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Investigate the Factors Influencing Treatment Adherence among Cancer Patients of Peshawar

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ABSTRACT

Background
Adherence to cancer treatment protocols is vital for therapeutic success, yet remains a persistent challenge, especially in low-resource settings. Poor adherence contributes to disease progression, increased mortality, and healthcare burdens. In Peshawar, socioeconomic instability, healthcare access issues, and psychological distress may exacerbate non-adherence, but limited regional studies address these concerns.

Objectives
This study aimed to identify the factors influencing treatment adherence among cancer patients in Peshawar and explore strategies to improve adherence in this population.

Methodology
A cross-sectional study was conducted from January to June 2024 in tertiary care hospitals in Peshawar. A sample of 300 adult cancer patients was recruited via stratified random sampling. Data collection involved standardised tools, including MMAS-8 for adherence, Kessler-10 for distress, and a Quality of Life (QOL) instrument. Statistical analyses included chi-square tests, t-tests, and multivariable logistic regression to identify significant predictors of non-adherence.

Results
Of the 300 participants, 165 (55%) were male and 135 (45%) were female, with a mean age of 52.4±11.7 years. Financial hardship (OR=2.5), psychological distress (OR=2.3), treatment side effects (OR=2.0), and rural residence (OR=2.1) emerged as significant predictors of non-adherence ($p<0.05$). Education level and transportation access were also influential.

Conclusion
Cancer treatment adherence in Peshawar is shaped by financial, psychological, and logistical barriers. Multilevel interventions, including subsidised care, mental health services, and improved health literacy, are urgently needed.

Keywords: Treatment adherence, Cancer, Peshawar, Psychological distress, Barriers, Quality of Life

INTRODUCTION

Cancer is a leading cause of death worldwide, accounting for nearly 10 million deaths in 2020, with the burden projected to increase significantly in the coming decades (1). The effectiveness of cancer treatment depends not only on the appropriateness of medical interventions but also on the patient's adherence to prescribed regimens. Treatment adherence defined as the extent to which a patient follows prescribed therapeutic instructions plays a crucial role in achieving optimal clinical outcomes, minimising disease progression, and improving survival and quality of life (2,3). However, treatment adherence among cancer patients is often suboptimal, particularly in low- and middle-income countries (LMICS), where systemic, social, and individual barriers compound the challenges of managing chronic diseases like cancer (4).

Adherence in cancer care is multifactorial and dynamic. It is influenced by a range of variables, including demographic characteristics, socioeconomic status, psychological well-being, disease-related factors, and health system support (5). Studies have shown that patients may fail to adhere to chemotherapy, radiotherapy, hormonal therapy, or oral medications due to complex treatment regimens, adverse effects, poor understanding of the disease, and emotional distress (6). Poor adherence can lead to subtherapeutic drug levels, disease relapse, increased healthcare costs, and mortality (7).

In Pakistan, where cancer is the sixth leading cause of death, adherence to treatment protocols poses a unique set of challenges (8). The country faces a rising incidence of cancer, with breast, lung, oral, and colorectal cancers among the most prevalent (9). However, national cancer control programs are underdeveloped, and public health infrastructure is often inadequate to meet the growing burden of oncological care. Limited access to specialised services, fragmented referral systems, and lack of affordable medications further impair patient adherence (10). Cultural misconceptions about cancer and its treatment, fear of side effects, and stigma add another layer of complexity to adherence issues (11). Most of the patients, especially those from rural or tribal areas, face transportation difficulties, financial hardship, and delayed diagnoses (12). A large segment of the population lives below the poverty line and relies on out-of-pocket healthcare expenditure, which acts as a deterrent to sustained treatment. Additionally, language barriers, low literacy rates, and lack of health education hinder effective communication between healthcare providers and patients, negatively impacting adherence (13).

Globally, studies have emphasised that patient-related factors such as depression, anxiety, and low health literacy significantly reduce adherence (14,15). A meta-analysis by DiMatteo et al. found that depressed patients were three times more likely to be non-adherent to medical treatment than non-depressed patients (16). Moreover, cancer-related fatigue and distress are often overlooked in outpatient settings, leading to unrecognised psychological needs (17). Despite this growing body of literature, research on treatment adherence in cancer patients in Pakistan and particularly in the Peshawar region is limited, making it difficult to design contextually appropriate interventions.

Several international and regional studies have explored the predictors of non-adherence in cancer care. For instance, a study in India revealed that patients who had low socioeconomic status, limited knowledge about their illness, and lived in rural settings were less likely to adhere to treatment protocols (18). Another study conducted in Turkey highlighted that patients who experienced severe side effects were more likely to discontinue chemotherapy or radiotherapy prematurely (19). In Nigeria, financial burden and long travel distances to healthcare facilities were the leading reasons for missed oncology appointments (20). In Pakistan, Ahmed et al. reported that about 40% of patients with cancer discontinued treatment due to a lack of finances and social support (21)(22).

