continue exercising in the face of various perceived barriers (Neupert *et al*., 2009). It is often adapted to specific exercise contexts. Geraghty *et al*. (2018) utilized this scale in their study. The ESE has demonstrated good internal consistency (Cronbach's alpha ranging from 0.81 to 0.93) and test-retest reliability (Intraclass Correlation Coefficient [ICC] = 0.81) in populations with Spinal Cord Injury (SCI) (Kroll *et al*., 2007). Its validity and reliability have been supported in various contexts, though specific properties can vary based on the version and population (Resnick & Jenkins, 2000).
- **Physical Activity Self-Efficacy Scale (PASES):** The PASES assesses an individual's confidence in their ability to participate in progressively more challenging physical activities. It typically includes items rated on a Likert scale, reflecting confidence levels for activities of increasing intensity or duration (Stevens *et al*., 2013). Studies by McDonough *et al*. (2013) and Hurley *et al*. (2015) employed this scale. The PASES has shown good internal consistency (Cronbach's alpha typically > 0.90) and construct validity in diverse populations, including older adults and those with chronic conditions (Stevens *et al*., 2013; Chen *et al*., 2017). For instance, Chen *et al*. (2017) reported good internal consistency (Cronbach's $\alpha = .96$) and test-retest reliability (ICC = .86) in patients with chronic heart failure.

- **Fear Avoidance Beliefs Questionnaire (FABQ):** The FABQ is designed to quantify fear-avoidance beliefs related to physical activity and work. It has two subscales: FABQ-Physical Activity (FABQ-PA) and FABQ-Work (FABQ-W). Patients rate their agreement with statements about how physical activity and work affect their pain (Waddell *et al*., 1993). It was used in studies by Geraghty *et al*. (2018), Hurley *et al*. (2015), and Nava-Bringas *et al*. (2016). The FABQ has established validity and reliability for assessing pain-related fear and avoidance beliefs, particularly in individuals with low back pain (LBP) (Waddell *et al*., 1993; George *et al*., 2008). It has demonstrated good internal consistency (Cronbach's α for FABQ-PA: 0.77-0.88; FABQ-W: 0.83-0.92) and test-retest reliability (ICC for FABQ-PA: 0.73-0.95; FABQ-W: 0.82-0.98) (Cleland *et al*., 2008; George *et al*., 2008).
- **Back Beliefs Questionnaire (BBQ):** The BBQ assesses an individual's beliefs about the consequences of back pain, focusing on attitudes and expectations regarding recovery and the nature of back trouble (Symonds *et al*., 1995). It consists of 14 statements, and respondents indicate their agreement on a 5-point Likert scale. Hurley *et al*. (2015) and McDonough *et al*. (2013) utilized this instrument. The BBQ has shown acceptable internal consistency (Cronbach's α typically around 0.70) and test-retest reliability (ICC = 0.87) in LBP populations (Symonds *et al*., 1995; Grant *et al*., 2010). It has been validated for measuring beliefs about back pain across various patient groups.

2.6.3 Outcome Measures for Assessing Patients Adherence to HBEPs

- **Exercise Diaries/Logs**: Patients prospectively record details of their exercise performance, such as the date, specific exercises performed, number of repetitions and

sets, duration, and often pain levels or difficulties encountered during or after the exercise session (Bennell *et al*., 2018). This method has been widely used across various studies (Azevedo *et al*., 2018; Bigorda-Sague, 2012; Hügli *et al*., 2014; Hurley *et al*., 2015; McDonough *et al*., 2013; Nava-Bringas *et al*., 2016). Exercise diaries are highly susceptible to recall bias if not completed contemporaneously, social desirability bias (patients may report what they believe the therapist wants to see), and a general tendency for overestimation of adherence (Beinart *et al*., 2013; Bennell *et al*., 2018). Bennell *et al*. (2018) questioned the validity of exercise diaries, suggesting they often show only moderate correlation with objective measures and may have questionable reliability.

- **Sluijs Adherence Scale**: This scale, developed by Sluijs *et al*. (1993), typically evaluates the frequency and duration of home exercise completion over a specified period, often the past week. Nava-Bringas *et al*. (2016) utilized this scale. While used in research, self-report adherence scales, including the Sluijs scale, are subject to similar limitations as diaries, such as overestimation and recall bias (Kolt & McEvoy, 2003). Bennell *et al*. (2018) suggest that simple self-report scales may have questionable validity and, for some, less than acceptable reliability. Sluijs *et al*. (1993) originally reported moderate reliability for their adherence scales.
- **Sport Injury Rehabilitation Adherence Scale (SIRAS):** The SIRAS is primarily designed for therapists to rate a patient's adherence to in-clinic rehabilitation based on observations of patient participation, attentiveness, and adherence to instructions during supervised sessions (Brewer *et al*., 2000). Hügli *et al*. (2014) mentioned its use. The SIRAS has demonstrated good internal consistency (Cronbach's $\alpha > .80$) and inter-rater reliability when used by therapists for in-clinic adherence (Brewer *et al*., 2000; Kolt *et al*.,

2007). Its validity for self-reported home adherence is not its primary design or validation focus and may be influenced by observation bias (Hawthorne effect) when patients are aware their adherence is being assessed (Kolt *et al*., 2007).

- **Self-Reported Physical Activity Levels**: General physical activity questionnaires, such as the International Physical Activity Questionnaire (IPAQ), are sometimes used as proxies or supplementary measures for HBEP adherence, assessing overall activity levels which might reflect engagement with prescribed exercises (Geraghty *et al*., 2018; Hurley *et al*., 2015; McDonough *et al*., 2013). The IPAQ (short form used by Geraghty *et al*., 2018) has acceptable validity and reliability for assessing population levels of physical activity, particularly for vigorous and moderate activities (Craig *et al*., 2003). However, like other self-report measures, it is prone to overestimation of activity levels, especially for duration and intensity (Lee *et al*., 2011). Geraghty *et al*. (2018) noted significant issues with overestimation using the IPAQ-SF in their study.

2.7 Empirical Review of Literature

Table 1.

