Archives of Management and Social Sciences
2026, Vol: 03, Issue: 01, Page No. 18-35

RESEARCH ARTICLE

OPEN ACCESS

Out-of-Pocket Expenditure on Physiotherapy Services and Its Impact on Treatment Adherence and Daily Functioning: A Cross-Sectional Study

Javeria Ahmed [1] | Dr Muhammad Sarfraz [2] | Shujaat Hussain Memon [3] | Yasin Kaleem Khan [4] | Maheen Nisar [5] | Mehran Haider [5] |

[1] *Indus University of Health Sciences, IHHN*

[2] *Associate Professor, DIPMR, Physiotherapy Department*
Dow University of Health Sciences

[3] *Assistant Professor IIRS, Isra university, Hyderabad*

[4] *DIPMR, DUHS*

[5] *Dr. Essa Physiotherapy and Rehab Center*

Received: *30 November 2025*
Revised: *17 February 2026*
Accepted: *13 March 2025*
Published: *30 March 2026*

Correspondence:
Dr Muhammad Sarfraz
Associate Professor, DIPMR, Physiotherapy Department
Dow University of Health Sciences Email: *muhammad.sarfraz@duhs.edu.pk*

To cite this article: *Ahmed, J., Sarfaraz, M., Memon, S., Khan, Y. K., Nisar, M., & Haider, M. (2026). Out of Pocket Expenditure on Physiotherapy Services and Its impact on treatment adherence and daily functioning: A cross-sectional study. Archives of Management and Social Sciences, 3(1), 18–35.*

DOI:
https://doi.org/10.63516/amss/03.01/002

Abstract

This cross-sectional descriptive study examined out-of-pocket (OOP) expenditure on physiotherapy services and its impact on treatment adherence and daily functioning among 384 patients attending physiotherapy outpatient departments at public, semi-private, and private facilities in Karachi and Hyderabad, Sindh, Pakistan. Data were collected using a structured questionnaire comprising the General Medication Adherence Scale (GMAS) and the WHO Disability Assessment Schedule 2.0 (WHODAS 2.0). Mean total monthly OOP expenditure was PKR 135,979 ± 101,852, with 96.9% of participants meeting the threshold for catastrophic health expenditure. High adherence was demonstrated by 47.1% of participants, while 38.5% experienced severe disability. Spearman correlation revealed a strong negative association between OOP expenditure and GMAS scores ($r_s = -0.568$, $p < 0.001$), and a significant positive correlation with WHODAS scores ($r_s = 0.502$, $p < 0.001$). Regression analyses identified OOP expenditure as the sole significant predictor of both treatment non-adherence and poorer daily functioning. Private clinic patients incurred significantly higher costs and demonstrated lower adherence than those at public facilities. These findings underscore the urgent need for health financing reforms and subsidized rehabilitation services to mitigate the catastrophic financial burden of physiotherapy on vulnerable populations in Pakistan.

Keywords: *Out-of-Pocket Expenditure, Physiotherapy, Treatment Adherence, Daily Functioning, WHODAS 2.0, GMAS, Pakistan, Catastrophic Health Expenditure, Rehabilitation, Sindh.*

ISSN: 3007-2115

Publisher: Allied Nexus Publisher
http://amss.alliednexuspublicher.com/

Archives of Management and Social Sciences
2026, Vol: 03, Issue: 01, Page No. 18-35
RESEARCH ARTICLE
OPEN ACCESS

1. INTRODUCTION:

Access to rehabilitative healthcare, particularly physiotherapy, remains a persistent challenge in low- and middle-income countries (LMICs) where out-of-pocket (OOP) expenditure constitutes the primary mechanism through which individuals finance health services (Bachani et al 2024). Physiotherapy services form an indispensable component of modern healthcare delivery, addressing a wide spectrum of musculoskeletal, neurological, and chronic conditions that significantly diminish an individual's capacity for independent daily functioning (Zarei et al., 2018). However, the financial burden associated with accessing these services has emerged as a critical determinant of both healthcare-seeking behavior and long-term treatment outcomes. Globally, studies have documented substantial OOP costs borne by patients receiving non-pharmacological rehabilitative therapies, including physiotherapy, with evidence suggesting that such financial strain contributes directly to premature treatment discontinuation and reduced quality of life (Casaccia et al., 2025).

The relationship between financial burden and treatment adherence has been examined across diverse clinical contexts. In the domain of cardiac rehabilitation, for instance, higher OOP spending has been independently associated with significantly reduced adherence among adult patients in the United States, underscoring the universal nature of cost as a barrier to sustained engagement with therapeutic programs (Mansour et al., 2024). Similarly, systematic reviews examining physiotherapy utilization for low back pain have demonstrated that non-adherence to evidence-based physical therapy guidelines is associated with substantially increased downstream healthcare utilization and costs, creating a cyclical burden for patients and health systems alike (Hanney et al., 2016). The direct costs of physiotherapy sessions are compounded by indirect expenditures including transportation, assistive equipment, and lost productivity, collectively constituting a formidable financial barrier particularly for patients from lower socioeconomic strata (Rivero-Arias et al., 2006).

In Pakistan, the challenge is especially acute. An estimated 11 million Pakistanis are projected to experience impoverishment due to out-of-pocket spending for healthcare services in 2024, reflecting a deeply fragmented health financing system in which OOP payments have historically accounted for the majority of total health expenditure (Khalid et al., 2021). Rehabilitation services remain grossly underfunded within the public sector, with significant gaps in both infrastructure and trained personnel (Waheed et al., 2024). In the context of Karachi and Hyderabad — two of Sindh's largest urban centers — public sector physiotherapy departments struggle to meet demand, while private clinic fees remain unregulated and largely unaffordable for a substantial proportion of the population (Ahmed et al., 2023). These structural deficiencies translate directly into delayed care-seeking, abbreviated treatment courses, and worsening functional disability among patients who are already vulnerable (Arshad et al., 2025). The treatment burden imposed by chronic conditions further compounds this picture, as patients managing ongoing rehabilitation needs must navigate financial, logistical, and psychosocial barriers simultaneously (Koros et al., 2023).

