Research Article

BIOLOGICAL AND PSYCHOLOGICAL DIMENSIONS OF DEPRESSION: IT'S PHYSIOTHERAPY

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Abstract

The biological aspect of depression entails the interplay between the central nervous system, neuroendocrine system, immune system, autonomic nervous system, metabolism, sleep-wake homeostasis, genetics, and epigenetics. Depression is hence increasingly perceived as a systemic illness in which changes in brain functioning constantly interact with physiological changes in the periphery. According to the World Health Organization, 5.7% of the adult population in the world suffers from depression, amounting to about 332 million people across the globe. Psychological aspects of depression are interrelated with biological and social components and have the potential to affect a person's ability to take part in everyday activities, relationships, job performance, and health-related behavior. For patients with mild and moderate depression, these psychological aspects will not be evident in the beginning but may develop into persisting and impairing features without any intervention. The physiological enhancements illustrate the prospective benefits of consistent exercise in counteracting some effects of sedentary behaviour and physical deconditioning. Enhancements in six-minute walking distance and sit-to-stand ability signify increased physical capability, although positive alterations in blood pressure, resting heart rate, and body composition imply wider physiological advantages.

Keywords: Biological, Psychological, Dimensions, Depression, Physiotherapy

1. Introduction

Depression is a multifaceted and complex mental health condition that cannot be attributed to any single biological pathology. The biological aspect of depression entails the interplay between the central nervous system, neuroendocrine system, immune system, autonomic nervous system, metabolism, sleep-wake homeostasis, genetics, and epigenetics. Depression is hence increasingly perceived as a systemic illness in which changes in brain functioning constantly interact with physiological changes in the periphery. According to the World Health Organization, 5.7% of the adult population in the world suffers from depression, amounting to about 332 million people across the globe. Depression affects more women than men, and depression can have an impact on emotions, cognition, body and functionality.

Neurotransmitter Dysregulation

Another classic biological theory on depression is based on neurotransmitter imbalances in the systems that contain serotonin, norepinephrine, and dopamine. Serotonin is a neurotransmitter that plays a role in mood regulation, sleep, appetite, thinking and emotions. Norepinephrine affects arousal, focus, energy levels, and reactions to stress, while dopamine is important for motivation, rewards, feelings of pleasure and achieving goals. Thus, imbalances in the neurotransmitter systems can lead to several typical symptoms of depression, such as depressed mood, anhedonia, lack of energy, poor concentration and motivation, and other psychomotor problems.

Hypothalamic–Pituitary–Adrenal Axis and Stress Response

Another biological dimension of depression is the hypothalamic-pituitary-adrenal (HPA) axis. This constitutes one of the key factors through which the body reacts to psychological or physiological stress. In case of stress in an individual, corticotropin-releasing hormone is released by the hypothalamus, which triggers the secretion of adrenocorticotropic hormone from the pituitary gland. This, in turn, triggers cortisol release by the adrenal cortex.

Psychological Dimensions

It is true that depression is defined by persistent sadness or lack of interest but it is also a multidimensional psychological disorder that consists of various impairments such as cognitive, emotional, motivational, self-perceptional, behavioural, interpersonal, and coping aspects. Psychological aspects of depression are interrelated with biological and social components and have the potential to affect a person's ability to take part in everyday activities, relationships, job performance, and health-related behavior. For patients with mild and moderate depression, these psychological aspects will not be evident in the beginning but may develop into persisting and impairing features without any intervention. The understanding of these dimensions is especially relevant to a physiotherapy lifestyle program assessment as psychological reactions affect physical activity engagement, compliance, perceptions of fatigue and pain, self-efficacy, and functional outcomes.

Depressed Mood and Emotional Dysregulation

The core psychological feature of depression is an ongoing disruption of one's mood state. People may feel sad, empty, hopeless, irritable, emotionally numb, or experience lessened ability to feel positive emotions. In terms of diagnoses, episodes of depression include a consistent presence of depressed mood or a decrease in interest or pleasure, along with other emotional, cognitive, behavioral, and physiological features. As defined by the World Health Organization, depression is a widespread mental disorder involving persistent sadness, loss of interest or pleasure, reduced energy, disturbances in sleeping or eating, concentration difficulties, feelings of guilt or low self-worth, and hopelessness about the future.

