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**PHYSIOTHERAPY FOR NEUROLOGICAL CONDITIONS:
EVALUATING DIFFERENT APPROACHES FOR MANAGING
STROKE OR PARKINSON'S DISEASE PATIENTS.**

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Abstract

The purpose of the study is to explore the importance of physiotherapy in the In the literature review the severity of PD and the effect on health. has been highlighted in a proper way as the cogitative declination can create a massive issue in the health factor of the patient. In the methodology chapter “interpretivism research philosophy” and “secondary data collection method” has been mentioned as it is appropriate for the study. Other than that, thematic analysis has been followed in the data analysis process along with the “systematic table”. In the findings chapter, themes have been discussed based on the topic such as purpose of strategies, importance of physiotherapy and new approaches for PD. In conclusion, some limitations of the study like limited time and recommendations like early intervention have been discussed.

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CHAPTER 1: INTRODUCTION

1.1 Background

Physiotherapy is the medical process that plays an inevitable part in curing movement related disability. Patients suffer from the neurological disorder as stressful situations have become an inseparable factor in the life of the population ¹. Physiotherapy not only helps to recover the impartiality of mussels but also treat the impairment caused by the adverse neurological conditions. Adverse neurological conditions can impact negatively on the health and the individual can be affected with the severe physical impartial condition. Losing the physical movement of the patients can suffer the most depressive condition and the traditional physiotherapy treatment can improve the neurological ability of the patients. The terrible neurological condition can be a disastrous situation and Parkinson disease is the most common factor in the neurodegenerative disorder.

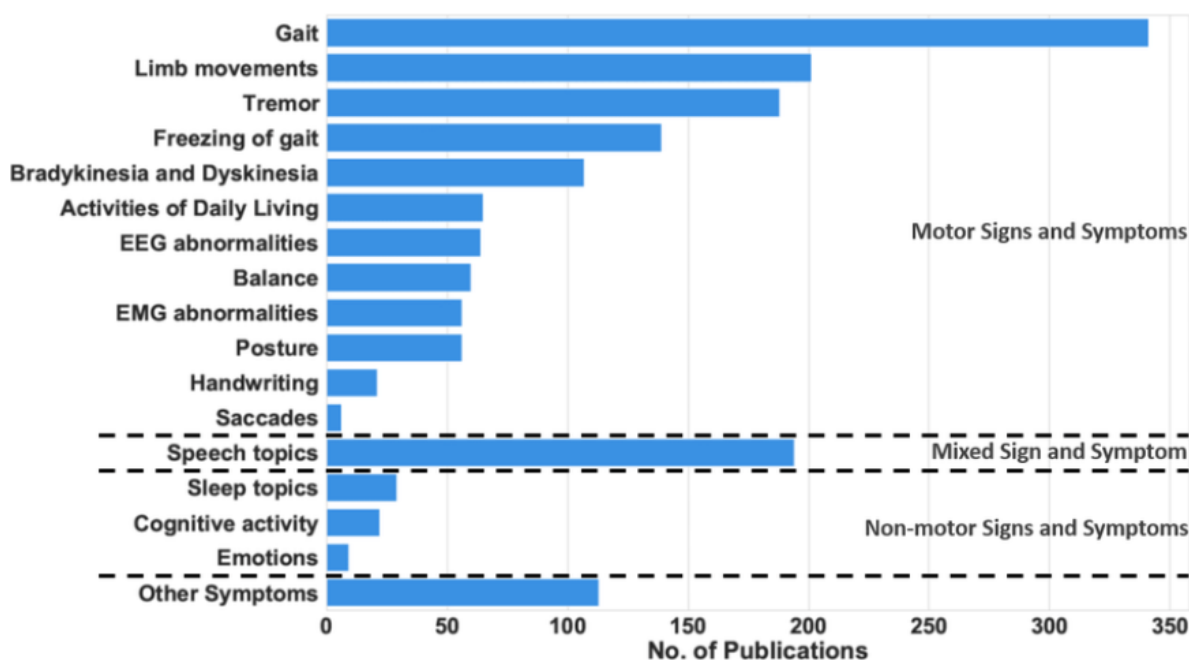


Figure 1.1 A Systematic Survey of Research Trends in Technology Usage for Parkinson's Disease

¹Sarah C, Lidstone, Nassif, W. *et al.* "Diagnosing functional neurological disorder: seeing the whole picture." *CNS spectrums*, 26(6), 593-600. (2021).