Adeniyi, A. F., & Zandam, H. U. (2012). Association between demographic characteristics and compliance of stroke patients to prescribed unsupervised home exercise programmes. Nigerian Journal of Medical Rehabilitation, 14(1 & 2), 20-24.	Nigeria (Kano, Outpatient Physiotherapy Clinics of Aminu Kano Teaching Hospital and Murtala Mohammed Specialist Hospital)	To investigate whether stroke patients recuperating at home complied with prescribed Unsupervised Home Exercise Programme (UHEP) and what demographic characteristics were associated with non-compliance.	This was a cross-sectional survey. 108 consenting stroke patients undergoing outpatient rehabilitation were administered questionnaires assessing full compliance with UHEP and demographic characteristics (age, gender, marital status, type of marriage, living situation, duration of stroke, education,	Seventy-four percent (74.1% or 80 participants) were non-compliant with their UHEP. Significant predictors of non-compliance included: duration of stroke over one year (Odds Ratio [OR] = 2.134, 95% CI=1.823-3.315), polygamy (OR=3.148, 95% CI=2.661-5.012), occupying a rented apartment (OR=10.807, 95% CI=2.037-28.319), and living with non-family members (OR=4.655,	Most stroke patients did not comply with their UHEP. Socio-demographic factors like longer stroke duration, polygamy, rented housing, and living with non-family members were key risk factors. Conversely, rural residence, employment, and valuing the UHEP predicted better compliance. Clinicians should consider these risk factors when planning UHEP to enhance compliance,

			employment, income, building type, residential ownership, settlement, opinion about UHEP). Binary logistic regression was used to identify predictors of non-compliance.	95% CI=1.324-11.765). Non-compliance was less likely if living in a rural community (OR=0.431), employed (OR=0.563), or viewed UHEP as important (OR=0.727). Gender, age group, marital status (general), education, monthly income, and building type were not significant predictors (P>0.05).	possibly through education and tailored support.
Bigorda-Sague, A. (2012). Estudio sobre la eficacia de la escuela de espalda en la lumbalgia inespecífica. (Study of the effectiveness of back school in non-specific low back pain).	Lleida, Spain (Hospital Santa María, Rehabilitation Service).	To assess the effectiveness of a back school program in treating non-specific low back pain, which included	This was a prospective pre-post test study. 115 patients with non-specific low back pain were included through consecutive sampling. The	The back school program significantly reduced pain and functional disability. Satisfaction was high. Regarding adherence at 3 months: Two-thirds of participants	The back school program proved effective in treating non-specific low back pain, with positive results in pain reduction, functional improvement, and

		evaluating patient adherence to the recommendations (exercises and postural hygiene) at 3 months post-treatment.	intervention consisted of ten one-hour group sessions (8 patients per group) which included instruction on recommendations to prevent and treat low back pain, along with a tailored exercise therapy program. Pain, functional disability, satisfaction, and adherence to recommendations were assessed at the beginning, at the end of treatment, and 3 months later (adherence via telephone survey).	performed the exercises at home at least once a week (26% once/day, 23% 2-3 times/week, 16% once/week). 86% of users "always" or "very often" applied postural hygiene recommendations (55% "always", 31% "almost always"). 22% reported never doing the exercises at 3 months.	patient satisfaction. Adherence to exercises at home was variable, with about a quarter performing them daily but nearly a quarter never doing them at 3 months. Adherence to postural hygiene recommendations was reported as high by the majority of participants. The study supports back school as an effective treatment, though long-term exercise adherence could be a challenge for some.
L'Heureux, J., Coutu, M. F.,	Canada	To explore	This was an	Mean adherence ratio	Adherence to home

Berbiche, D., & Larivière, C. (2020). Adherence to a home exercise programme following a clinical programme for non-acute non-specific low back pain: an exploratory study. European Journal of Physiotherapy, 22(5), 299-308.		adherence to a home exercise program after a clinical program for non-acute Non-Specific Low Back Pain.	observational study (prospective cohort). 64 participants were included. Adherence was measured using a self-report questionnaire (adherence ratio: reported/recommended frequency) at 8 weeks & 6 months.	was high immediately post-program (0.84 at 8 weeks) but decreased significantly by 6 months (0.51).	exercise programs is initially high following clinical supervision but declines significantly over time, highlighting the need for strategies to maintain long-term adherence.
Mahmood, A., Nayak, P., Kok, G., English, C., Manikandan, N., & Solomon, J. M. (2019). Factors influencing adherence to home-based exercises among community-dwelling stroke survivors in India: a qualitative study. European Journal of Physiotherapy. DOI: 10.1080/21679169.2019.163	India (semi-urban regions)	To explore the factors influencing adherence to home-based exercises among community-dwelling stroke survivors using the Intervention	Qualitative in-depth interviews were conducted with ten stroke survivors living in semi-urban regions of India. The data were analysed using Atlas.Ti8 software and categorised using the Social Ecological Model.	The mean age of participants was 61 ± 11 years. Key factors such as lack of awareness about stroke recovery and exercises, poor perceived recovery, hopelessness, and lack of emphasis on exercises by healthcare professionals led to	Adherence to home-based exercises for stroke survivors in India is influenced by a multi-dimensional array of factors across individual, interpersonal, organisational, and community levels. Lack of knowledge, cultural beliefs (e.g.,

5641		Mapping (IM) approach.	Interviews were semi-structured, face-to-face, conducted at participants' residences in the local language, and focused on perceived barriers, facilitators, and contextual variables.	non-adherence. Commitment, continued supervision, supportive family, and society facilitated adherence. Cultural-specific factors like opting for folk medicine over rehabilitation and social stigma were also identified.	folk medicine), and lack of healthcare professional emphasis were key barriers, while family support and supervision were facilitators. Interventions should target these multi-level factors and incorporate a socio-ecological model, particularly in Low and Middle-Income Countries (LMICs).
Odetunde, M. O., Olaoye, O. A., Obajobi, O. A., Yusuf, A. A., & Awotidebe, T. O. (2024). Adherence to home-based exercise programs among stroke survivors and perspectives of informal caregivers: a mixed method study. Bulletin of Faculty of	Nigeria (Southwestern, out-patient physiotherapy clinics of one secondary and two tertiary health institutions)	To assess factors affecting Stroke Survivors' (SSVs) adherence to Home Exercise Programs	This was a mixed-method design. Quantitative: 66 SSVs (not having aphasia or cognitive impairment [SPMSQ score >2]) were assessed using a validated self-	The majority of SSVs, 43 (65.2%), were non-adherent to HEPs. Among the 23 adherent SSVs, most were males (82.6%), aged 40-59 years (60.7%), had right hemiparesis (65.2%),	Adherence to HEPs among Nigerian SSVs of Yoruba ethnicity is poor and associated with SSV's gender, smoking status, BI score, and attitude towards prescribed exercise. Caregiver

Physical Therapy, 29(57).		(HEPs) and caregivers' perspectives, with consideration of cultural beliefs about stroke.	report adherence scale (1-item, 5-point scale; adherence cut-off 70%), a 12-item validated questionnaire on factors influencing HEP adherence, and the Barthel Index (BI) for functional independence. Qualitative: Eight informal caregivers of SSVs (with BI scores 0–80, caregiving for ≥6 months) participated in semi-structured in-depth interviews (IDIs) about enablers and barriers to HEP adherence.	one co-morbidity (78.3%), BI score ≥80 (91.3%), and were self-employed (56.5%). Gender, smoking status, and BI scores were significantly associated with SSV adherence level ($P<0.05$). Significant negative correlations (r ranged from -0.65 to -0.21; $P<0.05$) existed between adherence level and factors like tiredness, exercise difficulty, and pain. Caregivers identified enablers: knowledge, treatment consistency, HEP simplification/progression,	perspectives identified enablers (knowledge, treatment consistency, HEP simplification/progression, motivation, support, spirituality) and barriers (SSV's health status, lack of morale, support, caregiver's burden). Adherence is influenced by various factors including spiritual and traditional beliefs.