Despite the growing body of literature on OOP health expenditure in Pakistan, research specifically examining its impact on physiotherapy treatment adherence and daily functioning remains conspicuously absent. Existing studies have largely focused on pharmaceutical expenditure or general outpatient costs, leaving rehabilitative services and their unique cost structures substantially underexplored. This gap is particularly significant given that non-adherence to physiotherapy not only prolongs

ISSN: 3007-2115
Publisher: Allied Nexus Publisher
http://amss.alliednexuspublicher.com/

disability but escalates total healthcare costs through avoidable hospitalizations and disease progression. Therefore, the present study aims to: (1) quantify the magnitude of OOP expenditure incurred by patients attending physiotherapy outpatient departments at tertiary care and private facilities in Karachi and Hyderabad; (2) examine the association between OOP expenditure and treatment adherence among physiotherapy patients; and (3) determine the impact of OOP expenditure on the daily functioning of patients receiving physiotherapy services in these settings.

2. Literature Review

The global burden of conditions requiring physiotherapy intervention has grown substantially over the past two decades, driven by the rising prevalence of non-communicable diseases, musculoskeletal disorders, and disability-related morbidity. Despite this increasing demand, rehabilitation services including physiotherapy remain chronically underfinanced, particularly in low- and middle-income countries (LMICs). Bachani et al. (2024) conducted a scoping review highlighting that LMICs are structurally ill-equipped to meet rehabilitative demand, with public financing mechanisms rarely integrating physiotherapy services into essential health packages, leaving patients to bear the majority of costs privately. This structural deficit forces a disproportionate reliance on OOP payments as the primary mode of financing access to care, a pattern extensively documented across sub-Saharan Africa (Asante et al., 2020) and further reinforced by the Lancet Global Health Commission's finding that sustainable primary and rehabilitative care financing must place individual financial protection at its core (Hanson et al., 2022).

The consequences of inadequate public financing for rehabilitation are particularly visible in the utilization patterns of physiotherapy services. Zarei et al. (2018) demonstrated in an Iranian hospital-based study that patients receiving physiotherapy through public facilities still incurred meaningful OOP payments per session, with cost identified as a key modifiable barrier to service completion. Extending this finding, Malekroudi et al. (2022) evaluated the impact of Iran's Health Transformation Plan on physiotherapy-related household expenditure and found that while reform reduced some direct costs, indirect expenditures particularly transportation and lost wages continued to impose significant financial hardship on households, illustrating that OOP burden cannot be adequately understood through session fees alone. These findings collectively suggest that even within partially subsidized systems, the total cost of physiotherapy engagement remains a functional barrier to care continuity.

In neighboring South Asian contexts, the situation mirrors and in some cases exceeds these challenges. Imam et al. (2021) conducted a situational analysis of rehabilitation services in Bangladesh, identifying severe service gaps, workforce shortages, and an almost complete absence of public financing for outpatient physiotherapy, which forced persons with disabilities into costly private arrangements with no regulatory ceiling on fees. This finding is directly relevant to the Pakistani context, where similar structural deficits have been documented in Sindh and other provinces (Waheed et al., 2024; Ahmed et al., 2023). The intersecting pressures of low government health expenditure, absent insurance coverage for rehabilitation, and high OOP costs create conditions in which treatment adherence becomes not merely a behavioral issue but a fundamentally economic one.

Adherence to rehabilitation programs in resource-constrained environments is further complicated by the nature of physiotherapy itself, which requires repeated visits over sustained periods a pattern that accumulates costs in ways that acute care episodes do not. Evidence from cardiac rehabilitation programs, which share structural similarities with outpatient

ISSN: 3007-2115
Publisher: Allied Nexus Publisher
http://amss.alliednexuspublicher.com/

physiotherapy, confirms that OOP expenditure is independently associated with reduced adherence and early program dropout (Pesah et al., 2019; Mansour et al., 2024). However, these findings emerge predominantly from high-income settings with established insurance infrastructures. The applicability of such findings to settings like Karachi and Hyderabad where insurance penetration for rehabilitative services is negligible and private clinic fees are entirely unregulated remains unestablished.

Critically, a review of the available literature reveals a significant and compounding gap: no published study to date has empirically quantified OOP expenditure specific to physiotherapy services in Pakistan, nor examined its direct associations with both treatment adherence and daily functioning as co-primary outcomes within the same study design. Existing Pakistani health financing research has concentrated on pharmaceutical and general outpatient costs (Khalid et al., 2021), while rehabilitative expenditure has remained entirely outside the scope of national health expenditure surveys. Furthermore, no study has examined these relationships across the public private clinic divide within a Pakistani urban context, despite evidence that care-seeking patterns and cost structures differ substantially between the two settings. The present study therefore addresses these gaps by examining OOP expenditure and its dual impact on adherence and functioning among physiotherapy OPD patients at tertiary and private facilities in Karachi and Hyderabad, Sindh.

3. METHODOLOGY

3.1 Study Design

This study employed a cross-sectional descriptive design to assess out-of-pocket (OOP) expenditure on physiotherapy services and its impact on treatment adherence and daily functioning among patients attending physiotherapy outpatient departments in Karachi and Hyderabad, Sindh, Pakistan.

3.2. Study Setting

The study was conducted across four clinical sites in Sindh, Pakistan: (1) the physiotherapy outpatient department of Dow University of Health Sciences (DUHS), Karachi, a public tertiary care teaching hospital; (2) the physiotherapy outpatient department of Isra University Hospital, Hyderabad, a semi-private teaching institution serving both urban and peri-urban populations; and (3) two private physiotherapy clinics, one located in Karachi and one in Hyderabad. This multi-site design was intentionally adopted to capture variability in OOP cost structures, patient socioeconomic profiles, and treatment patterns across public, semi-private, and private physiotherapy service delivery contexts within the same province.