While these studies provide useful insights, they are largely focused on urban centres and do not reflect the socio-cultural and healthcare dynamics of Peshawar, where tribal affiliations, conflict-affected populations, and infrastructural disparities present unique barriers to care. Furthermore, most of the existing studies rely on retrospective data or limited sample sizes, without integrating comprehensive tools that assess both psychosocial and quality-of-life aspects alongside adherence behaviour. The lack of holistic strategies tailored to the local context that can improve adherence. While awareness campaigns and financial assistance schemes exist in theory, their implementation is inconsistent and often lacks follow-up. Additionally, the psychological well-being of cancer patients is seldom addressed in routine care, even though distress significantly impairs motivation and self-care behaviours.

METHODOLOGY

The cross-sectional study was conducted across tertiary care hospitals and oncology clinics in Peshawar, Khyber Pakhtunkhwa, Pakistan. These institutions provide both public and private oncological services to a diverse patient population, including individuals from urban, peri-urban, and rural backgrounds. The study duration spanned six months, from January to September 2024. The patients (≥18 years) diagnosed with any type or stage of cancer, currently undergoing active treatment (chemotherapy, radiotherapy, hormonal therapy, immunotherapy, or oral targeted therapy), able to comprehend and respond to questionnaires and willing to provide informed consent were included in the study. The patients who had completed treatment more than six months before the study were in terminal stages (receiving only palliative care), and those with severe cognitive impairments or psychiatric conditions that impaired their ability to participate reliably were excluded.

A sample size of 300 patients was determined based on an expected adherence prevalence of 50% (to maximise sample size), with a confidence level of 95% and a margin of error of 5%, accounting for a 10% non-response rate. Stratified random sampling was used to ensure representation across age groups, gender, treatment modalities, and hospital settings. Each hospital served as a stratum, with proportional allocation based on patient load. Data were collected using a structured questionnaire developed after reviewing relevant literature and validated tools. The questionnaire consisted of Demographic and Clinical Profile: Age, gender, education, marital status, income level, place of residence (urban/rural), cancer type and stage, and current treatment modality. The Morisky Medication Adherence Scale (MMAS-8) was used to assess adherence. It includes 8 items with yes/no responses and a cumulative score (range: 0–8), with adherence classified as: High (score = 8), Medium (6–7), and Low (<6) (2). The Kessler Psychological Distress Scale (K10) was used to evaluate non-specific psychological distress over the past 4 weeks. It includes 10 items rated on a 5-point Likert scale. Scores range from 10 to 50, with higher scores indicating greater distress. A cut-off of ≥22 was considered indicative of high psychological distress (3). A shortened version of the WHOQOL-BREF questionnaire was included, covering four domains: physical health, psychological health, social relationships, and environment. Scores were standardised on a scale from 0 to 100 (4). Additional questions focused on perceived barriers (e.g., financial problems, transportation, treatment side effects) and potential facilitators (e.g., family support, insurance, availability of counselling). All data were collected through face-to-face interviews. Each interview lasted approximately 25–30 minutes. Written informed consent was obtained before participation. Patient confidentiality was maintained throughout the process. All data were entered into SPSS version 26.0 for analysis. A significance level of $p<0.05$ was used throughout the analysis.

RESULT

A total of 300 cancer patients participated in the study. The majority were male (55%), and the mean age was 52.4 ± 11.7 years. Most participants were from rural areas (61%), with low socioeconomic status (66%). Breast and gastrointestinal cancers were the most common types. Table 1 summarises the key demographic and clinical features. Table 2 presents adherence levels based on MMAS-8 scores. Only 26% of participants had high adherence, while 39% had low adherence. Mean scores for psychological distress and QoL are also shown. Table 3 revealed significant associations between low adherence and rural residence ($p=0.015$), low income ($p=0.008$), high psychological distress ($p=0.003$), and presence of treatment side effects ($p=0.012$). Table 4 identified financial constraints, psychological distress, rural residence, and treatment side effects as independent predictors of low adherence. Table 5 illustrates the self-reported barriers to treatment adherence, where financial difficulties and transportation ranked highest.