(Source:²)

Postural instability is the prime reason for Parkinson Disease as the cardinal motor symptoms and motor impairments are vigilant among the affected patients. Working in the extreme exposure of the metal and solvents can limit the presence of oxygen in the brain cells and the irregular sleeping can intensify the possibility of Parkinson disease. Sleeping disorder, anxiety, depression and the increased bradykinesia can result in Parkinson disease. Cardinal impairment can cause severe muscle weakness, aerobic capacity and other disorders and trigger the gradual declination in the physical activity level. Muscle stiffness, decrease in the movement and insomnia can be considered as the first warning regarding the infected disease ³. Declining the cognitive abilities can cause the massive impact of the stressful situation and the increased weakness in the muscle intensifies the physical inabilities. Sleeping disorder, anxiety, depression and the increased bradykinesia can result in Parkinson disease. Performing the regular exercise under the surveillance of experts, intaking healthy diet food and following proper medication can limit the progression of Parkinson disease. The study will explore the new psychotherapy approaches to treat the neurological conditions of Parkinson disease patients.

1.2 Research aim and objectives

The aim of the research is to explore new physiotherapy approaches to treat the neurological conditions of Parkinson disease patients. The objectives are

- To assess the importance of the physiotherapy to treat the neurological condition of the Parkinson patients in India
- To identify the new physiotherapy approaches to manage Parkinson disease patients in India
- To propose the strategies to limit the terrible impact of neurological condition on the physical movement of the Parkinson patient

²Randeep deb, An, S., et al. 2022, A Systematic Survey of Research Trends in Technology Usage for Parkinson's Disease. available at: https://www.researchgate.net/figure/The-number-of-research-publications-between-2008-and-2021-that-measure-each-sign-and_fig1_362239255 (last visited 19 Oct 2024)

³Abeer A, Tony, A.A., Tony, E.A et al. "COVID-19-associated sleep disorders: a case report." *Neurobiology of Sleep and Circadian Rhythms*, 9, 100057.(2020).

1.3 Research question

Research questions are the following

- What is the importance of physiotherapy to treat the neurological condition of the Parkinson patients in India?
- What are the new physiotherapy approaches to manage Parkinson disease patients in India?
- How can the strategies help to limit the terrible impact of neurological conditions on the physical movement of the Parkinson patient?

1.4 Scope of the study

The inability in the movement and improper behavioural skills among the adult patients can create socio-economic differences in a wider range of population. Degeneration of the nerve cells can cause the disease as the decline of the nerve cells can limit the production of dopamine. The study will provide a deep insight regarding the importance of physiotherapy and the impact of the new approaches of physiotherapy to treat the Parkinson patients in India. Presence of the extreme sleeping disorder and the irregular activities like alcohol consumption and smoking habit can intensify the possibility of Parkinson Disease. Working in the extreme exposure of the metal and solvents can limit the presence of oxygen in the brain cells and the irregular sleeping can intensify the possibility of Parkinson disease. The people having a genetic history can be at the high risk to be infected with the disease. Decreased movement can create severe in confidence and distrust among the patients and increase isolation attributes among the individual. Preventing the disease is quite possible under the training session of the doctors but the cure of the disease is quite an impossible process.

CHAPTER 2: LITERATURE REVIEW

2.1 Influence of Parkinson Disease on the cognitive decline

The negative impact of Parkinson disease can be vigilant on the health in the preliminary and the advanced stage and the individuals face severe barriers in the social segment during the interaction process. People affected with the terrible disease can face difficulties in accomplishing the task in a proper way ⁴. People affected by the disease can face a troublesome situation in a group decision as the individuals suffer in an indecision and face difficulties to remember any vital information that is required to accomplish the task in a structured manner. The mild cognitive impairment can be tracked by the testing process but it is not vigilant generally from the attributes of the individuals.