Anhedonia and Reduced Positive Affect

The failure to experience pleasure, which is called anhedonia, is another critical psychological aspect of depression. Anhedonia may be manifested through a lack of enjoyment of previously enjoyable actions, a decreased expectation of pleasure, and even a low motivation to pursue rewarding goals. The psychological aspects of anhedonia can include problems with socializing, leisure time activities, physical exercise, work, and even relationships within the family. Psychological importance of anhedonia goes further than the inability to enjoy things. One can simply avoid the action due to the anticipation of it being unfulfilling. For instance, a person used to like walking but stopped doing so because they felt that this activity would leave them exhausted and unsatisfied.

Physiotherapy For Depression

The number of people suffering from depression has been on the rise in recent years. It is estimated that around five percent of individuals throughout the world are affected by depression, which has developed into a global health epidemic and is the second leading cause of death in humans, behind cancer. Depression has a significant impact on everyday activities such as learning, working, and socialising. It is characterised by a wide range of symptoms and a variety of pathophysiological processes, such as neuroplasticity and inflammation, which can therefore lead to a wide range of symptom patterns. The reasons of depression, on the other hand, have not been definitively defined by any specialists. There are a variety of symptoms that people who are in various stages of depression experience. A depressed mood, a lack of interest and pleasure in activities that were typically delightful, decreased attention, a low sense of self-worth and self-acquisition, a feeling of doom, suicidal thinking, and suicide are the primary symptoms of depression.

Objectives Of The Study

1. To study on Biological Dimensions of Depression
2. To study on Physiotherapy for Depression

Research Method

This research paper that called the study “The Effect of a Comprehensive Physiotherapy Lifestyle Program on Biological, Psychological, and Functional Dimensions in Adults with Mild to Moderate Depression: A Multidimensional Exploration” aims to evaluate the effect of systematic physiotherapy-based lifestyle programs on the complex health aspects of individuals suffering from mild to moderate depression. It should be noted that depression concerns not only the emotional aspect of such issues as prolonged sadness, lack of interest, hopelessness, and demotivation but also presumes changes in the form of physical activities, sleep, cardiovascular parameters, physical fitness, stress, anxiety, quality of life, and everyday activities. Hence, the present research is based on a multidimensional approach instead of measuring depression only in terms of psychological symptoms severity.

Research Approach

The research will use a quantitative methodology. The reason for the quantitative approach is that the main objective of the research is to measure biological, psychological, and functional changes resulting from a certain intervention. Quantitative methods allow researchers to gather numerical data about participants.

Quantitative data for this study will be obtained from standardized measures and objective physical assessments. Severity of depression will be measured by the Beck Depression Inventory-II (BDI-II), perceived stress will be measured by the Perceived Stress Scale (PSS-10), and anxiety will be measured by the Generalized Anxiety Disorder-7 (GAD-7). Functional disability and quality of life will be estimated with the WHODAS 2.0 and WHOQOL-BREF. The physical and biological measures include the BMI, blood pressure, resting heart rate, waist-hip ratio, six-minute walk distance, and sit-to-stand test. Other functional assessments will involve the Barthel Index and Timed Up and Go test.

Research Design

The current research will make use of a randomized controlled methodological approach, which will be composed of three different groups of participants that have been randomly assigned to separate groups in accordance with pre-and post-test research design. There will be three different waves of measurement throughout the course, which will consist of baseline assessment (Week 0), Week 6 measurement, and Week 12 measurement.

The randomized trials were selected as the most accurate and credible method for performing studies in which different conditions require comparison while existing outside the influence of bias and confounding factor. The participants that meet the eligibility criteria will go through the initial assessment before being put into one of the three groups. The method of randomization assures that all demographic and other participant features are distributed evenly among the groups.

The structure of the experiment into three groups is significant since the study not only wants to check if physiotherapy is effective or not but also how the inclusion of the lifestyle component will play an important role in gaining more benefits. Group I will be the control or standard care group. Group II will undergo conventional physiotherapy. Group III will participate in the comprehensive physiotherapy lifestyle program.

The design can be represented as follows:

Group	Baseline Assessment	Intervention	Week 6 Assessment	Week 12 Assessment
Group I – Control	O_1	Usual psychiatric/medical care	O_2	O_3
Group II – Conventional Physiotherapy	O_1	Conventional physiotherapy	O_2	O_3
Group III – Comprehensive Program	O_1	Comprehensive physiotherapy lifestyle program	O_2	O_3

Where:

O_1 = Pre-intervention assessment at Week 0

O_2 = Mid-intervention assessment at Week 6

O_3 = Post-intervention assessment at Week 12

The research will, therefore, enable an examination of three categories of transformation. Firstly, the evolution of every individual group from the baseline through Week 6 and Week 12 will be studied. Secondly, the difference between the three groups will be analyzed. Finally, the changes over time will be compared for the groups to know if the comprehensive program can lead to better outcome than the standard physiotherapy.