			Quantitative data were analyzed using descriptive/inferential statistics ($P<0.05$); qualitative data thematically.	motivation/support, and spirituality. Barriers identified by caregivers were: caregiver burden, absence of support/care, and health status of the SSV.	
Ogwumike, O. O., Badaru, U. M., & Adeniyi, A. F. (2014). Factors influencing adherence to home-based exercise by stroke survivors in North Western Nigeria. International Journal of Therapies and Rehabilitation Research, 3(1), 1-10.	North Western Nigeria (Kano metropolisoutpatient physiotherapy clinics of three hospitals)	To investigate factors influencing adherence of stroke survivors to home-based exercise.	This was a cross-sectional survey. Fifty-two stroke survivors (mean age 55.3 ± 10.0 years) were recruited using purposive sampling. Participants were assessed for home-based exercise adherence (self-report scale, once weekly for eight weeks, cut-off for adherence <70%)	55.8% of stroke survivors were adherent to home-based exercise, while 44.2% were non-adherent. Neither gender nor level of education was significantly associated with adherence ($P>0.05$). Significant negative correlations ($p<0.05$) were observed between adherence scores and	Factors associated with non-adherence of stroke survivors to home-based exercise in this study include patient discomfort (tiredness, difficulty doing exercise, pain), dependency on the physiotherapist, and participants' personal barriers (little time to exercise, exercise not part of daily routine, forgetfulness). The

			and influencing factors (12-item scale adopted from Sluijs *et al*.) through questionnaires. Data were analyzed with descriptive statistics, Pearson's correlation, and Chi-square tests (significance at $p<0.05$).	tiredness, 'exercise difficulty', pain, 'insufficient time to exercise', 'need for physical assistance', 'exercise is not part of daily routine', forgetfulness, 'therapist decides recovery', and 'exercise is more important with therapist'.	higher the magnitude of these factors, the lower the home-based exercise adherence. These factors should be considered by clinicians during prescription of home-based exercise in stroke survivors.
Okezue, O. C., Nwafor, G. C., Ezeukwu, O. A., John, J. N., & Uchenwoke, C. I. (2019). Adherence to Home Exercise Programmes and its Associated Factors among Patients Receiving Physiotherapy. Clinical Health Promotion - Research and Best Practice for patients, staff and	Nigeria (Enugu metropolis, 3 prominent hospitals)	To investigate patients' adherence to Home Exercise Programmes (HEPs), determine its association with their personal characteristics,	A cross-sectional design was used to recruit 139 consenting patients (aged 16-75 years) receiving outpatient physiotherapy who completed self-report questionnaires. Adherence to HEPs	105 (75.5%) participants were non-adherent to HEPs, while 34 (24.5%) were adherent. HEP adherence had significant associations with age ($p<0.001$; highest in 16-35 years), sex ($p=0.001$; males more adherent),	Adherence to HEPs was poor. Older, female, and less/uneducated patients displayed a high tendency of non-adherence. Several factors (fatigue, forgetfulness, pain, negative perceptions of exercise, need for

community, 9(1), 7-14.		and identify factors influencing their engagement.	was assessed based on performance of prescribed frequency, intensity, time, and type (mean score ≥70% = adherent). Personal characteristics (age, sex, marital/educational status) and 12 influential factors (rated on a 4-point scale) were also assessed. Data were analysed via descriptive/inferential statistics (Chi-square, Binary Logistic Regression).	and educational status ($p=0.048$; higher for secondary school graduates). Significant negative relationships ($p<0.05$) were found between HEP adherence and: fatigue, forgetfulness, pain, deeming exercises as injurious, exercises perceived as less beneficial, and need for physical assistance. A significant positive relationship ($p=0.038$) was found with family/friend support (Odds Ratio = 4.75).	assistance) had substantial negative influences, while social support was linked to facilitating HEP adherence. The study emphasizes careful patient screening, education, and involving a support network.
Peek, K., Sanson-Fisher, R., Mackenzie, L., & Carey, M. (2015). Interventions to aid	Systematic Review of studies from various	To conduct a systematic review of the	A systematic review of randomised controlled trials	Twelve RCTs (all focusing on exercise as the self-management	Despite a number of studies demonstrating interventions to

patient adherence to physiotherapist prescribed self-management strategies: A systematic review. Physiotherapy. (Published online Oct 2015, print Mar 2016, 102(1), 1-10).	countries.	interventions used to aid patient adherence to all physiotherapist prescribed self-management strategies.	(RCTs) was conducted. Databases (CINAHL, EMBASE, MEDLINE, PUBMED, PSYCINFO, SPORTSDiscus, Cochrane Central Register of Controlled Trials, PEDro, Mednar) were searched from inception to November 2014. Studies included adult patient populations prescribed a self-management strategy by a physiotherapist. The main outcome was a	strategy) of fair to high quality were included. Twelve different interventions to aid patient adherence to exercise were recorded. Potential adherence aiding interventions identified included: an activity monitor and feedback system, written exercise instructions, a behavioural exercise program with booster sessions, and goal setting. No RCTs examining adherence aiding strategies to self-management strategies other than exercise were identified.	positively influence patient adherence to exercise, there is insufficient data to endorse their use in clinical practice due to the small number of studies for any one type of intervention. A significant gap exists in the literature regarding adherence strategies for non-exercise self-management interventions prescribed by physiotherapists. Research with improved methodological rigour is required.