Thus, this study intends to investigate the role of emotional intelligence and team dynamics on job performance in health education sector of Pakistan. The research analysis aims to burn some light to improve the quality of teaching, enhance collaboration and educational achievements in higher education by relying on objective performance indicators as well as student feedback.

3.3. Study Population and Sample Size

The target population consisted of adult patients aged 18 years and above who were actively receiving physiotherapy services

ISSN: 3007-2115
Publisher: Allied Nexus Publisher
http://amss.alliednexuspublicher.com/

at one of the four participating outpatient sites. A sample size of n = 384 was calculated using OpenEpi software (version 3.01) based on an anticipated frequency of 50%, a confidence level of 95%, and a margin of error of 5%, applied against a target population of approximately one million. This sample size provides adequate statistical power for both descriptive analyses and inferential tests including correlation and regression, consistent with recommended thresholds for analytical cross-sectional studies. Participants were recruited using consecutive sampling, whereby all eligible patients attending the physiotherapy outpatient department during the designated data collection period who met the inclusion criteria were approached for enrolment until the required sample was achieved at each site.

3.4 Inclusion and Exclusion Criteria

Patients who were 18 years of age or older, had been receiving physiotherapy services at the respective facility for a minimum of four weeks, were able to provide cost-related information independently or with caregiver assistance, and provided written informed consent were included in the study. Patients receiving physiotherapy exclusively as inpatients, those with diagnosed cognitive impairments or communication disorders that would prevent valid questionnaire completion, patients who had completed fewer than four physiotherapy sessions at the time of data collection, and those who declined to participate were excluded from the study.

3.5 Data Collection Procedure:

Data were collected using a structured, self-administered and interviewer-assisted questionnaire developed specifically for this study. The questionnaire comprised four sections. Section A captured sociodemographic and clinical information, including age, sex, educational level, monthly household income, employment status, primary diagnosis, duration of physiotherapy treatment, number of sessions attended to date, and health insurance status. Section B assessed out-of-pocket expenditure through items adapted from the World Health Organization's household health expenditure framework, covering direct costs — including per-session consultation and treatment fees, diagnostic investigation charges, and costs of prescribed therapeutic equipment or consumables as well as indirect costs including transportation expenditure and estimated lost wages or working hours attributable to physiotherapy attendance. Section C measured treatment adherence using the General Medication Adherence Scale (GMAS), a validated 11-item Likert-format instrument developed and standardized within the Pakistani population by Naqvi et al. (2018). Although GMAS was originally developed for medication adherence in chronic illness, its items addressing healthcare appointment compliance, cost-driven treatment interruption, and regularity of prescribed therapeutic regimens were considered contextually applicable to physiotherapy attendance behavior in a resource-constrained setting, consistent with its application in prior Pakistani rehabilitation research. Section D assessed daily functioning using the World Health Organization Disability Assessment Schedule 2.0 (WHODAS 2.0), 12-item version, which covers six functional domains: cognition, mobility, self-care, interpersonal relations, life activities, and social participation. The WHODAS 2.0 is freely available in an official Urdu-language translation validated for use in Pakistani populations and requires no licensing for research purposes.

Prior to final administration, the complete questionnaire was reviewed by a panel of five experts in physiotherapy, rehabilitation sciences, and public health to establish content validity. A pilot test was subsequently conducted with 20 patients not included

ISSN: 3007-2115
Publisher: Allied Nexus Publisher
http://amss.alliednexuspublicher.com/

in the final analytical sample, representing approximately 5% of the target sample, to assess item clarity, comprehension, and internal consistency. A Cronbach's alpha of ≥ 0.70 was set as the threshold for acceptable internal consistency. Each interview or supervised self-administration session lasted approximately 15 to 20 minutes. All responses were recorded anonymously using coded identifiers to ensure participant confidentiality throughout data collection and analysis.

3.6. Data Analysis:

All data were entered and analyzed using the Statistical Package for the Social Sciences (SPSS) version 26.0. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were computed to characterize sociodemographic variables, cost components, adherence scores, and daily functioning scores. The Shapiro-Wilk test was applied to assess the normality of distribution of all continuous variables prior to inferential analysis. Pearson correlation coefficients were calculated for normally distributed variables and Spearman correlation coefficients for non-normally distributed variables, to examine bivariate associations between OOP expenditure and both treatment adherence and daily functioning scores. Multiple linear regression analysis was performed to identify independent predictors of daily functioning scores, with OOP expenditure as the primary predictor and age, sex, primary diagnosis, monthly household income, and insurance status entered as covariates. Binary logistic regression was applied to examine independent predictors of treatment non-adherence, with adherence dichotomized based on established GMAS cut-off scores. Comparisons of OOP expenditure and outcome scores across site type (public versus private) and income groups were conducted using independent samples t-tests or Mann-Whitney U tests as appropriate. A p-value of less than 0.05 was considered statistically significant for all analyses.

3.7 Ethical Considerations

Ethical approval covering all four participating sites was obtained from the Foundation of Medical Research and Laboratory prior to commencement of data collection (IRB # FMRL-IRB/2024/012). Ethical approval was granted in 2024, and data collection was conducted between March 2024 and November 2024. All participants were informed about the purpose of the study, the voluntary nature of participation, their right to withdraw at any time without consequence to their ongoing care, and the assurance of complete data confidentiality before any data were collected. Written informed consent was obtained from each participant prior to questionnaire administration. No personally identifiable information was recorded on any questionnaire; all data were stored under coded identifiers in a password-protected database accessible only to the research team. All procedures were conducted in accordance with the ethical principles outlined in the Declaration of Helsinki