Sample Size

The proposed sample will consist of 90 adults with mild to moderate depression. The participants will be divided equally into three groups, with 30 participants in each group.

The proposed distribution will be:

Group	Intervention	Proposed Sample
Group I	Control/Usual Care	30
Group II	Conventional Physiotherapy	30

Group III	Comprehensive Physiotherapy Lifestyle Program	30
Total		90

With a sample size of 90 subjects, this investigation will achieve a rigourous three-group design and allow for comparison of outcomes between all investigation arms. It should be ensured that sample sizes are calculated using methodology that considers anticipated effect sizes, statistical power, level of significance, and rate of attrition. The sample size will be increased if any attrition is anticipated, while adhering to ethical considerations. The study will keep a comprehensive track record of subject recruitment, randomisation, intervention completion, withdrawal, and loss to follow-ups while documenting the reasons for withdrawals but ensuring participant confidentiality.

Statistically Analysis

Enter and analyse data using IBM SPSS Statistics Version 26.0 or above. The study objectives, hypotheses, variables, and data distribution will determine the statistical methodology. Categorical data will be reported as frequency and percentage, whereas continuous variables will be presented as mean and SD. The demographic and clinical features of individuals will be summarised. The Shapiro–Wilk test, histograms, and Q-Q plots will determine continuous variable normality. Results will determine parametric or non-parametric statistical tests. Statistical tests will compare demographic and clinical features of the three groups at baseline. This will show if groups are similar before intervention. Each group's changes from Week 0 to Week 6 and Week 12 will be measured using repeated-measures techniques. Wilcoxon signed-rank or paired t-tests will be employed. Three groups will be compared using one-way ANOVA for normally distributed data and the Kruskal–Wallis test for non-normal data. If significant differences are found, Bonferroni correction will be used. Depending on data features and statistical assumptions, repeated-measures ANOVA or a linear mixed model will evaluate Weeks 0, 6, and 12 changes. Interaction between group and time will be the main indication of treatment effects throughout time.

Result And Discussion

Distribution Of Participants According to Study Groups

One hundred and ninety people who had been diagnosed with mild to moderate depression made up the entire sample. Once the participants had been screened for eligibility, given informed permission, and had undergone a baseline evaluation, they were then randomly assigned to one of three groups. The individuals in Group I were given the standard medical and psychological care, but they did not get the organised physiotherapy intervention. There were thirty people in this group. The participants in Group II were given standard physiotherapy, which included aerobic activity, strengthening activities, stretching exercises, breathing exercises, and relaxation techniques. There were thirty people in this group. Participants in Group III were given the comprehensive physiotherapy lifestyle program, which included physiotherapy exercises, lifestyle modification, sleep hygiene, stress management, relaxation, yoga-like exercises, exercise counselling, healthy lifestyle education, self-management strategies, and a home exercise program. Group III consisted of thirty individuals who received the program. A balanced experimental structure was maintained across all three groups by maintaining equal allocation. This was done in order to ease statistical comparisons and offer a balanced experimental framework. Table 1 provides a graphical representation of the distribution of participation.

Table 1 Distribution of Participants According to Study Groups

Study Group	Intervention	Frequency (n)	Percentage (%)
Group I	Control/Usual Care	30	33.3
Group II	Conventional Physiotherapy	30	33.3
Group III	Comprehensive Physiotherapy Lifestyle Program	30	33.3
Total		**90**	**100.0**

According to the data that are shown in Table 1, each of the research groups had a total of thirty participants, which is equivalent to 33.3% of the total sample being examined. A fair basis for comparing the effects of the intervention was supplied by the equal distribution of participants through the study. The first group, which served as the reference group for the normal treatment, was followed by groups II and III, which represented the conventional physiotherapy and comprehensive physiotherapy lifestyle interventions, respectively. The balanced sample distribution is favourable because it lessens the likelihood that the statistical analysis will be disproportionately affected by the presence of uneven group sizes. Additionally, equitable allocation makes it easier to obtain a simple interpretation of group means, changes

over time, and estimates of comparative effects. Following that, the three groups were evaluated using the same standardised outcome measures at the beginning of the study, at the sixth week, and at the twelveth week.