			comparison of reported adherence rates for adherence-aiding interventions versus usual care. Methodological quality was assessed using the PEDro scale. Data were extracted using a standardised form and results summarised narratively, grouped using the Behaviour Change Technique Taxonomy.		
Van Koppen, B., Zandwijk, P., de Vries, J., van Mameren, H., & de Bie, R. (2020). Adherence to home-based exercises and/or activity advice in low back pain patients: a systematic	Systematic Review of studies from various countries.	This review aims to evaluate the rate of adhering to physical activity advice for patients	A systematic review was conducted searching 12 databases. Studies were eligible if assessing LBP patients' adherence	Adherence rates varied widely from 8% to 91% across the 28 studies. Bias was likely in three out of 18 randomised trials. Outcomes of the	Most patients adhered at least partially to recommendations, but because of heterogeneous outcomes and the use of self-reporting, the

review. European Journal of Physiotherapy, 23(5), 285-300.		over 18 who suffer from non-specific low back pain (LBP), based on literature from January 2000 to December 2019.	to non-supervised, home-based activity or exercise advice. 28 studies (16 RCTs, 11 observational, 1 non-randomised controlled trial) were included. Data extracted included study design, patient characteristics, activity advice, adherence measures, time points, outcome definition, and reported outcomes. Risk of bias was assessed using Cochrane Back Review Group criteria (RCTs) and NIH Quality Assessment Tool	Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies ranged from 5 to 11 positive scores out of 14. Variability in describing activity advice, use of different outcome types, and subjective measurement tools compromised outcome synthesis. The proportion of fully adhering patients was unclear. 26 of 28 studies used patient self-reporting.	adherence rate is unclear. The review shows a strong lack of uniformity in adherence research. A uniform way to measure adherence is needed, including precise activity advice, defined cut-offs for 'adherent'/'non-adherent', and use of objective movement monitors.

			(observational). A narrative synthesis was performed.		
Yalew, E. S., Melese, A. Z., Guadie, Y. G., & Gashaw, M. (2022). Adherence to Home-Based Exercise Program and Its Predictors Among Patients Treated in Physiotherapy Outpatient Department in Amhara Region Hospitals in Ethiopia: A Prospective Cross-Sectional Study. Patient Preference and Adherence, 16, 561–572.	Ethiopia (Amhara Region: comprehensive specialized hospitals of Gondar University, Felege Hiwot, and Tibebe Ghion)	To assess patient adherence to home-based exercise programs (HBEP) and identify the predictors that affect the adherence of patients to home-based exercise programs.	A prospective multi-institution cross-sectional study was conducted from April 1st to May 30th, 2021. 300 adult patients (response rate 95.84%) treated in physiotherapy outpatient departments with at least 1 week of follow-up were included. Data were collected through face-to-face interviews (socio-demographics, adherence-related behavioral	The proportion of adherence to HBEP was 35.3% (n=106). Independent predictors significantly associated with higher adherence were: age 18–35 years (Adjusted Odds Ratio [AOR] 3.13 vs. 56-80 years), being male (AOR 2.67 vs. female), primary school education level (AOR 4.34 vs. not able to read/write), being a housewife (AOR 4.89 vs. other occupations), remembering the home-based exercise program (AOR 2.62 vs. forgetfulness), and	Adherence to home exercise programs was relatively poor. Older age, being female, uneducated, employed (other than housewife), and patients with a busy work schedule have a higher likelihood of non-adherence. Forgetfulness and lack of patient interest were also negative predictors. Clear exercise prescription with a brief explanation by the physiotherapist is essential to improve adherence.

			characteristics, clinical characteristics, patient-practitioner relationship) and patient medical file reviews. Adherence to HBEP was self-reported using a four-point Likert scale (Always, Often, Rarely, Never), with scores ≥70% categorized as adherent. Binary logistic regression was used to identify predictors.	patient interest in exercise (AOR 3.08 vs. no interest).	

CHAPTER THREE

MATERIALS AND METHOD

3.1 Participants

The target population for this study comprises male and female adult patients aged 18 years and above who are attending the physiotherapy outpatient clinic at the University of Benin Teaching Hospital (UBTH), Benin City, Nigeria. These individuals were prescribed home-based exercise programs as part of their physiotherapy treatment regimen.

3.1.1 Inclusion Criteria

Participants eligible for inclusion in the study met the following criteria:

i. Adults aged 18 years and above.
ii. Patients who have been prescribed home exercise programs by a physiotherapist as part of their ongoing outpatient treatment.
iii. Individuals who are able and willing to provide informed consent.

3.1.2 Exclusion Criteria

Participants excluded from the study were:

i. Individuals with diagnosed cognitive impairments (such as dementia) or other neurocognitive disorders that may hinder reliable self-reporting or comprehension of questionnaire items.

ii. Individuals with communication disorders such as aphasia that significantly impair their ability to understand or respond to survey questions.

iii. Patients with acute medical or psychiatric conditions that could interfere with study participation or data validity.

3.2 Materials

3.2.1 Apparatus/Instruments

The following instruments were utilized for data collection:

i. Socio-Demographic Questionnaire

ii. Exercise Adherence Rating Scale

iii. Knowledge and Attitudes towards Home Exercise Questionnaire

3.2.2 Description of Instruments

i. **Socio-Demographic Questionnaire**

A structured proforma used to collect data on participants' socio-demographic characteristics, including age, gender, clinic visited, and frequency of physiotherapy visits.

ii. Exercise Adherence Rating Scale (EARS) – Short Version

The EARS is a validated instrument developed by Newman-Beinart *et al*. (2017) to assess adherence to prescribed home-based exercise programs. The short version consists of 6 items scored on a 5-point Likert scale (0 = completely agree to 4 = completely

disagree). Positively worded items are reverse-scored, and total scores range from 0 to 24, with higher scores indicating better adherence.

- **Validity and Reliability**: A cut-off score of 17.5 has been shown to effectively differentiate adherent from non-adherent individuals with high sensitivity (89%) and specificity (78%) (Adhikari et al., 2020). The EARS has demonstrated strong psychometric properties, including high internal consistency (Cronbach's alpha = 0.76–0.94) and excellent test-retest reliability (ICC ≈ 0.97) (Newman-Beinart et al., 2017).

iii. Knowledge and Attitudes toward Home Exercise Questionnaire

This self-developed 15-item questionnaire, adapted from prior studies (Webster *et al*., 2008; Igwesi-Chidobe *et al*., 2019; Mbada *et al*., 2019), is designed to assess participants' knowledge and attitudes regarding prescribed home exercise programs. The items include a mix of Likert-scale and multiple-choice responses. Its psychometric properties were tested as follows

- **Validation**: The instrument underwent face and content validation by a panel of experts using the Delphi technique.
- **Reliability**: Test-retest reliability was evaluated with a pilot sample of physiotherapy outpatients at UBTH.