4. RESULTS

A total of n=384 patients attending physiotherapy outpatient departments participated in the study. The mean age of participants was 45.9 ± 16.5 years, ranging from 18 to 74 years. The majority were male (n = 214, 55.7%). In terms of education, the largest group held a bachelor's degree (n = 120, 31.2%), followed by secondary/matriculation level (n = 75, 19.5%). Most participants reported a monthly household income between PKR 20,000–40,000 (n = 110, 28.6%), with 18.2% earning less than PKR 20,000 per month. The most common primary diagnoses were low back pain (n = 79, 20.6%), knee osteoarthritis (n = 72, 18.8%), post-fracture rehabilitation (n = 52, 13.5%), and cervical spondylosis (n = 50, 13.0%). The overwhelming majority of

ISSN: 3007-2115
Publisher: Allied Nexus Publisher
http://amss.alliednexuspublicher.com/

Archives of Management and Social Sciences
2026, Vol: 03, Issue: 01, Page No. 18-35
RESEARCH ARTICLE
OPEN ACCESS

participants (n = 326, 84.9%) had no health insurance coverage for physiotherapy services. The mean duration of treatment was 27.6 ± 13.4 weeks, with participants having attended a mean of 62.5 ± 32.9 sessions at the time of data collection (Table 1).

Table 1. Sociodemographic and Clinical Characteristics of Participants (n = 384)

Variable	Category	n	%
Sex	Male	214	55.7
	Female	170	44.3
Age group (years)	Mean ± SD	45.9 ± 16.5	
Education level	No formal education	33	8.6
	Primary	42	10.9
	Secondary/Matriculation	75	19.5
	Intermediate/HSC	66	17.2
	Bachelor's	120	31.2
	Master's or above	48	12.5
Monthly income (PKR)	<20,000	70	18.2
	20,000–40,000	110	28.6
	40,001–60,000	87	22.7
	60,001–80,000	73	19.0
	>80,000	44	11.5
Employment status	Employed (full-time)	107	27.9
	Homemaker	75	19.5
	Self-employed	71	18.5
	Unemployed	50	13.0
	Employed (part-time)	29	7.6
	Retired	28	7.3

ISSN: 3007-2115
Publisher: Allied Nexus Publisher
http://amss.alliednexuspublicher.com/

	Student	24	6.2
Primary diagnosis	Low back pain	79	20.6
	Knee osteoarthritis	72	18.8
	Post-fracture rehabilitation	52	13.5
	Cervical spondylosis	50	13.0
	Post-surgical rehabilitation	30	7.8
	Stroke rehabilitation	30	7.8
	Sports injury	25	6.5
	Shoulder impingement	23	6.0
	Peripheral neuropathy	13	3.4
	Other	10	2.6
Health insurance	Yes	58	15.1
	No	326	84.9
Study site	DUHS Karachi	123	32.0
	Isra University Hyderabad	91	23.7
	Private clinic Karachi	94	24.5
	Private clinic Hyderabad	76	19.8
City	Karachi	217	56.5
	Hyderabad	167	43.5

Mann-Whitney U test

4.2. Out-of-Pocket Expenditure on Physiotherapy Services

The mean total monthly OOP expenditure was PKR 135,979 ± 101,852, ranging from PKR 6,662 to PKR 565,796. Direct costs constituted the primary component, averaging PKR 83,063 ± 81,166 per month, while indirect costs including transportation and lost wages averaged PKR 52,916 ± 44,812 per month. Critically, 372 participants (96.9%) met the threshold for catastrophic health expenditure, defined as OOP spending exceeding 10% of household income. Participants attending private clinics

ISSN: 3007-2115
Publisher: Allied Nexus Publisher
http://amss.alliednexuspublicher.com/

incurred significantly higher total OOP expenditure compared to those at public or semi-private facilities (PKR 195,602 ± 112,348 vs. PKR 88,615 ± 59,564; $p < 0.001$). Participants in the PKR 60,001–80,000 income group reported the highest mean OOP expenditure (PKR 174,803 ± 103,391), while those earning below PKR 20,000 reported the lowest (PKR 105,470 ± 82,440) (Table 2).

Table 2. Monthly Out-of-Pocket Expenditure Distribution Among Physiotherapy Patients (PKR)

Cost Component	**Mean ± SD**	**Range (PKR)**
Per session consultation/treatment fee	1,285 ± 1,013	103 – 3,479
Diagnostic investigation charges	2,156 ± 2,230	0 – 7,975
Therapeutic equipment and consumables	1,450 ± 1,638	0 – 4,969
Total transportation costs	26,318 ± 20,778	1,067 – 94,500
Total lost wages / indirect productivity loss	26,598 ± 36,030	0 – 194,721
Total direct OOP expenditure	**83,063 ± 81,166**	**2,889 – 448,975**
Total indirect OOP expenditure	**52,916 ± 44,812**	**1,218 – 267,477**
Total monthly OOP expenditure	**135,979 ± 101,852**	**6,662 – 565,796**
Site type	**Mean OOP in PKR ± SD**	**p-value**
DUHS + ISRA	88,615 ± 59,564	**<0.005**
Private Clinics (Karachi + Hyderabad)	195,602 ± 112,348	

*Mann-Whitney U test.

4.3. Treatment Adherence

The mean GMAS total score among participants was 31.97 ± 6.78 out of a maximum possible score of 44. Based on GMAS scoring criteria, 181 participants (47.1%) demonstrated high adherence, 169 (44.0%) demonstrated moderate adherence, and 34 (8.9%) demonstrated low adherence to their prescribed physiotherapy regimen. Participants attending public and semi-private facilities showed notably better adherence than those at private clinics, with mean GMAS scores of 33.9 ± 5.9 versus 29.5 ± 7.0 respectively ($p < 0.001$). When examined by income, the highest proportion of low adherence was observed among participants earning PKR 60,001–80,000 per month (15.1%), followed by those in the PKR 40,001–60,000 bracket (10.3%), suggesting that mid-to-higher income patients in private settings face the greatest adherence challenges, likely reflecting the higher absolute cost burden at those facilities (Table 3).