The loss of intellectual ability is present among the affected patients and the individuals prefer isolation from the social aspects. Delay in the accomplishment of the task and remembering the important information to perform the activity in a prominent manner. The individuals are unable to remember the daily events as the important chemical messenger including acetylcholine and norepinephrine has changed dramatically intensifying the severe memory loss. Declining problem-solving abilities among the individual and the decreased speed of memory processing can decrease the workflow of the patient ⁵. The individual can face several barriers during the accomplishment of the work and cause a massive turmoil in communicating with the social aspects. Visuospatial difficulties and the language abnormalities can also be seen in the individuals during the interaction process.

2.2 Importance of the new physiotherapy approaches to cure the Parkinson disease

Improving the stiffness of the muscles is the prioritised factor of physiotherapy to cure Parkinson disease. Affected patients face a huge bulky and communication issues in the social aspects and

⁴ Roongroj, Bhidayasiri, R., Sringean, J. *et al.* "The rise of Parkinson's disease is a global challenge, but efforts to tackle this must begin at a national level: a protocol for national digital screening and "eat, move, sleep" lifestyle interventions to prevent or slow the rise of non-communicable diseases in Thailand." *Frontiers in Neurology*, 15,1386608.(2024).

⁵Matteo, Vandoni, Giuriato, M. *et al.* "Motor Skills and Executive Functions in Pediatric Patients with Down Syndrome: A Challenge for Tailoring Physical Activity Interventions." *Pediatric Reports*, 15(4), 691-706.(2023).

the individuals prefer isolation to stay far from the situation. Physiotherapy can engage the patients with the physical activities and improve the movement among the mussels. Stretching, treadmill training, Nordic walking and robot assisted training can help the individuals in improving the mussel powers by eliminating stiffness ⁶. Mobility training can also improve the tremors and stimulate the strength of the mussels in a positive manner. Exercising under the surveillance of the expert physiotherapist can create a positive impact on the health of the patient as the individual optimises the regular routine and improves the exercise programme to reduce the risk of misbalancing. Aerobic activity must be implicated by the expert physiotherapist to improve the movement of the patients.

2.3 Impact of Parkinson Disease on the neural mechanism

Emerging disorders in the nervous system can increase the possibility of Parkinson disease as the patients can face a severe social disruptive situation during the accomplishment of the task. Severe memory loss and the ignition in uttering the words can be shameful to the patients and the patients prefer to live in a sacred place. Tremor and rigidity can be considered a prime symptom among the individuals who are affected with the deadly disease and the neural mechanism can be witnessed in the preliminary stage ⁷. In the middle stage of Parkinson disease, the working ability of the individual decreases gradually as the base of the brain called substantia nigra becomes deadly in a gradual manner.

Affected patients can also lose the nerve endings that can deliver a supreme chemical messenger to the part of the nervous system to control the blood pressures and pulse of the body in an automatic manner. Reducing the cells of Lewy bodies in a harmful level triggers the cell's death and the abnormality in the neuro system can be found in a gradual manner ⁸. The weakness in mussel's and insatiable situation of the neuro system can limit the neural mechanism among the

⁶Panizzolo, F.A., Cimino, S. *et al.* "Effect of a passive hip exoskeleton on walking distance in neurological patients." *Assistive Technology*, 34(5), 527-532. (2022).

⁷Meenakshi, Dhanawat, Dinesh K. Mehta. *et al.* "Understanding the pathogenesis involved in Parkinson's disease and potential therapeutic treatment strategies." *Central Nervous System Agents in Medicinal Chemistry (Formerly Current Medicinal Chemistry-Central Nervous System Agents)*, 20(2), 88-102.(2020).

⁸Jingyi, He, Zhu, G. *et al.* "Oxidative stress and neuroinflammation potentiate each other to promote progression of dopamine neurodegeneration." *Oxidative medicine and cellular longevity*, 2020(1), 6137521.(2020).

patients affected by Parkinson disease. Weakness in the neural mechanism can impact negatively on the regular activity of the human being and declines the presence of the patient in the social aspects.