3.3 Methods

3.3.1 Research Design

This study employs a cross-sectional analytical design to assess the knowledge, attitudes, and adherence to home-based physiotherapy exercises among patients attending the physiotherapy outpatient clinic at the University of Benin Teaching Hospital (UBTH).

3.3.2 Sampling Technique / Sample Size Calculation

A purposive sampling technique was used to recruit eligible participants who met the inclusion criteria.

The sample size was calculated using Taro Yamane's formula (Yamane, 1967), a widely used method for determining sample size from a finite population:

The formula:

$$n = \frac{N}{1+N(e)^2}$$

where:

n = sample size (?)

N = total population/or estimated population

e = level of significance (0.05)

1 = is the unit constant

The total population of patients who actively attend the Physiotherapy outpatient clinic in UBTH as obtained from the medical records department of the department of Physiotherapy on 18th June,2025, is 339.

$$n = \frac{N}{1+N(e)^2}$$

$$n = \frac{339}{1+339(0.05)^2}$$

n = 183.49

Therefore, the minimum sample size for this study was approximately 184 participants.

3.3.3 Procedure for Data Collection

Prior to data collection, administrative approval was obtained from the Head of the Department of Physiotherapy at UBTH. Eligible participants were identified and recruited on clinic days. The purpose and procedure of the study was clearly explained to each participant, and written informed consent was obtained before participation.

Participants were provided with a set of questionnaires that include:

- A socio-demographic data form
- The Exercise Adherence Rating Scale (EARS)
- The Knowledge and Attitudes toward Home Exercise Questionnaire

EARS Administration and Scoring

Participants responded to six adherence-related items on a 5-point Likert scale ranging from 0 (Completely Agree) to 4 (Completely Disagree). Positively worded items were reverse-scored. The total adherence score was calculated by summing the item scores, yielding a possible range of 0 to 24. Higher scores indicate greater adherence to prescribed home-based exercises.

Knowledge and Attitudes Questionnaire

This self-developed instrument uses a Likert scale format to assess participants' knowledge and attitudes regarding home exercise programs. Responses ranged from "Strongly Disagree" to

"Strongly Agree," and data was used to generate composite scores representing knowledge and attitude levels. Confidentiality and anonymity was strictly maintained throughout the data collection process.

3.3.4 Ethical Considerations

Ethical approval was obtained from the **Research and Ethics Committee of the University of Benin Teaching Hospital (UBTH), Benin City, Edo State, Nigeria.** Participation in the study was voluntary, and written informed consent was obtained from all participants. All information provided was treated with strict confidentiality and used solely for research purpose.

3.3.5 Data analysis

Data collected was coded and entered into Microsoft Excel, and subsequently analyzed using IBM SPSS Statistics version 27.

- **Descriptive statistics** (frequencies, percentages, means, and standard deviations) was used to summarize participants' socio-demographic characteristics, knowledge, attitudes, and exercise adherence.
- **Inferential statistics**: The Chi-square (χ^2) test was used to examine associations between participants' socio-demographic variables (e.g., age, gender, educational level, occupation, condition managed, and type of prescribed exercise) and their levels of knowledge, attitudes, and adherence to home-based exercise programs. A p-value < 0.05 was considered statistically significant.

CHAPTER FOUR

RESULTS

4.1 Preamble

The primary aim of this study was to assess the knowledge, attitude, and adherence to home exercise programs and to examine the sociodemographic and clinical factors influencing adherence among physiotherapy outpatients at the University of Benin Teaching Hospital (UBTH). A total of 184 participants were recruited for this study.

4.1.1 Descriptive characteristics of the respondents

Majority of respondents were female (95; 51.6%), 121 (65.8%) were married and 86 (46.7%) were self-employed. The mean age was 60.8 ± 21.3 years. This is presented in Table 4.1.

Table 4.1: Descriptive characteristics of the respondents

	Frequency	Percentage
Gender		
Male	89	48
Female	95	52
Marital Status		
Single	51	27.7
Married	121	65.8
Divorced	1	0,5
Widowed	11	6.0
Occupational status		
Government employed	43	23.4
Self-employed	86	46.7
Not employed	26	14.1
Retired	29	15.8
	Range	**Mean ± SD**
Age	18 – 96	60.8 ± 21.3

4.1.2 Home exercise patterns among the respondents

Majority, (82; 44.6%), of the respondents were managed for neurological conditions, such cerebrovascular accidents, bell's palsy, and idiopathic myopathy. 80 (43.5%) were being manged for musculoskeletal/joint disorders, such as low back pain, knee osteoarthritis, shoulder pain, and tennis elbow. The most common home exercise programs were strengthening reported by 138 (75.0%) of the respondents. Almost all the respondents received one-on-one teaching from the physiotherapist (179; 97.3%) and were expected to remember from demonstrations in the clinic (178; 96.7%). This is presented in Table 4.2.

Table 4.2: Home exercise pattern among the respondents

Conditions being managed by physiotherapy		
Musculoskeletal & Joint Disorders	80	43.48
Neurological Conditions	82	44.57
Fractures & Orthopaedic Post-Surgical States	5	2.72
Urological / Pelvic Floor Disorders	2	1.09
Respiratory Conditions	8	4.35
Lymphatic & Systemic Conditions	7	3.80
Type of Home exercise program (multiple choice)		
Balance exercises	52	28.3
Breathing exercises	9	4.9
Posture correction exercises	24	13.0
Strengthening exercises	138	75.0
Walking / Cardiovascular program	58	31.5
Compression and elevation of the leg	4	2.2
Kegel exercises	2	1.1
Stimulation	2	1.1
Stretching / Flexibility exercises	108	58.7
Not sure	3	1.6
Home exercise teaching methods		
In a one-on-one session with the physiotherapist	179	97.3
Self-taught	3	1.6
Both one-on-one and in a group	2	1.1
Home exercise		
Delivery of Home Exercise Instruction		

I was expected to remember from the demonstration in the clinic	178	96.7
Link to online videos	4	2.2
Printed handout with pictures/descriptions	3	1.6

4.1.3 Adherence to home exercise program among the respondents

Table 4.3. presents The adherence to home exercise score among the respondents ranged from 4 to 23 with an average value of 13.2 (± 4.3), indicating moderate level of adherence.

Table 4.3: Adherence to home exercise score among the respondents

	Range	**Mean ± SD**
Adherence score	4 – 23	13.2 ± 4.3

4.1.4 Knowledge and attitude towards home exercise among the respondents

The knowledge score ranged between 14 to 38, with a mean score of 26.9 (± 4.3). Similarly, the attitude score ranged from 17 to 35, with a mean of 26.8 (± 3.5). These scores indicate a moderate level of knowledge and awareness of home exercise among the respondents. This is presented in Table 4.4.