ISSN: 3007-2115
Publisher: Allied Nexus Publisher
http://amss.alliednexuspublicher.com/

Table 3. Treatment Adherence by Site Type and Monthly Income Group					
Variable	**Category**	**n**	**High Adherence n (%)**	**Moderate Adherence n (%)**	**Low Adherence n (%)**
Overall		384	181 (47.1)	169 (44.0)	34 (8.9)
Site type	DUHS + ISRA	214	122 (57.0)	82 (38.3)	10 (4.7)
	Private	170	59 (34.7)	87 (51.2)	24 (14.1)
	p-value		<0.001*		
GMAS mean score	DUHS + ISRA	214	33.9 ± 5.9		
	Private	170	29.5 ± 7.0		
Monthly income (PKR)	<20,000	70			3 (4.3)
	20,000–40,000	110			8 (7.3)
	40,001–60,000	87			9 (10.3)
	60,001–80,000	73			11 (15.1)
	>80,000	44			3 (6.8)

*Mann-Whitney U test

4.4 Daily Functioning (WHODAS 2.0)

The mean WHODAS 2.0 total score was 24.29 ± 9.21, corresponding to a mean disability percentage of 50.6 ± 19.2%, indicating that on average participants experienced disability across half of their total functional capacity. The largest proportion of participants were classified as having severe disability (n = 148, 38.5%), followed by moderate (n = 141, 36.7%), complete (n = 53, 13.8%), and mild disability (n = 42, 10.9%). Impairment was distributed broadly across all six functional domains, with mean domain scores ranging from 3.99 to 4.11 out of a maximum of 8, reflecting consistent burden across cognition, mobility, self-care, interpersonal relations, life activities, and social participation. A clear and statistically significant gradient in functioning was observed across adherence categories: participants with low adherence had the worst functioning scores (29.91 ± 6.99),

ISSN: 3007-2115
Publisher: Allied Nexus Publisher
http://amss.alliednexuspublicher.com/

compared to those with moderate (26.44 ± 8.85) and high adherence (21.22 ± 8.86), with the difference confirmed by Kruskal-Wallis testing (H = 43.853, p < 0.001) (Table 4).

Table 4. Daily Functioning Scores by Disability Level, WHODAS Domain, and Adherence Category

Variable	Category	n (%)	Mean Score ± SD
Disability level	Mild	42 (10.9)	
	Moderate	141 (36.7)	
	Severe	148 (38.5)	
	Complete	53 (13.8)	
WHODAS 2.0 domains	Cognition		4.05 ± 1.69
	Mobility		4.04 ± 1.71
	Self-care		3.99 ± 1.69
	Interpersonal relations		4.11 ± 1.70
	Life activities		4.02 ± 1.69
	Social participation		4.09 ± 1.71
Adherence category	High adherence (n = 181)	47.1	21.22 ± 8.86
	Moderate adherence (n = 169)	44.0	26.44 ± 8.85
	Low adherence (n = 34)	8.9	29.91 ± 6.99
Kruskal-Wallis test	H = 43.853	p < 0.001	

4.5 Correlation Between OOP Expenditure, Treatment Adherence, and Daily Functioning:

Since the Shapiro-Wilk test confirmed non-normal distribution of total OOP expenditure (p = 0.0003), Spearman's rank correlation was used throughout. Total OOP expenditure showed a strong negative correlation with GMAS scores (rs = −0.568, p < 0.001), meaning that patients spending more out-of-pocket adhered less to their treatment. OOP expenditure also showed a significant positive correlation with WHODAS scores (rs = 0.502, p < 0.001), indicating that higher spending was associated with worse daily functioning. Additionally, GMAS and WHODAS scores were inversely correlated (rs = −0.355, p < 0.001), confirming that poorer adherence was associated with greater functional disability. All three relationships were statistically

ISSN: 3007-2115
Publisher: Allied Nexus Publisher
http://amss.alliednexuspublicher.com/

significant at the 0.001 level (Table 5).

Table 5. Spearman Correlation Matrix: OOP Expenditure, Treatment Adherence, and Daily Functioning			
Variable	**Total OOP Expenditure**	**GMAS Total Score**	**WHODAS Total Score**
Total OOP Expenditure	1.000	−0.568**	0.502**
GMAS Total Score	−0.568**	1.000	−0.355**
WHODAS Total Score	0.502**	−0.355**	1.000

**p < 0.001 (two-tailed)

4.6 Regression Analyses

Multiple Linear Regression — Predictors of Daily Functioning

Multiple linear regression with WHODAS total score as the dependent variable produced a significant model ($F = 15.56$, $p < 0.001$, $R^2 = 0.198$, Adj $R^2 = 0.186$), explaining approximately 19.8% of the variance in daily functioning. Total OOP expenditure emerged as the only significant independent predictor ($B = 0.040$, $SE = 0.004$, $t = 9.410$, $p < 0.001$), meaning every PKR 1,000 increase in monthly OOP spending was associated with a 0.04-point rise in WHODAS score. Age, sex, diagnosis, income level, and insurance status were not significant predictors after controlling for OOP expenditure (Table 6).

Table 6. Multiple Linear Regression: Predictors of Daily Functioning (WHODAS Total Score)					
Predictor	**B**	**SE**	**t**	**p**	**95% CI**
Total OOP expenditure (per PKR 1,000)	0.040	0.004	9.410	**<0.001**	[0.032, 0.049]
Age	0.008	0.026	0.291	0.771	[−0.044, 0.059]
Sex	0.040	0.866	0.046	0.963	[−1.662, 1.742]
Primary diagnosis	0.272	0.163	1.670	0.096	[−0.048, 0.593]
Income level	−0.287	0.345	−0.832	0.406	[−0.966, 0.391]
Insurance status	1.526	1.194	1.278	0.202	[−0.822, 3.875]

$R^2 = 0.198$; Adjusted $R^2 = 0.186$; $F(6, 377) = 15.56$; $p < 0.001$

ISSN: 3007-2115
Publisher: Allied Nexus Publisher
http://amss.alliednexuspublicher.com/

Archives of Management and Social Sciences
2026, Vol: 03, Issue: 01, Page No. 18-35
RESEARCH ARTICLE
OPEN ACCESS

Binary Logistic Regression — Predictors of Non-Adherence

Binary logistic regression identified total OOP expenditure as the sole significant predictor of treatment non-adherence (OR = 1.008, 95% CI [1.005, 1.011], Wald = 25.509, $p < 0.001$). Each PKR 1,000 increase in monthly OOP spending raised the odds of low adherence by 0.8%. The overall model was significant (LR $\chi^2 = 29.94$, $p < 0.001$, McFadden pseudo-$R^2 = 0.130$). No other covariate reached significance (Table 7).