2.4 Theoretical background

Schachter-singer theory

The theory defines the power of emotion in the presence of the psychological arousal and the cognitive attitudes defines the emotion level. Mitigation in the psychological factor can also impact the cognitive levels among the human being and help in mitigating the emotional factors. Human beings can perform the activity according to the surroundings and the emotional interchange can be found among the patients as massive presence in the air pollution affects the neural system in a prominent manner and the imbalanced sleeping can trigger decline in the psychological state of a human being. Imbalanced psychological state can reduce the mental state of the human being in a gradual manner and the negative impact on the nervous system is vigilant among the individuals.

Affected individuals can forget the important circumstances in a predominant manner and reduce the workflow. Reduced activity of the individuals can employ an adverse impact on the presence of the individual in the social aspect⁹. Patients under the surveillance of the experts must employ an emotional connection to cure the health of the patient as the cognitive behaviour of the patient can help in treating the deadly disease. The patients affected from Parkinson disease can feel the gradual shaking and muscle stiffness during the presence of any trauma as the psychological imbalance can cause the deadly situation.

⁹Iris A, Lesser, I.A. and Nienhuis, C.P. "The impact of COVID-19 on physical activity behavior and well-being of Canadians." *International journal of environmental research and public health*, 17(11), 3899. (2020).

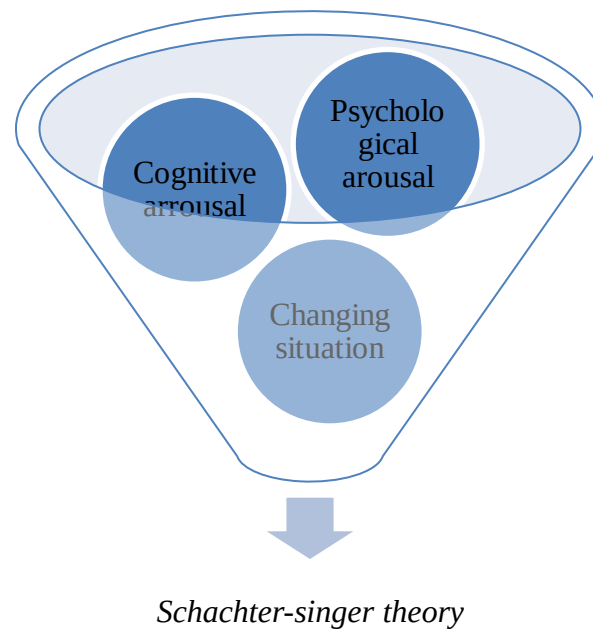


Figure 2.4. Schachter-singer theory

(Source: Self-developed)