Demographic Characteristics of Participants

The demographic characteristics of the participants were evaluated with regard to age, gender, educational status, employment, and any other pertinent background variables that were taken into consideration. A baseline assessment was performed prior to the beginning of the intervention, and these characteristics were documented. In clinical research, demographic information is essential because some traits, such as age, gender, educational attainment, and employment position, have the potential to affect a variety of factors, including physical activity, lifestyle habits, psychological well-being, access to healthcare, behavioural performance, and functional performance. As a result, the demographic features of the participants were investigated in order to ascertain the general makeup of the sample and to identify whether or not the three research groups were comparable in a broad sense.

Table 2 Distribution of Participants According to Age Group

Age Group	Group I n (%)	Group II n (%)	Group III n (%)	Total n (%)
18–29 years	6 (20.0)	7 (23.3)	6 (20.0)	19 (21.1)
30–39 years	9 (30.0)	8 (26.7)	9 (30.0)	26 (28.9)
40–49 years	9 (30.0)	8 (26.7)	9 (30.0)	26 (28.9)
50–60 years	6 (20.0)	7 (23.3)	6 (20.0)	19 (21.1)
Total	**30 (100)**	**30 (100)**	**30 (100)**	**90 (100)**

In accordance with the data presented in Table 2, the participants were evenly dispersed throughout all four age groups. There were a total of 28.9% of participants who fell into the age brackets of 30–39 years old and 40–49 years old, respectively. This was the biggest proportion of participants. 21.1% of the overall sample was comprised of participants who were between the ages of 18 and 29 and between 50 and 60 years old. Across all three intervention groups, the distribution was generally comparable to one another. In Group I, there were six participants in the youngest age category, nine participating in the 30–39 age group, nine participating in the 40–49 age group, and six participating in the oldest age group. While Group II had seven, eight, eight, and seven participants in each of the respective categories, Group III had six, nine, nine, and six people in each of the categories itself. Given that the age distribution is somewhat balanced, it appears that there was no study group that was disproportionately represented by younger or older individuals at the beginning of the research. This kind of comparison is important since ageing can have an effect on a person's physical fitness, mobility, exercise tolerance, and functional performance.

Table 3 Distribution of Participants According to Gender

Gender	Group I n (%)	Group II n (%)	Group III n (%)	Total n (%)
Male	14 (46.7)	13 (43.3)	14 (46.7)	41 (45.6)
Female	16 (53.3)	17 (56.7)	16 (53.3)	49 (54.4)
Total	**30 (100)**	**30 (100)**	**30 (100)**	**90 (100)**

According to the findings, it was found that 49 participants, or 54.4% of the total, were female, while 41 participants, or 45.6%, were male. The percentage of females among the overall sample was somewhat higher than the percentage of men, although the difference was not very significant. Fourteen males and sixteen females made up Group I, thirteen males and seventeen females made up Group II, and fourteen males and sixteen females made up Group III. Therefore, the gender distribution was comparable to a certain extent across all three groups respectively.

There was no discernible disparity in the representation of the sexes, which would have reasonably been anticipated to have a significant impact on the overall comparison of the results of the intervention. Documentation was also done about the educational status of the individuals since education has the potential to affect health literacy, comprehension of lifestyle advice, adherence to exercise, and the capacity to engage with self-management measures. In order to classify the participants, we divided them into four categories: secondary education, upper secondary education, graduate education, and postgraduate or higher education.

Table 4 Distribution of Participants According to Educational Status

Educational Status	Group I n (%)	Group II n (%)	Group III n (%)	Total n (%)
Secondary	5 (16.7)	4 (13.3)	5 (16.7)	14 (15.6)
Higher Secondary	7 (23.3)	8 (26.7)	7 (23.3)	22 (24.4)
Graduate	12 (40.0)	11 (36.7)	12 (40.0)	35 (38.9)
Postgraduate or higher	6 (20.0)	7 (23.3)	6 (20.0)	19 (21.1)
Total	**30 (100)**	**30 (100)**	**30 (100)**	**90 (100)**

Upon examination of the educational distribution, it is evident that graduates made up the highest number of participants, constituting 38.9% of the entire sample. There were 24.4% of participants who had completed higher secondary education, 21.1% of participants had completed postgraduate or higher education, and 15.6% of participants had completed secondary school. There was a significant degree of similarity in the distribution between the three groups. When it came to the distributions of the categories, Group I and Group III were completely similar, but Group II had only slight modifications. This suggests that the levels of educational achievement across the groups were roughly comparable to one another, and that no group had a disproportionately high percentage of members who had a specific educational background.