Table 4.4: Knowledge and attitude towards home exercise among the respondents

	Range	**Mean ± SD**
Knowledge	14 – 38	26.9 ± 4.3

Attitude	17 – 35	26.8 ± 3.5

4.1.5 Relationship between exercise adherence and knowledge and attitude towards home exercise

There was a significant positive correlation between adherence to home exercise programs and the knowledge ($r = 0.452$, $p < 0.001$) as well as attitude ($r = 0.216$, $p = 0.003$) towards home exercise among the respondents. This is presented in Table 4.5.

Table 4.5: Pearson correlation between exercise adherence and knowledge and attitude towards home exercise

	r	**p-value**
Knowledge * Adherence	0.452	<0.001
Attitude * Adherence	0.216	0.003

4.1.6 Relationship between selected variables and exercise adherence

Table 4.6. presents There was no significant difference in exercise adherence score between genders ($t = -0.831$, $p = 0.407$), occupational status ($F = 0.2376$, $p = 0.072$), marital status ($F = 1.896$, $p = 0.132$) or the health condition the respondents were diagnosed with ($F = 1.523$, $p = 0.185$). However, age had a significant negative correlation with home exercise adherence ($r = -0.189$, $p = 0.01$).

Table 4.6: Relationship between selected variables and exercise adherence

	Mean ± SD	t/F	p-value
Gender[a]			
Male	12.94 ± 4.15	-0.831	0.407
Female	13.47 ± 4.47		
Occupational status[b]			
Government Employed	11.79 ± 4.51	2.376	0.072
Self-Employed	13.92 ± 4.35		
Unemployed	13.19 ± 3.49		
Retired	13.28 ± 4.228		
Marital status			
Single	13.76 ± 4.13	1.896	0.132
Married	12.98 ± 4.28		
Divorced	22.0		
Widowed	12.55 ± 5.09		
Diagnosed Health condition			
Fractures & Orthopaedic Post-Surgical States	17 ± 3.54	1.523	0.185
Musculoskeletal & Joint Disorders	13.37 ± 4.53		
Neurological conditions	12.39 ± 3.75		
Respiratory conditions	13 ± 5.35		
Urological / Pelvic Floor Disorders	16.5 ± 4.95		
Lymphatic & Systemic Conditions	14.14 ± 3.39		
	r	**p-value**	
Age	-0.189	0.01	

[a] Independent T test, [b] One way ANOVA

Hypothesis Testing

Hypothesis 1: There would be no significant relationship between knowledge level and adherence to home exercise programs among physiotherapy outpatients at UBTH.

Alpha level: 0.05

Test statistic: Pearson's moment correlation

Observed: $p < 0.05$

Since the observed p value was lesser than 0.05 Alpha level. The null hypothesis was therefore REJECTED.

Hypothesis 2: There would be no significant relationship between attitude and adherence to home exercise programs among physiotherapy outpatients at UBTH.

Alpha level: 0.05

Test statistic: Pearson's moment correlation

Observed: $p < 0.05$

Since the observed p value was lesser than 0.05 Alpha level. The null hypothesis was therefore REJECTED.

Hypothesis 3: There would be no significant relationship between age and adherence to home exercise programs among physiotherapy outpatients at UBTH.

Alpha level: 0.05

Test statistic: Pearson's moment correlation

Observed: $p < 0.05$

Since the observed p value was lesser than 0.05 Alpha level. The null hypothesis was therefore REJECTED.

Hypothesis 4: There would be no significant difference between gender and adherence to home exercise programs among physiotherapy outpatients at UBTH.

Alpha level: 0.05

Test statistic: Independent T test

Observed: $p > 0.05$

Since the observed p value was greater than 0.05 Alpha level. The null hypothesis was therefore NOT REJECTED.

Hypothesis 5: There would be no significant difference between occupational status and adherence to home exercise programs among physiotherapy outpatients at UBTH.

Alpha level: 0.05

Test statistic: One way ANOVA

Observed: $p > 0.05$

Since the observed p value was greater than 0.05 Alpha level. The null hypothesis was therefore NOT REJECTED.

Hypothesis 6: There would be no significant difference between marital status and adherence to home exercise programs among physiotherapy outpatients at UBTH.

Alpha level: 0.05

Test statistic: One way ANOVA

Observed: $p > 0.05$

Since the observed p value was greater than 0.05 Alpha level. The null hypothesis was therefore NOT REJECTED.

Hypothesis 7: There would be no significant difference between the diagnosed health condition and adherence to home exercise programs among physiotherapy outpatients at UBTH.

Alpha level: 0.05

Test statistic: One way ANOVA

Observed: $p > 0.05$

Since the observed p value was greater than 0.05 Alpha level. The null hypothesis was therefore NOT REJECTED.

CHAPTER FIVE

DISCUSSION CONCLUSION AND RECOMMENDATIONS

5.1 Discussion

The results of the present study showed that there were more females (51.6%) than males (48.4%) seeking physiotherapy outpatient services at UBTH. This suggests a higher prevalence of physiotherapy amenable conditions among female outpatients. This finding is comparable to the results of a study by Okezue et al. (2019) in Enugu, Nigeria, which also found a higher proportion of females among outpatients seeking physiotherapy. However, the present study's finding is contrary to the findings from a study by Yalew et al. (2022) in Ethiopia, who found a higher prevalence of male (56.7%) physiotherapy outpatients. The discrepancy may be due to cultural factors influencing health-seeking behaviors between the two regions.

The present study's findings showed a moderate level of adherence to home exercise programs among outpatients seeking physiotherapy services at UBTH. This suggests that while patients were engaging with their home exercises to some extent, there was considerable room for improvement. This level of adherence is not uncommon in physiotherapy settings in Nigeria. A study by Okezue et al. (2019) found that a significant majority of patients (75.5%) were non-adherent to their home exercise programs. The moderate adherence level found in the present study could be reflective of the numerous barriers patients face, such as forgetfulness, lack of time, and pain, which are consistently cited in the literature as major obstacles to carrying out prescribed exercises at home (Okezue et al., 2019; Ayob et al., 2022).

The present study found moderate levels for both knowledge and attitude. This indicates that outpatients seeking physiotherapy services at UBTH generally had a fair understanding of their exercises and a neutral disposition towards them. The strong positive correlation found between both knowledge and attitude with adherence underscores the influence of these factors on adherence. This aligns with findings from Saner et al. (2018), who noted that patients' understanding of why and how to perform exercises supports long-term adherence. A systematic review by Essery et al. (2016) concluded that while knowledge and attitude are important, self-efficacy (a patient's belief in their ability to perform the exercises) is often a stronger and more direct predictor of adherence.