2.5 Outline of literature

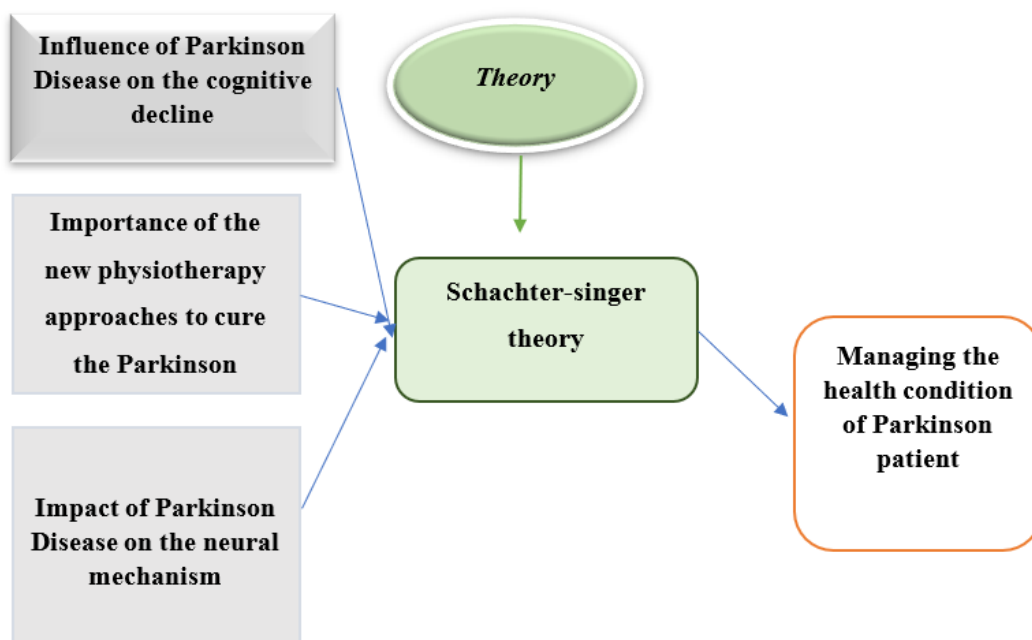


Figure 2.5: Outline of literature

(Source: Self-developed)

2.6 Literature gap

The approaches for managing Parkinson's disease have been mentioned in the previous literature related to the topic however, neural mechanisms cannot be discussed elaborately. Factors like cognitive decline in Parkinson's diseases cannot be discussed in a detailed manner in the existing literature. The present study tries to elaborate the factors and make the study more acceptable. Literature gap is the portion which is not mentioned and discussed in the published literature. It provides the opportunity to identify the undiscovered part and elaborate it in a proper way.

CHAPTER 3: METHODOLOGY

3.1 Research Philosophy

Research philosophy assists the research process and maintain its focus towards objectives. In the present research case “interpretivism research philosophy” has been chosen among all philosophies. This philosophy provides contextual understanding and helps in gaining subjective experience¹⁰. It is necessary to maintain the progress of the research and also get the exact information about the approaches used to manage disease like “Parkinson’s”. Other than that, “positivism” and “pragmatism” research philosophies used in empirical evidence along with practical application which is not related to the topic. “Interpretivism research approach” has been able to manage the requirement of this study.

3.2 Research approach

Research approach is the process of choosing appropriate approaches that can guide the data collection process. In the present case “deductive research approach” has been followed to get more knowledge about the topic. “Deductive research approach” includes theory related to the topic which is helpful in providing the chase to test hypotheses¹¹. “Inductive research approach” is more data driven and provides new theories from results of research. Apart from these research approaches, “abductive research approach” is also used by researchers as it is the mixture of “inductive” and “deductive” approaches. “Deductive approach” is applicable for the research work as it gives a detailed description about the topic with appropriate theory.

3.3 Data collection

Data collection process decides the quality and authenticity of data that has been collected during the research. “Primary data collection” and “secondary data collection” are the main data collection processes used in different researches. In this study a “secondary data collection” process has been followed which provides detailed and authentic information from relevant websites. It helps to get more information in a minimum time and descriptive data helps in

¹⁰NasrinPervin, and Mokhtar, M. “The interpretivist research paradigm: A subjective notion of a social context.” *International Journal of Academic Research in Progressive Education and Development*, 11(2), 419-428. (2022).

¹¹MattiaCasula, Rangarajan, N., *et al.* “The potential of working hypotheses for deductive exploratory research.” *Quality & Quantity*, 55(5), 1703-1725. (2021).

developing dynamic perspective among readers¹². “Qualitative” data has been used in this research to explore new areas of research and support inclusive research approaches.

3.4 Data analysis

Findings of the research and reliability of findings have been dependent on the data analysis process of the study. “Secondary qualitative data analysis” has been used to get results from the present research. “Systematic table” has been used to select articles and review them to prove the relevance of the present study. This process is appropriate to understand the process used in related topics which are published in recent years¹³. “Thematic analysis” has been performed in the present case by creating themes depending on objectives of the study. Careful selection of the data analysis process is necessary to maintain the demand of the study.

