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Original Article

Empowering Health: Revolutionizing Care for Non-Communicable and Neurodegenerative Diseases in Diverse Pakistani Communities through Adapted Physical Activity and Physical Therapy

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ABSTRACT

Background: Physical inactivity is a major modifiable risk factor for non-communicable diseases (NCDs) and neurodegenerative diseases, impacting global health significantly. In Pakistan, these health challenges are exacerbated by disparities in health awareness and access between urban and rural communities.

Objective: This study aims to investigate the awareness and utilization of adapted physical activity and physical therapy as a treatment for NCDs and neurodegenerative diseases in Pakistani communities, with a focus on understanding the influence of educational background and geographical location.

Methods: An exploratory mixed-methods design was utilized, combining quantitative and qualitative approaches. A total of 500 participants (250 from urban and 250 from rural areas) were recruited using a convenience sampling method. Quantitative data were collected through structured questionnaires, focusing on demographics, awareness levels, and barriers to accessing adapted physical activity and physical therapy. Qualitative data were gathered via in-depth interviews and focus group discussions. Statistical analyses included paired t-tests and ANOVA to examine differences based on educational levels and geographic location.

Results: The study revealed a balanced gender distribution (50% male and 50% female). Significant differences in awareness and utilization based on educational background were observed, with mean scores for "PTA_Rural- Education" at 49.488 (SD = 28.976) and "PTA_Urban- Education" at 47.880 (SD = 29.447), both with p-values of .000. ANOVA results indicated significant differences in the means for variables such as "PTA_NCD_Kits" ($p = 0.032$), "PTA_Treatment" ($p = 0.020$), and "PTA_Neurodegenerative" ($p = 0.01$), suggesting variations in treatment approaches and knowledge regarding NCDs and neurodegenerative diseases across different groups.

Conclusion: The study highlights the impact of educational background and geographic location on the awareness and utilization of adapted physical activity and physical therapy in Pakistani communities. These findings underscore the need for targeted health interventions and educational programs to address the disparities in health service accessibility and effectiveness in rural and urban areas.

Keywords: Non-Communicable Diseases, Neurodegenerative Diseases, Adapted Physical Activity, Physical Therapy, Health Awareness, Pakistan, Education, Rural and Urban Health Disparities.

INTRODUCTION

Physical inactivity, a primary modifiable risk factor, detrimentally impacts health and well-being. Acknowledged as a crucial preventive strategy, regular physical exercise is vital for optimal bodily function and health maintenance. The World Health

Journal of Health and Rehabilitation Research 2791-156X JHRR

Organization (WHO) underscores the psycho-physical benefits of consistent physical activity, noting its necessity in averting sedentary lifestyle-related diseases (1,2,3).

The journey of health awareness commences with information acquisition. Individuals gain knowledge through diverse channels, including educational programs, healthcare professionals, media, and community initiatives. This information undergoes cognitive processing involving attention, perception, comprehension, and retention (4). The WHO reports that Non-communicable diseases (NCDs) account for 74% of global deaths annually, with 41 million fatalities. In Asia, NCDs contribute to 47% of the global disease burden, exacerbated by rapid urbanization (5,6,7).

In Pakistan, adapted physical activity and physical therapy emerge as potent treatments for NCDs and neurodegenerative diseases, prevalent in both rural and urban settings. Addressing associated risk factors can prevent numerous non-communicable diseases (8,9). Rural Pakistani communities, while rich in communal ties and traditional values, face challenges including poverty, limited healthcare and education access, inadequate amenities, economic constraints, and environmental degradation (10). Conversely, urban areas offer diverse, fast-paced lifestyles with education and employment opportunities. However, urban challenges like traffic, pollution, and affordable housing scarcity impede low-income families' access to essential services (11).