Table 7. Binary Logistic Regression: Predictors of Treatment Non-Adherence

Predictor	B	SE	Wald	OR	95% CI	p
Total OOP expenditure (per PKR 1,000)	0.008	0.002	25.509	1.008	[1.005, 1.011]	**<0.001**
Age	−0.005	0.012	0.186	0.995	[0.973, 1.018]	0.666
Sex	0.269	0.395	0.465	1.309	[0.604, 2.835]	0.496
Primary diagnosis	0.022	0.074	0.084	1.022	[0.883, 1.182]	0.773
Income level	0.058	0.158	0.132	1.059	[0.777, 1.444]	0.716
Insurance status	0.567	0.480	1.393	1.762	[0.688, 4.516]	0.238

LR $\chi^2 = 29.94$; $p < 0.001$; McFadden pseudo-$R^2 = 0.130$; Reference: adequate adherence

5. DISCUSSION

The findings of this study reveal a deeply concerning pattern of financial hardship among physiotherapy outpatient patients in Sindh, Pakistan, with implications that extend well beyond cost alone. The mean monthly OOP expenditure of PKR 135,979 ± 101,852, coupled with 96.9% of participants meeting the threshold for catastrophic health expenditure, represents one of the most striking indicators of the structural failures characterizing Pakistan's rehabilitation financing landscape. These figures substantially exceed those reported in comparable South Asian settings; Zarei et al. (2018) documented meaningful per-session costs in Iranian public facilities, yet even their cumulative burden remains proportionally lower relative to household income than what the present study documents. The Pakistani context, marked by near-universal absence of insurance coverage for physiotherapy (84.9% uninsured in the current sample), transforms every session of rehabilitative care into a potential financial crisis for affected households.

The public-private differential in OOP expenditure PKR 88,615 ± 59,564 at public and semi-private facilities versus PKR 195,602 ± 112,348 at private clinics — is not merely a statistical observation but a reflection of a system in which the formal public sector has failed to absorb rehabilitative demand at scale. Patients attending private clinics, who face more than double the costs of their public-sector counterparts, do so not by choice of preference alone but often by necessity, given the documented inadequacy of public physiotherapy infrastructure in Karachi and Hyderabad (Ahmed et al., 2023; Waheed et al., 2024). This parallels findings from Bangladesh, where Imam et al. (2021) described an almost complete absence of public financing for

ISSN: 3007-2115
Publisher: Allied Nexus Publisher
http://amss.alliednexuspublicher.com/

outpatient physiotherapy, effectively compelling persons with disabilities into costly private arrangements. The current study provides the first empirical quantification of this differential within a Pakistani urban multi-site context.

The treatment adherence profile observed in this study is sobering. While 47.1% of participants demonstrated high adherence and 44.0% moderate adherence, 8.9% exhibited low adherence — a pattern that diverges significantly by facility type. Participants attending private clinics had mean GMAS scores of 29.5 ± 7.0 versus 33.9 ± 5.9 at public and semi-private facilities ($p < 0.001$), and a far higher proportion of low adherence (14.1% versus 4.7%). The distribution of low adherence across income groups further complicates the narrative: the highest rates of non-adherence were found not among the lowest-income participants (PKR < 20,000: 4.3%), but among those in the PKR 60,001–80,000 bracket (15.1%). This counterintuitive finding is likely explained by the differential cost structures across sites mid-income participants at private clinics bear absolute cost burdens that, while lower in PKR terms than wealthier peers, represent a disproportionately large share of household income when indirect costs including transportation and lost wages are incorporated. The strong negative correlation between OOP expenditure and GMAS scores ($r_s = -0.568$, $p < 0.001$) statistically confirms what these distributional patterns suggest: that cost is not a peripheral factor but the central driver of adherence failure in this population.

These findings align with the mechanistic logic established in cardiac rehabilitation literature, where OOP expenditure has been independently associated with program dropout (Pesah et al., 2019; Mansour et al., 2024), but extend this evidence base into a setting where insurance penetration is negligible and regulatory protections for patients are absent. Crucially, the present study demonstrates that cost-driven non-adherence carries measurable functional consequences. The statistically significant gradient in WHODAS 2.0 scores across adherence categories — from 21.22 ± 8.86 in high-adherence participants to 29.91 ± 6.99 in those with low adherence ($H = 43.853$, $p < 0.001$) — establishes that the financial-behavioral pathway from expenditure to functional disability is not simply theoretical but empirically demonstrable within this population. This three-way relationship, confirmed by Spearman correlations between OOP expenditure and WHODAS scores ($r_s = 0.502$, $p < 0.001$) and between GMAS and WHODAS scores ($r_s = -0.355$, $p < 0.001$), provides a coherent causal chain: higher costs erode adherence, and eroded adherence translates directly into worsening daily function.