3.5 Ethical consideration

The “secondary data” has been collected from verified and official websites which maintain the validity of the research. Inclusion and exclusion criteria have been followed to incorporate relevance data based on the topic. Ethics should be maintained in the research to ensure the relevance of the study¹⁴. Referencing processes have been followed as per the guidance and other guidelines have tried to be met in this research. Article with full text and article with pdf have been used in this study which helps to give complete data about the research related to the present topic. The ethics related to choosing articles and maintaining relevance in selection of articles based on recent study has been maintained in this research.

¹²Linda L Pederson, Vingilis, E., *et al.* “Use of secondary data analyses in research: Pros and Cons.” *Journal of Addiction Medicine and Therapeutic Science*, 6(1), 058-060. (2020).

¹³Rebecca Popenoe, Langius-Eklöf, A., *et al.* “A practical guide to data analysis in general literature reviews.” *Nordic journal of nursing research*, 41(4), 175-186. (2021).

¹⁴Eungoo Kang, and Hwang, H. J. “Ethical conducts in qualitative research methodology: Participant observation and interview process.” *Journal of Research and Publication Ethics*, 2(2), 5-10. (2021).

CHAPTER 4: FINDING AND DISCUSSION

4.1 Systematic analysis table

Sl. No.	Author and year	Title	Aim	Method used	Main findings
1.	Danique L. M. Radder, LÍgia Silva de Lima, A., <i>et al.</i> 2021	“Physiotherapy in Parkinson’s Disease: A Meta-Analysis of Present Treatment Modalities”	The study has the purpose to find recent physiotherapy interventions and conventional effectiveness of the patient of Parkinson’s disease.	Systematic search from different websites like PubMed, Embase and many more has been used to collect data.	Activities like walking, balancing and dancing can improve motor symptoms.
2.	Jennifer G. Goldman, Volpe, D., <i>et al.</i> 2024	“Delivering Multidisciplinary Rehabilitation Care in Parkinson’s Disease: An International Consensus Statement”	“This study aims to identify the goal of the International Parkinson’s Foundation Rehabilitation Medicine Task Force	Literature based on IPFRMT has been chosen to provide detailed review and systematic review has been performed.	Rehabilitation intervention plays a crucial role in the recovery process of “Parkinson’s disease”.

			(IPFRMT) to implement rehabilitation in Parkinson's disease care.”		
3.	RoopaRajan, Brennan, L. <i>et al.</i> 2020	“Integrated Care in Parkinson's Disease: A Systematic Review and Meta-Analysis”	The research focuses on the integrated care model that has been used in Parkinson's disease.	Systematic reviews have been used in the particular research based on the integrated model of selected disease.	“Outpatient integrated care” for Parkinson's disease can improve the health quality of patients.
4.	KsenijaSevcenko and Lindgren, I., 2022	“The effects of virtual reality training in stroke and Parkinson's disease rehabilitation: a systematic review and a perspective on usability”	“The Purpose of the study is to identify the impact of Virtual reality (VR) training in the patients of Parkinson's and Stroke disease.”	In this research systematic literatures have been searched based on the topic.	VR training has been effective for patients and helps to motivate patients suffering from the diseases.

Table 1: Systematic analysis table

(Source: Self-developed)

4.2 Findings

4.2.1 Assessing the importance of the physiotherapy to treat the neurological condition

In managing neurological conditions, physiotherapy is extremely important to improve overall quality of life. In providing mobility and balance physiotherapy plays a crucial role, it also helps in managing motor symptoms¹⁵. Parkinson's disease (PD) creates a great impact on the walking ability of patients and disrupts the coordination among organs. Physiotherapy delays the progression of the disease and provides a healthy lifestyle to patients. Training such as walking, dancing, daily exercise prescribed by professionals and balance practice can be able to improve the physical condition of patients.

4.2.2 Identifying the new physiotherapy approaches to manage Parkinson's disease patient in India

There are different physiotherapy approaches taken by the professional to improve the condition of patients suffering from PD. Teleneurorehabilitation (TNR), VR and mind-body exercise are the examples of the physiotherapy process implemented in such cases. The data can give the idea about the impact of the rehabilitation process like physiotherapy on the health condition of PD patients. In India this process has been used to treat patients of PD as TNR increases the accessibility and makes the communication easy with professionals. Such approaches help in improving the health condition of patients and provide them a quality of life.