Neurodegenerative diseases, encompassing Alzheimer's, Parkinson's, Huntington's diseases, and ALS, are marked by progressive neuronal degeneration (12). Their heterogeneous nature and complex pathophysiological mechanisms result in a spectrum of symptoms like memory loss, cognitive decline, movement disorders, muscle weakness, and mood changes. The severity and progression of these symptoms vary across individuals and diseases (13,14,15). Treatment focuses on symptom management, slowing progression, and enhancing life quality. This includes medications like cholinesterase inhibitors and levodopa, along with rehabilitative therapies (physical, occupational, speech) and supportive care (16).

This study aims to evaluate awareness, barriers, attitudes, and usage of adapted physical activity and physical therapy in Pakistani communities, considering the limited literature on these topics. Understanding these aspects is crucial for addressing health issues and enhancing population well-being in both rural and urban settings.

MATERIALS AND METHODS

The study employed an exploratory mixed-methods research design, incorporating both quantitative and qualitative approaches to data collection and analysis. A convenience sampling technique was utilized, selecting individuals who were readily accessible and met the established inclusion criteria. The sample comprised 500 individuals.

For the quantitative component, data were gathered from healthcare facilities in both rural and urban areas of Pakistan, including hospitals and clinics. Additional participants were recruited from the general population in community settings like public parks and community centers.

The qualitative data were obtained through in-depth interviews and focus group discussions with patients, healthcare professionals, and policymakers, conducted in healthcare facilities, community centers, or public spaces in both rural and urban settings.

The inclusion criteria for the quantitative study encompassed individuals aged 18 and above, diagnosed with non-communicable diseases (e.g., diabetes, hypertension, cardiovascular diseases) and neurodegenerative diseases (e.g., Alzheimer's, Parkinson's disease) in both rural and urban regions. For the qualitative component, included participants were those with experience or knowledge concerning adapted physical activity and physical therapy for these diseases in both areas.

Exclusion criteria for the quantitative study included individuals with severe medical conditions precluding participation in physical activity or therapy, pregnant individuals, and those unable to provide informed consent. For the qualitative study, excluded were individuals lacking experience or knowledge regarding adapted physical activity and physical therapy for the specified diseases.

Participants were divided into two groups: 250 in the Urban Group and 250 in the Rural Group. The quantitative study involved administering a structured questionnaire developed from existing validated scales and instruments. This questionnaire aimed to collect demographic data, assess awareness levels, identify barriers to access, and measure attitudes and perceptions towards adapted physical activity and physical therapy. It underwent a pilot test to ensure its clarity, relevance, and reliability.

RESULTS

Table I presented a balanced gender distribution among the study participants. Both female and male participants were equally represented, each comprising 50% of the total sample (250 individuals per gender), amounting to a combined total of 500 participants. This equal distribution facilitated an unbiased examination of gender-specific responses in subsequent analyses.

Table II delineated the influence of education on Physical Therapy Awareness (PTA) in rural and urban settings. The mean score for "PTA_Rural- Education" stood at 49.488 with a standard deviation of 28.976, while "PTA_Urban- Education" exhibited a mean of 47.880 and a standard deviation of 29.447. The significance values (p-values) for both were .000, indicating highly significant

Journal of Health and Rehabilitation Research 2791-156X JHRR

differences in PTA based on educational levels in both settings. These results, with p-values substantially below the conventional threshold of 0.05, led to the rejection of the null hypothesis (no difference in mean scores based on education) and acceptance of the alternative hypothesis (significant educational influence on PTA).

Table III outlined the Analysis of Variance (ANOVA) results for various PTA-related variables across different groups. This analysis aimed to discern significant differences in mean scores among different phases or groups for the variables PTA_Urban, PTA_NCD_Kits, PTA_Treatment, and PTA_Neurodegenerative.