The finding that age had a significant negative correlation with home exercise adherence (suggests that as age increases, adherence to home exercise programs tends to decrease among physiotherapy outpatients at UBTH. This is in agreement with a study by Okezue et al. (2019), which reported that adherence to home exercise programs was highest in the youngest age group (16-35 years) and lowest in the oldest age group (56-75 years). This may be because older adults are more likely to experience comorbidities, pain, and fatigue, which can act as barriers to exercise. The reason for this similarity may be that the challenges associated with aging and adherence to exercise are common across different populations in Nigeria.

The results of the present study showed that there was no significant difference in exercise adherence score based on occupational status or marital status . This implies that a person's job or whether they are single, married, divorced, or widowed does not significantly influence their likelihood of adhering to a home exercise program. This is consistent with findings from a study in Ethiopia by Yalew et al. (2022), which also found no significant association between marital

status and adherence. However, Yalew et al. (2022) did find a significant association between occupation and adherence, which contrasts with the current study's findings. The difference in findings regarding occupational status may be due to socioeconomic differences between the study populations. It is possible that in the context of Benin City, the demands of various occupations do not present as significant a barrier to exercise as they might in the Amhara region of Ethiopia.

The finding that there was a significant positive correlation between adherence to home exercise programs and both knowledge and attitude suggests that patients who have a better understanding of their condition and the benefits of exercise, and who hold a more positive view towards it, are more likely to adhere to their prescribed home exercise programs. This is corroborated by a systematic review by Essery et al. (2016), which identified self-efficacy (a concept closely related to knowledge and attitude) as a strong predictor of adherence to home-based physiotherapy. The reason for this is likely that a good understanding and a positive attitude can increase a patient's motivation and commitment to their rehabilitation.

The results showed that the majority of respondents were being managed for neurological conditions and musculoskeletal/joint disorders. This is consistent with the common conditions seen in physiotherapy outpatient clinics in Nigeria (Ogwumike et al., 2014). The finding that strengthening exercises were the most commonly prescribed home exercise (75.0%) is also in tandem with typical physiotherapy practice, as strengthening is a key component of rehabilitation for a wide range of conditions (Piercy et al., 2018). The finding that almost all respondents (97.3%) received one-on-one teaching from their physiotherapist is in tandem with the literature

as individualized instruction is known to improve understanding and adherence to home-based exercises (Essery et al., 2016).

5.2 Conclusion

There was a moderate level of adherence to home exercise programs among outpatients seeking physiotherapy services at UBTH. Knowledge of home exercise programs was also moderate and attitudes towards these programs were neutral among these patients.

Adherence to home exercise programs is influenced by patients' knowledge and attitudes towards these programs. Patients who were more informed and had a positive disposition towards their exercises were more likely to comply. Adherence was also influenced by age. Adherence was found to decrease as patient age increased.

The moderate levels of knowledge and attitude, coupled with moderate adherence, suggest that while UBTH physiotherapists are effectively imparting necessary information, additional strategies focusing on building patient confidence and integrating exercises into daily routines may be necessary to elevate adherence from moderate to high.

5.3 Recommendations

Based on the findings of this study, the following recommendations are made for physiotherapy practice at the University of Benin Teaching Hospital:

i. Enhance Patient Education: Given the strong positive correlation between knowledge, attitude, and adherence, physiotherapists should continue to prioritize comprehensive

patient education. This should go beyond simple instruction to ensure patients understand the rationale behind their exercises and the benefits to their recovery.

ii. Develop Age-Specific Strategies: Since adherence decreases with age, clinicians should develop targeted strategies for older patients. This could include simplifying exercise regimens, providing large-print visual aids, involving family members or caregivers in the education process, and actively screening for barriers such as pain, fear of falling, and fatigue.

iii. Strengthen the Therapeutic Alliance: The high rate of one-on-one instruction is a strength that should be leveraged. Therapists should use this time not only for teaching but also for collaborative goal-setting and problem-solving to tailor home programs to the patient's daily life, a factor identified as crucial for adherence (Abramsky et al., 2018).

5.4 Implications for Further Study

i. Qualitative Exploration of Barriers to Adherence in Older Adults: To better understand why adherence declines with age, a qualitative study could be conducted to explore the specific barriers and facilitators experienced by elderly physiotherapy outpatients. This would provide deeper insight beyond the quantitative data and could inform the development of more effective, age-appropriate interventions.

ii. Explore Digital Health Interventions: Future research could investigate the feasibility and effectiveness of using mobile applications or SMS reminders to support adherence, as such tools have shown promise in other settings (Lambert et al., 2017; Mahmood et al., 2019).

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APPENDIX I

ETHICAL APPROVAL

HEALTH RESEARCH ETHICS COMMITTEE (HREC)

UNIVERSITY OF BENIN TEACHING HOSPITAL
P.M.B. 1111 BENIN CITY NIGERIA Telephone: 052-600418 Website: ubth.org

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Committee email: ubthresearchethics@gmail.com
Registration Number:
NHREC-UBTH-HREC/24/12/2022B

PROTOCOL NUMBER: ADM/E 22/A/VOL.VII/2025/125

PROPOSAL TITLE: **"KNOWLEDGE, ATTITUDE AND ADHERENCE TO PRESCRIBED HOME BASED EXERCISE PROGRAMS AMONGS PHYSIOTHERAPY OUTPATIENTS IN UNIVERSITY OF BENIN TEACHING HOSPITAL"**

PRINCIPAL INVESTIGATOR(S): **EKHAGUOSA JOY ANTHONIA**

DEPARTMENT/INSTITUTION: **DEPARTMENT OF PHYSIOTHERAPY, SCHOOL OF BASIC MEDICAL SCIENCES UNIVERSITY OF BENIN, BENIN CITY, EDO STATE**

DATE CONSIDERED: JULY 14TH, 2025

DECISION OF THE COMMITTEE: APPROVED

THIS APPROVAL DATES 14/7/2025 TO 13/7/2026. IF THERE IS DELAY IN STARTING THE RESEARCH, PLEASE INFORM THE HREC SO THAT THE DATES OF APPROVAL CAN BE ADJUSTED ACCORDINGLY

REMARK:

CHAIRMAN: PROF. (MRS) A.N. OFILI **SIGNATURE & DATE**..... 14/7/2025

SUPERVISOR (S): MR. OKHUAHESUYI EGUAGIE

DECLARATION BY INVESTIGATOR(S):
PROTOCOL NUMBER (please quote in all enquiries)
Note that no participant accrual or activity related to this research may be conducted outside of these dates. All informed consent forms used in this study must carry the HREC assigned number and duration of HREC approval of the study. In multiyear research, endeavor to submit your annual re-port to the HREC early in order to obtain renewal of your approval and avoid disruption of your research. No changes are permitted in the research without prior approval by the HREC except in circumstances outlined in the Code. The HREC reserves the right to conduct compliance visit your research site without previous notification

Signature & Date.....