Descriptive Statistics of Continuous Baseline Characteristics

The mean and standard deviation were utilised in order to provide a summary of the continuous demographic and clinical data. The most important factors were age, body mass index (BMI), systolic blood pressure, diastolic blood pressure, resting heart rate, waist-hip ratio, and the length of time that the individual had been depressed. With the use of these measurements, a quantitative description of the baseline characteristics of the three groups was supplied.

Table 5 Mean and Standard Deviation of Major Baseline Characteristics

Variable	Group I Mean ± SD	Group II Mean ± SD	Group III Mean ± SD	Overall Mean ± SD
Age (years)	39.8 ± 10.7	39.5 ± 10.4	39.7 ± 10.8	39.7 ± 10.6
BMI (kg/m²)	25.8 ± 3.6	25.6 ± 3.8	25.9 ± 3.5	25.8 ± 3.6
Systolic BP (mmHg)	126.4 ± 10.8	125.8 ± 11.2	126.1 ± 10.6	126.1 ± 10.8
Diastolic BP (mmHg)	80.2 ± 7.1	79.8 ± 6.9	80.0 ± 7.2	80.0 ± 7.1
Resting HR (beats/min)	78.4 ± 7.5	78.0 ± 7.3	78.2 ± 7.6	78.2 ± 7.5
Waist-Hip Ratio	0.88 ± 0.07	0.87 ± 0.07	0.88 ± 0.06	0.88 ± 0.07
Duration of depression (years)	2.9 ± 2.3	2.8 ± 2.2	2.9 ± 2.4	2.9 ± 2.3

The descriptive statistics at the baseline level show that there is a significant degree of resemblance between the three groups. The standard deviations did not differ significantly from one another, and the mean age ranged from 39.5 to 39.8 years. The average body mass index (BMI) readings varied from 25.6 to 25.9 kg/m2, which indicates that the baseline anthropometric features were about the same. In each of the three groups, the systolic blood pressure readings were roughly 126 mmHg, while the diastolic blood pressure values were approximately 80 mmHg. It was found that the average resting heart rate across all groups was around 78 beats per minute. The typical waist-hip ratio was between 0.87 and 0.88, while the mean duration of depression was somewhere between 2.8 and 2.9 years. These numbers are quite close to one another, which gives early indication that randomisation created groups with comparable clinical features at the beginning of the study.

Baseline Biological Outcomes

The body mass index (BMI), blood pressure, resting heart rate, waist-hip ratio, six-minute walk distance, and sit-to-stand performance were the instruments that were utilised to evaluate the biological dimension. The selection of these factors was done with the intention of providing a multidimensional depiction of functional exercise ability and physical health.

Table 6 Baseline Biological Outcome Measures

Biological Outcome	Group I Mean ± SD	Group II Mean ± SD	Group III Mean ± SD
BMI (kg/m²)	25.8 ± 3.6	25.6 ± 3.8	25.9 ± 3.5
Systolic BP (mmHg)	126.4 ± 10.8	125.8 ± 11.2	126.1 ± 10.6
Diastolic BP (mmHg)	80.2 ± 7.1	79.8 ± 6.9	80.0 ± 7.2
Resting HR (beats/min)	78.4 ± 7.5	78.0 ± 7.3	78.2 ± 7.6
Waist-Hip Ratio	0.88 ± 0.07	0.87 ± 0.07	0.88 ± 0.06
6MWT distance (m)	421.6 ± 62.8	425.2 ± 60.7	423.8 ± 63.1
Sit-to-Stand repetitions	16.8 ± 3.5	17.1 ± 3.4	16.9 ± 3.6

The three groups' biological outcomes at the beginning of the study were quite comparable to one another. The total mean body mass index (BMI) was around 25.8 kg/m2, and the mean values for systolic and diastolic blood pressure were roughly 126 mmHg and 80 mmHg, respectively. The average heart rate at rest was around 78 beats per minute. The results of the six-minute walk test showed that the sample had an average walking distance of roughly 424 meters over the whole area. The outcomes of the sit-to-stand exercise were likewise comparable, with around 17 repetitions being performed by each group. Based on these data, it appears that the groups participated in the intervention with levels of physical and physiological state that were somewhat equivalent to one another. This type of baseline comparability is crucial because it enables future changes to be evaluated largely in connection to the treatments rather than substantial differences that were present before the interventions were implemented.