Parameters	Pre-treatment	Post-treatment	t	P*
MDS-UPDRS II	12.2 (7.9)	12.1 (7.4)	-1.71	0.104
MDS-UPDRS III	36.6 (17.1)	37.2 (18.1)	2.02	0.060
PDQ-8-SI	27.4 (22.3)	26.1 (21.1)	1.71	0.104
NMSS	37.8 (38.3)	38.1 (39.2)	1.44	0.167
*Dependent t test used				

Figure 4.2.2: Impact of the rehabilitation process

(Source:¹⁶)

4.2.3 Discussing the purpose of strategies to limit the terrible impact of neurological conditions on the physical movement of the Parkinson's patient

¹⁵Danique L.M. Radder, Lígia Silva de Lima, A., et al. "Physiotherapy in Parkinson's disease: a meta-analysis of present treatment modalities." *Neurorehabilitation and neural repair*, 34(10), 871-880. (2020).

¹⁶Divyani Garg, Majumdar, R., et al. "Teleneurorehabilitation among person with Parkinson's disease in India: The initial experience and barriers to implementation." *Annals of Indian Academy of Neurology*, 24(4), 536-541. (2021).

The primary goal of strategies is physiotherapy to reduce the impact of the disease from the body function of PD patients. Modification of lifestyle gives therapeutic benefits and helps in improving physical movement. “Pharmacologic dopamine replacement strategy” and alternative medicines are also important in minimising the impact of the disease like PD¹⁷. Strategies related to different therapies taken by health professionals to identify the progress of the diseases in the body of a patient and try to limit its impact from the patients. “Motor symptoms” are quite common in this disease, effective strategies control these symptoms.