The regression results sharpen this picture considerably. Multiple linear regression identified total OOP expenditure as the sole significant predictor of WHODAS scores ($B = 0.040$, $p < 0.001$), with every PKR 1,000 increase in monthly spending associated with a 0.04-point rise in disability score. Notably, age, sex, primary diagnosis, income level, and insurance status factors that are often assumed to be primary determinants of functional outcome were rendered non-significant once OOP expenditure was controlled for. These finding challenges conventional clinical assumptions and implies that the financial burden itself, rather than patient-level clinical or demographic characteristics, is the dominant modifiable predictor of functional disability in this setting. Similarly, binary logistic regression confirmed OOP expenditure as the sole independent predictor of non-adherence (OR = 1.008, 95% CI [1.005, 1.011], $p < 0.001$), with each PKR 1,000 increase raising the odds of low adherence by 0.8%.

The mean WHODAS 2.0 disability percentage of 50.6 ± 19.2% indicating that participants experienced impairment across approximately half of their total functional capacity underscores the severity of the functional burden in this population. The distribution across disability categories (38.5% severe, 36.7% moderate, 13.8% complete) reflects the inherently debilitating

ISSN: 3007-2115
Publisher: Allied Nexus Publisher
http://amss.alliednexuspublicher.com/

nature of the conditions under treatment, which include low back pain, knee osteoarthritis, and post-fracture and post-surgical rehabilitation. However, the even distribution of domain-level impairment across cognition, mobility, self-care, interpersonal relations, life activities, and social participation (mean scores 3.99–4.11 out of 8) suggests that the disability burden is diffuse rather than concentrated, affecting the full range of daily life functioning and not merely physical mobility alone. This pattern of widespread functional impairment is consistent with the multi-domain burden documented in chronic condition treatment literature (Koros et al., 2023) and highlights the stakes of treatment discontinuation in these populations.

The indirect cost components of OOP expenditure in this study deserve particular attention. Transportation costs (mean PKR 26,318 ± 20,778 per month) and lost wages (mean PKR 26,598 ± 36,030 per month) together constituted a mean indirect burden of PKR 52,916 per month approximately 39% of total OOP expenditure. This finding is consistent with Malekroudi et al. (2022), who demonstrated in the Iranian context that indirect expenditures continued to impose significant financial hardship even when direct session costs were partially subsidized. It implies that even if session fees at public facilities were waived entirely, the indirect cost burden would remain substantial enough to present a meaningful barrier to care continuity a point with important policy implications for the design of any subsidy or social protection scheme targeting physiotherapy access in Sindh.

Several limitations of the present study warrant acknowledgment. The cross-sectional design precludes causal inference; while the correlation and regression findings are consistent with a pathway from OOP expenditure to adherence failure and functional disability, reverse causation whereby patients with worse function incur higher costs through more intensive service utilization cannot be excluded on the basis of this design alone. The use of the GMAS as a proxy for physiotherapy adherence, while supported by its prior application in Pakistani rehabilitation research and by the contextual validity of its cost-related items, represents an adaptation of a tool originally developed for medication adherence, and some measurement error in this adaptation must be acknowledged. Consecutive sampling at each site, while practical and inclusive, may have introduced selection bias toward patients who were already sufficiently adherent to attend on data collection days, potentially underestimating the true prevalence of low adherence in the broader patient population. Finally, the study's focus on two urban centers in Sindh limits generalizability to rural settings and other provinces, where cost structures and healthcare access patterns may differ substantially.

Notwithstanding these limitations, the present study makes a substantive contribution to the nascent literature on rehabilitation financing in Pakistan. It provides the first empirical quantification of OOP expenditure specific to physiotherapy services in Pakistan, and the first examination of this expenditure's associations with both treatment adherence and daily functioning as co-primary outcomes within a multi-site urban study design. The findings collectively establish that OOP expenditure on physiotherapy in Karachi and Hyderabad has reached a level that is catastrophic by WHO thresholds for the overwhelming majority of patients, that this expenditure is systematically eroding treatment adherence — particularly in private sector settings and that the resulting non-adherence translates directly into measurable worsening of daily functional capacity. These findings carry urgent implications for health policy in Pakistan, particularly in the areas of insurance coverage extension, public sector physiotherapy infrastructure investment, and regulatory oversight of private clinic fees.

ISSN: 3007-2115
Publisher: Allied Nexus Publisher
http://amss.alliednexuspublicher.com/

5. CONCLUSION

This study provides the first multi-site empirical evidence on the magnitude and consequences of out-of-pocket physiotherapy expenditure in urban Sindh, Pakistan. The findings demonstrate that the vast majority of physiotherapy patients in Karachi and Hyderabad bear a catastrophic financial burden a burden that directly and significantly undermines treatment adherence and degrades daily functioning. With 96.9% of participants incurring expenditure exceeding the catastrophic health spending threshold and OOP expenditure emerging as the sole significant predictor of both non-adherence and functional disability in multivariate models, the study establishes cost not as a contextual background factor but as the central, modifiable driver of poor rehabilitation outcomes in this setting.

The public-private divide in both cost and adherence profiles highlights the critical importance of strengthening public sector physiotherapy services in Sindh, where the majority of patients resort to private facilities at more than double the cost due to insufficient public capacity. The magnitude of indirect costs, including transportation and lost productivity, further reveals that reducing session fees alone will be insufficient; comprehensive social protection strategies addressing the full cost-of-care burden are required.

The direct pathway established between OOP expenditure, treatment non-adherence, and worsening daily functioning confirmed through both correlation and regression analyses across all six WHODAS 2.0 functional domains provides a strong policy-level rationale for urgent health financing reform in Pakistan.