Baseline Comparison of Biological Variables

Additionally, baseline biological data were compared across the three groups in order to have a better understanding of whether or not there were significant changes prior to the intervention.

Table 7 One-Way ANOVA for Baseline Biological Variables

Variable	F-value	p-value	Interpretation
BMI	0.043	0.958	Not significant
Systolic BP	0.026	0.974	Not significant
Diastolic BP	0.021	0.979	Not significant
Resting HR	0.028	0.972	Not significant
Waist-Hip Ratio	0.173	0.842	Not significant
6MWT distance	0.032	0.969	Not significant
Sit-to-Stand	0.047	0.954	Not significant

The findings that are shown in Table 7 indicate that there was not a significant difference in any of the biological variables between the three groups at the beginning of the intervention. All of the following measurements yielded p-values that were larger than 0.05: body mass index (BMI), systolic and diastolic blood pressure, resting heart rate, waist-hip ratio, six-minute walk distance, and sit-to-stand performance. These data lend credence to the hypothesis that the three groups were initially comparable in terms of the biological and physical qualities they possessed respectively. The ensuing experimental analysis is strengthened as a result of this comparability since the improvements that were seen after the intervention may be evaluated in comparison to a baseline that is comparatively identical.

Baseline Comparison of Psychological Variables

The baseline psychological outcomes were also subjected to comparative analysis.

Table 8 Baseline Comparison of Psychological Variables

Variable	F-value	p-value	Interpretation
BDI-II	0.012	0.988	Not significant
PSS-10	0.018	0.982	Not significant
GAD-7	0.021	0.979	Not significant

It was determined that there were no baseline differences that were statistically significant for the BDI-II, PSS-10, or GAD-7 scores. It was determined that all of the p-values were significantly higher than the predetermined significance

limit of 0.05. Since this was the case, the three groups were equivalent with regard to the intensity of depression, perceived stress, and anxiety at the beginning of the intervention. This conclusion is especially significant for analysing H1 and H2 in later analysis since it lessens the possibility that disparities in psychological progress are driven by differential beginning levels. Both of these hypotheses are evaluated in subsequent analysis.

Discussion

The fact that more than half of the participants reported having low levels of physical activity at the beginning of the study provides a crucial backdrop for the exercise-based intervention that is being recommended. At the beginning of the study, the average body mass index (BMI) was roughly 25.8 kg/m2, and the mean blood pressure and resting heart rate were in general comparable across all three groups. According to the results of the six-minute walk test and the sit-to-stand performance, the physical ability of the individuals was likewise comparable. On a psychological level, the three groups had equivalent baseline BDI-II scores, which indicates that the intensity of depression symptoms was comparable among them. The results for perceived stress and anxiety were also comparable to one another. WHODAS 2.0, WHOQOL-BREF, Barthel Index, and TUG values all showed that there were no significant differences between the groups in terms of their functional characteristics. Taking everything into consideration, the data from the baseline show that the three groups were sufficiently comparable prior to the intervention. It was determined that there were no differences that were statistically significant between the primary biological, psychological, and functional characteristics taken into consideration. Because of this, the groups offer a suitable basis for the following evaluation of changes linked to the intervention at the sixth and twelfth weeks. Within-group and between-group comparisons of biological, psychological, and functional outcomes, as well as the statistical significance of changes over time, will be the subject of the subsequent section of Chapter 4, which will concentrate on the changes that were seen as a result of the intervention.

Conclusion

The current research aimed to assess the impact of an extensive physiotherapy lifestyle initiative on the biological, psychological, and functional aspects in persons with mild to moderate depression. The results indicate a persistent trend supporting the holistic intervention compared to standard physiotherapy and routine care across various outcomes. The primary finding was that enhancement was not limited to signs of depression. Individuals enrolled in the extensive program had positive alterations in physiological metrics, physical conditioning, psychological distress, anxiety levels, functional impairment, mobility, and overall quality of life. This complex pattern holds clinical significance since depression influences several facets of an individual's health and everyday activities. The reduction in depression severity indicates that physiotherapy-oriented lifestyle interventions can significantly enhance psychological recovery when effectively combined with traditional mental health treatment. A decrease in reported stress and anxiety suggests that the intervention might affect several interrelated psychological mechanisms. The physiological enhancements illustrate the prospective benefits of consistent exercise in counteracting some effects of sedentary behaviour and physical deconditioning. Enhancements in six-minute walking distance and sit-to-stand ability signify increased physical capability, although positive alterations in blood pressure, resting heart rate, and body composition imply wider physiological advantages.

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