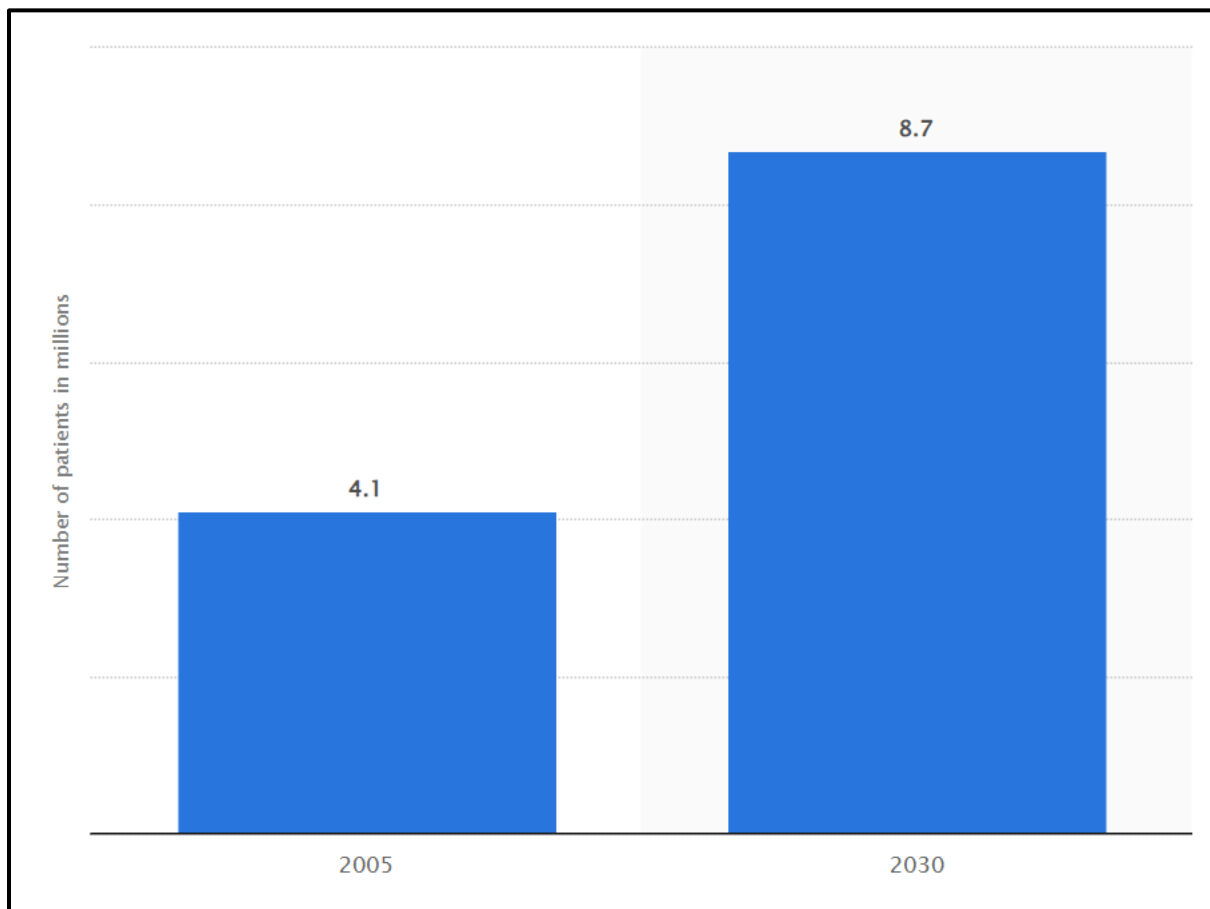


Figure 4.2.3: Increase of PD in the world

(Source:¹⁸)

¹⁷Frank C. Church. “Treatment options for motor and non-motor symptoms of Parkinson’s disease”. *Biomolecules*, 11(4), 612. (2021)

¹⁸Satista Research Department (2024). Projected worldwide increase in prevalence of Parkinson’s disease in 2005 and 2030. statista. available at: <https://www.statista.com/statistics/215459/projected-worldwide-increase-in-prevalence-of-parkinsons-diseas/> (last visited on October 9, 2024)

The above graph suggests the increase of PD which increases the need of different strategies to improve the condition of situation related to the disease. In this graph the data of world from 2005 to 2030 has been provided and also the projected increases of the disease have been provided in the graph. The purpose of strategies needs to be strong and implementation process need to be quick to reduce the impact of the disease.

4.3 Discussion

The themes and systematic table suggest the importance of physiotherapy to improve the condition of patients suffering from PD. The new physiotherapy approaches such as rehabilitation, TNR and exercise of mind-body have created a significant impact on the recovery process from the neurological condition. In this chapter the approaches taken by professionals of India has been discussed and provides its effectiveness among patients. Purpose of new strategies are dependent on the condition of patients and the impact of this disease in the patient's body.

CHAPTER 5: CONCLUSION AND LIMITATIONS

5.1 Conclusion

PD is a neurological disease that has an impact on movement of people and also disrupts balance. Influence of PD in neural mechanisms and appropriate neuro physiotherapy approaches have been necessary for control symptoms. Cognitive decline is one of the common physical conditions that can be seen in this disease. “Secondary qualitative data” and related approaches has been appropriate for the study. The finding based on the systematic tables and prepared themes suggests the importance of physiotherapy based on PD.

5.2 Limitations

The present study only focuses on the “secondary qualitative data” however, “primary quantitative data” helps to provide more detail about the disease. In a limited time, some information may not be included in the research work. These are the limitations of this study and need to improve in further research.

5.3 Recommendation

Early intervention of physiotherapy and life-style modification can minimise the impact of this disease among patients. In preventing complications “early intervention of physiotherapy” is extremely necessary and it also detects motor symptoms¹⁹. Modification of life-style supports the physiotherapy approaches that have been taken by health professionals. This process helps the PD patients to recover from the condition and lead a healthy life.

¹⁹RaqualBouça-Machado, Rosário, A., *et al.* “Physical activity, exercise, and physiotherapy in Parkinson's disease: defining the concepts”. *Movement disorders clinical practice*, 7(1), 7-15. (2020).

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