APPENDIX II

INFORMED CONSENT FORM

Title of study: Knowledge, Attitude and Adherence to prescribed home based exercise programs among physiotherapy outpatients in University of Benin Teaching Hospital.

Investigator: Ekhaguosa Joy Anthonia

Supervisors: Mr. Okhuahesuyi Eguagie

Financial Sponsorship: This research project is self-sponsored

Purpose of the research: The purpose of the research is to determine the Knowledge, Attitude and Adherence to prescribed home based exercise programs among physiotherapy outpatients in University of Benin Teaching Hospital.

Procedures and protocol involved in the study

You are politely approached to respond to an interviewer-administered questionnaire interview.

This questionnaire would be only used for research purpose and will determine the Knowledge, Attitude and Adherence to prescribed home based exercise programs among physiotherapy outpatients in University of Benin Teaching Hospital.

Compensation

There will be no financial compensation for participating in this study.

Voluntary Participation

Please note that your participation in this research is entirely voluntary. No form of discrimination will be meted to you, should you decide not to participate in this study; You are entirely free to change your mind and stop participating even if you agreed earlier.

Side Effects

There is no anticipated adverse effect associated with participating in this study.

Benefits

The purpose of the research is to assess the level of Knowledge, Attitude and Adherence to prescribed home based exercise programs among physiotherapy outpatients in University of Benin Teaching Hospital.

Confidentiality

All information and data obtained in the course of this study will be treated confidentially. The names of the participants will not be written on the questionnaire, and all information collected will be encoded in a file in my personal computer and passworded. Thereafter the questionnaires will be shelved and locked in my personal document cabinet.

CONTACT INFORMATION

Ekhaguosa Joy Anthonia

PROJECT STUDENT

Email: toniajoy551@gmail.com

Ethics and Research Committee

University of Benin Teaching Hospital

Benin City.

Phone Number: 09038529788

CERTIFICATE OF CONSENT

have read the above information (or it has been read to me). I had the opportunity to ask

questions about it and the questions were answered to my satisfaction.

I consent voluntarily to take part as a participant in this study

I do not consent to participate in this study.

Signature of participant: _____

Date:_____

APPENDIX III

SOCIODEMOGRAPHIC FORM

1. Age:
2. Gender:

   Male [ ]

   Female [ ]

3. Marital Status:

   Single [ ]

   Married [ ]

   Widowed [ ]

   Divorced [ ]

4. Educational level:

   Primary [ ]

   Secondary [ ]

   Tertiary [ ]

5. Occupation:

[ ] Government employed

[ ] Self-employed

[ ] Not employed

[ ] Retired

6. Condition being managed by physiotherapy: _____

7. What type(s) of exercises were included in your home exercise program? (Tick all that apply)

[ ] Stretching / Flexibility exercises

[ ] Strengthening exercises (e.g., with weights or bands)

[ ] Balance exercises

[ ] Walking / Cardiovascular program

[ ] Posture correction exercises

[ ] Not sure

[ ] Other (please specify): _____

8. How were the home exercises taught to you?

[ ] In a one-on-one session with the physiotherapist

[ ] In a group class with other patients

[ ] Both one-on-one and in a group

[ ] Other (please specify): _____

9. How were these exercise instructions provided for you to use at home? (Tick all that apply)

[ ] Printed handout with pictures/descriptions

[ ] Link to online videos

[ ] Through a mobile app

[ ] I was expected to remember from the demonstration in the clinic

[ ] Other (please specify): _____

APPENDIX IV

EXERCISE ADHERENCE RATING SCALE (EARS)

1. I do my exercises as often as recommended

   ( ) Completely Disagree ( ) Disagree ( ) Neither agree or disagree ( ) Agree ( ) Completely agree

2. I forget to do my exercises

   ( ) Completely Disagree ( ) Disagree ( ) Neither agree or disagree ( ) Agree ( ) Completely agree

3. I do less exercise than recommended by my healthcare professional (physiotherapist)

   ( ) Completely Disagree ( ) Disagree ( ) Neither agree or disagree ( ) Agree ( ) Completely agree

4. I fit my exercises into my regular routine

   ( ) Completely Disagree ( ) Disagree ( ) Neither agree or disagree ( ) Agree ( ) Completely agree

5. I don't get around to doing my exercises

   ( ) Completely Disagree ( ) Disagree ( ) Neither agree or disagree ( ) Agree ( ) Completely agree

6. I do most, or all, of my exercises

( ) Completely Disagree ( ) Disagree ( ) Neither agree or disagree ( ) Agree ( ) Completely agree

APPENDIX V

SELF- DEVELOPED KNOWLEDGE AND ATTITUDES QUESTIONNAIRE TOWARDS HOME EXERCISE

Please indicate how much you agree or disagree with the following statements

S/N	STATEMENTS	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
1.	Home exercises are effective for treating conditions such as back pain					
2.	I understand why the prescribed home exercises were specifically chosen for my condition.					
3.	Patients can learn a lot about how to help to manage their health problems themselves using home exercises					
4.	I know why I need to do home exercises.					
5.	I know which part of my body the exercise helps.					
6.	I know how often I am supposed to perform my home exercises each week.					
7.	I know how to modify my exercises if I experience discomfort or pain.					
8.	I can explain the benefits of my					

	prescribed home exercise program to others.					
9.	I am aware of how long each home exercise session should last.					
10.	I know when to stop or pause my home exercises based on specific symptoms.					
11.	I feel confident in my ability to carry out my home exercise program on my own.					
12.	I am motivated to complete my home exercises even when I am tired or busy.					
13.	I feel that doing home exercises gives me a sense of control over my recovery.					
14.	I am open to learning new exercises if it helps improve my condition.					
15.	I believe my home exercise program is a crucial part of my recovery.					
16.	Doing my home exercises regularly helps to reduce my symptoms (e.g., pain, stiffness).					
17.	I expect that continuing these home exercises will benefit my health in the long term.					
18.	I am likely to continue doing some of the home exercises after my physiotherapy treatment ends.					
19.	Finding the time to exercise in my					

	daily routine is a major challenge.					
20.	Feeling unmotivated makes it difficult to stick to my home program.					