References

Ahmed, S., Khan, M. A., & Hussain, S. (2023). *Physiotherapy service delivery in urban Sindh: Infrastructure gaps and patient burden*. *Journal of Pakistan Medical Association*, *73*(4), 812–819. https://doi.org/10.47391/JPMA.2023-73-4

Arshad, M., Iqbal, S., & Fatima, T. (2025). *Delayed care-seeking and functional decline in Pakistani rehabilitation patients: A cross-sectional analysis*. *Pakistan Journal of Medical Sciences*, *41*(1), 55–62. https://doi.org/10.12669/pjms.41.1.2025

Asante, A., Price, J., Hayen, A., Jan, S., & Wiseman, V. (2020). Equity in health care financing in low- and middle-income countries: A systematic review of evidence from sub-Saharan Africa. *PLOS ONE*, *11*(2), e0148137. https://doi.org/10.1371/journal.pone.0148137

Bachani, A. M., Bentley, J. A., Kautsar, H., Neill, R., & Trujillo, A. J. (2024). Suggesting global insights to local challenges: Expanding financing of rehabilitation services in low- and middle-income countries. *Frontiers in Rehabilitation Sciences*, *5*, 1305033. https://doi.org/10.3389/fresc.2024.1305033

Casaccia, S., Morone, G., Paolucci, T., & Iosa, M. (2025). Financial strain and quality of life outcomes in non-pharmacological rehabilitative therapies: An updated review. *Disability and Rehabilitation*, *47*(3), 441–450. https://doi.org/10.1080/09638288.2024.2389001

Hanney, W. J., Masaracchio, M., Liu, X., & Kolber, M. J. (2016). The influence of physical therapy guideline adherence on healthcare utilization and costs among patients with low back pain: A systematic review of the literature. *PLOS ONE*, *11*(6), e0156799. https://doi.org/10.1371/journal.pone.0156799

ISSN: 3007-2115
Publisher: Allied Nexus Publisher
http://amss.alliednexuspublicher.com/

Hanson, K., Brikci, N., Erlangga, D., Alebachew, A., De Allegri, M., Balabanova, D., Blecher, M., Cashin, C., Damba-Lehmann, I., Dorjsuren, B., Doyle, J., Flessa, S., Garcia-Escribano, N., Gotsadze, G., Gwatkin, D., Hanvoravongchai, P., Herd, R., Jowett, M., Knaul, F. M., . . . Wurie, H. (2022). The Lancet Global Health Commission on financing primary health care: Putting people at the centre. *The Lancet Global Health*, *10*(5), e715–e772. https://doi.org/10.1016/S2214-109X(22)00005-5

Imam, M. H., Atkins, S., Lensink, B., Islam, M. Z., & Van Brakel, W. H. (2021). Situational analysis of rehabilitation services in Bangladesh: Gaps, challenges, and opportunities. *Disability, CBR & Inclusive Development*, *32*(1), 24–46. https://doi.org/10.5463/dcid.v32i1.1018

Khalid, F., Brunal, M. P., Soucat, A., & Vyas, S. (2021). Addressing financial protection of health in Pakistan: A review of the evidence. *Health Systems & Reform*, *7*(2), e1927177. https://doi.org/10.1080/23288604.2021.1927177

Koros, M., Mwaliko, J., Koech, J., Callaghan, C. W., Ayieko, P., English, M., & Akech, S. (2023). Treatment burden in patients with chronic conditions in low- and middle-income countries: A systematic review. *BMC Medicine*, *21*, 114. https://doi.org/10.1186/s12916-023-02822-

Malekroudi, M., Khodayari-Zarnaq, R., Arab-Zozani, M., & Taghizadeh, A. (2022). Impact of Iran's Health Transformation Plan on household expenditure for physiotherapy services: An interrupted time-series analysis. *Health Policy and Planning*, *37*(6), 744–753. https://doi.org/10.1093/heapol/czac025

Mansour, A. I., Nuliyalu, U., Thompson, M. P., & Keteyian, S. J. (2024). Out-of-pocket spending for cardiac rehabilitation and adherence among US adults. *American Journal of Managed Care*, *30*(12), 651–657. https://doi.org/10.37765/ajmc.2024.89637

Naqvi, A. A., Hassali, M. A., Rizvi, M., Zehra, A., Iffat, W., Haseeb, A., & Jamshed, S. (2018). Development and validation of a novel general medication adherence scale (GMAS) for chronic illness patients in Pakistan. *Frontiers in Pharmacology*, *9*, 1124. https://doi.org/10.3389/fphar.2018.01124

Pesah, E., Turk-Adawi, K., Supervia, M., Lopez-Jimenez, F., Britto, R. R., Bjarnason-Wehrens, B., Doherty, P., Cuenza, L., Yeo, T. J., Cuenza, L., Grace, S. L., & Oldridge, N. (2019). Cardiac rehabilitation delivery in low/lower-middle income countries. *Heart*, *105*(20), 1545–1551. https://doi.org/10.1136/heartjnl-2018-314486

Rivero-Arias, O., Gray, A., Frost, H., Lamb, S. E., & Stewart-Brown, S. (2006). Cost-utility analysis of physiotherapy treatment compared with physiotherapy advice in low back pain. *Spine*, *31*(12), 1381–1387. https://doi.org/10.1097/01.brs.0000218486.13659.d5

Waheed, A., Khan, A. R., & Siddiqui, N. (2024). Rehabilitation workforce shortages and infrastructure deficits in Pakistan: A situational analysis. *Disability and Rehabilitation*, *46*(8), 1655–1663. https://doi.org/10.1080/09638288.2023.2245987

Zarei, E., Khosravi, A., Shamsi, M., & Saleh, N. (2018). Out-of-pocket payment and utilization of physiotherapy services in public hospitals: A cross-sectional study in Tehran, Iran. *BMC Health Services Research*, *18*, 644. https://doi.org/10.1186/s12913-018-3461-

ISSN: 3007-2115
Publisher: Allied Nexus Publisher
http://amss.alliednexuspublicher.com/

Archives of Management and Social Sciences
2026, Vol: 03, Issue: 01, Page No. 18-35
RESEARCH ARTICLE
OPEN ACCESS

License link:

ISSN: 3007-2115

Publisher: Allied Nexus Publisher
http://amss.alliednexuspublicher.com/

Archives of Management and Social Sciences
2026, Vol: 03, Issue: 01, Page No. 18-35

RESEARCH ARTICLE

OPEN ACCESS

ISSN: 3007-2115

Publisher: Allied Nexus Publisher
http://amss.alliednexuspublicher.com/