Table 1 Gender Distribution

Gender	Frequency	Percent
Female	250	50%
Male	250	50%
Total	500	100%

Table 2 Paired T-Test Results for PTA Based on Education

Variable	Mean ± Std. Deviation	P value
PTA_Rural- Education	49.488 ± 28.976	.000
PTA_Urban- Education	47.880 ± 29.447	.000

Table 3 ANOVA Results for Various PTA Variables

Variables	Group	Mean Square	P value
PTA_Urban	Between Groups	962.64	0.05
	Within Groups	866.954	
PTA_NCD_Kits	Between Groups	3.116	.032
	Within Groups	845.058	
PTA_Treatment	Between Groups	271.221	.020
	Within Groups	846.647	
PTA_Neurodegenerative	Between Groups	830.630	0.01
	Within Groups	841.961	

DISCUSSION

The findings of this exploratory mixed-methods study provide critical insights into the awareness and utilization of adapted physical activity and physical therapy for non-communicable diseases (NCDs) and neurodegenerative diseases in Pakistan's diverse rural and urban settings. The study's robust design, integrating quantitative and qualitative approaches, enabled a comprehensive exploration of the research objectives.

A key finding is the significant variation in awareness and utilization of health services related to education levels. This is evident from the disparity in mean scores for "PTA_Rural- Education" (M = 49.488, SD = 28.976) and "PTA_Urban Education" (M = 47.880, SD = 29.447), with a significant t-test result (p = .000). This underscores the impact of education on health literacy, aligning with existing research that highlights education as a crucial determinant of health awareness and behavior (17). Individuals with varying educational backgrounds exhibit different levels of understanding and engagement with adapted physical activity and physical therapy, necessitating targeted educational interventions to bridge this gap.

The study also reveals significant differences in mean scores related to NCD kits and treatment strategies, as evidenced by the ANOVA results for "PTA_NCD_Kits" (p = 0.032) and "PTA_Treatment" (p = 0.020). This finding resonates with literature emphasizing the importance of tailored health interventions and treatments for specific conditions (18,19). It highlights the need for customized approaches in healthcare, considering the specific needs and conditions of individuals, particularly in managing NCDs and neurodegenerative diseases.

Interestingly, the lack of significant differences in the "PTA_Urban" variable across groups, despite P values of 0.001 and 0.005, indicates a relative consistency in urban areas. However, this does not imply a homogenous level of awareness and utilization of

Journal of Health and Rehabilitation Research 2791-156X JHRR

health services in these areas. Factors such as healthcare access, affordability, and infrastructure play a crucial role in determining the effectiveness of adapted physical activity and physical therapy in urban settings.

This study contributes significantly to the body of knowledge on managing NCDs and neurodegenerative diseases through adapted physical activity and physical therapy. It emphasizes the importance of considering factors like education, geographic location, and specific health conditions when designing and implementing healthcare interventions. The findings hold considerable implications for healthcare providers, policymakers, and organizations focused on empowering communities with the necessary knowledge and resources to combat these diseases. Enhancing awareness and access to adapted physical activity and physical therapy can lead to improved health outcomes and quality of life for individuals affected by NCDs and neurodegenerative diseases.

In summary, the study underscores the necessity of targeted health promotion and intervention strategies tailored to the unique needs of Pakistani communities. It calls for a multi-faceted approach that considers educational, regional, and health condition-specific factors in health service delivery, aiming to optimize outcomes and improve the lives of those affected by these

CONCLUSION

This study conclusively demonstrates the critical role of education, geographic location, and specific health conditions in influencing the awareness and utilization of adapted physical activity and physical therapy for non-communicable and neurodegenerative diseases in Pakistan. The significant disparities observed in awareness levels based on education, and the effectiveness of treatment strategies, underscore the necessity for customized health interventions. These findings have profound implications for healthcare providers, policymakers, and community leaders. They emphasize the need for targeted educational programs and healthcare initiatives that address the unique challenges and requirements of different populations, particularly in rural and urban settings. By focusing on these key areas, there is potential to significantly enhance health outcomes, improve access to effective therapies, and ultimately uplift the quality of life for individuals affected by these conditions in diverse Pakistani communities.

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Journal of Health and Rehabilitation Research 2791-156X JHRR

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