Table 1: Demographic and Clinical Characteristics of Pediatric UTI Patients (n = 89)

Variable	Category	Frequency	p-value
Age Group	0–1 year	18	0.032
	1–5 years	42	
	6–12 years	29	
Gender	Male	39	0.412
	Female	50	
Residence	Urban	54	0.289
	Rural	35	
Nutritional Status	Normal	63	0.045

	Underweight	17	
	Overweight	9	
Previous UTI History	Yes	22	0.038
	No	67	
Family History of UTI	Yes	15	0.065
	No	74	

Table 2: Adherence and Psychosocial Measures

Measure	Mean ± SD / Frequency (%)
MMAS-8 Score	5.7 ± 1.8
Adherence Level	
- Low (score <6)	117 (39.0%)
- Medium (score 6–7)	105 (35.0%)
- High (score 8)	78 (26.0%)
K10 Score (Psychological Distress)	24.6 ± 5.9
WHOQOL-BREF (Total Score)	58.2 ± 11.4

Table 3: Associations Between Demographic Variables and Adherence

	Variable	Adherence Level (% Low)	p-value
Residence	Urban	30.8	0.015*
	Rural	44.8	
Socioeconomic Status	Low	48.5	0.008*
	Middle/High	29.2	
Psychological Distress	K10 ≥ 22	52.4	0.003*
	K10 < 22	31.7	
Treatment Side Effects	Present	46.3	0.012*
	Absent	33.2	

*Statistically significant at $p<0.05$

Table 4: Logistic Regression for Predictors of Low Treatment Adherence

Predictor	Adjusted OR	95% CI	p-value
Financial Constraints	2.5	1.6–4.1	0.01*
Psychological Distress	2.3	1.4–3.9	0.012*
Rural Residence	2.1	1.3–3.4	0.018*
Treatment Side Effects	2.0	1.2–3.3	0.015*
Polypharmacy	1.6	1.1–2.5	0.02*

*Statistically significant at $p<0.05$

Table 5: Major Reported Barriers to Treatment Adherence (%)

Barrier	Percentage of Respondents
Financial constraints	68%
Transportation issues	52%
Treatment side effects	47%
Lack of knowledge	41%
Psychological distress	39%
Long waiting times	33%
Social stigma	29%

DISCUSSION

The current study aimed to identify factors influencing treatment adherence and explore strategies for improving adherence among cancer patients in Peshawar. The findings revealed that financial hardship, psychological distress, rural residence, and treatment side effects were the strongest predictors of low adherence. These results underscore the multifactorial nature of treatment adherence and highlight the critical need for holistic interventions. The adherence rate in this study was suboptimal, with only 26%

of patients exhibiting high adherence. Most patients reported moderate to low adherence levels, consistent with patterns observed in other low-resource settings (8). Financial difficulty emerged as the most prominent barrier, with patients experiencing economic constraints being 2.5 times more likely to report non-adherence. These findings align with previous research suggesting that treatment costs, especially in the absence of health insurance or subsidies, can significantly impair continuity of care (9,10). Moreover, the study confirmed that psychological distress plays a major role in adherence behaviour. Patients with elevated K10 scores showed over twice the odds of non-adherence compared to those with lower distress. This aligns with Gupta and Sharma's (11) work in India, which found that anxiety and depression were significantly correlated with treatment interruptions. Cancer-related distress is multifaceted, often exacerbated by fears about prognosis, treatment toxicity, and uncertainty regarding recovery (12). Rural residence was also significantly associated with lower adherence, possibly due to limited healthcare accessibility, poor infrastructure, and lack of cancer-specific facilities in outlying districts of Khyber Pakhtunkhwa. These findings echo those of Patel et al. (13), who observed that geographical barriers and transportation challenges impede regular follow-up and continuity of care in rural populations. Lastly, treatment side effects, especially nausea, fatigue, and neuropathy, were reported by 47% of patients and found to significantly influence adherence. These symptoms often lead to intentional dose skipping or discontinuation, as corroborated by studies in similar populations (12,13,14). Addressing these symptoms through supportive care strategies is essential to maintaining treatment continuity. The findings of this study resonate with the broader literature on adherence in oncology. Multiple studies in LMICS have documented adherence challenges linked to socio-economic disparities. Johnson et al. (16) found that low-income breast cancer patients in Kenya faced significant difficulties in adhering to treatment due to direct and indirect treatment costs. Likewise, Rehman et al. (17), in a multicentre study in Pakistan, reported that over 60% of patients who discontinued chemotherapy cited financial reasons.

In terms of psychological distress, literature confirms its role in undermining treatment adherence. A meta-analysis by DiMatteo et al. (18) demonstrated that depression is associated with a threefold increase in non-adherence among patients with chronic diseases, including cancer. Another study from Bangladesh reported that patients with higher emotional distress were more likely to miss oncology appointments and skip medication doses (19). The role of geographic disparities and healthcare accessibility also finds support in existing research. A study by Sajid et al. (20) revealed that patients from rural areas in Pakistan had significantly lower rates of follow-up and higher treatment dropout. Similarly, transportation barriers were highlighted by Ho et al. (21) as critical in limiting timely access to treatment.

Furthermore, polypharmacy was a notable finding in this study. Although not the strongest predictor, patients on multiple medications were more likely to report non-adherence. This has been documented in other studies, suggesting that regimen complexity contributes to confusion, especially among older adults and those with low health literacy (22). Interestingly, while the current study identified low education as a barrier, it did not reach statistical significance in multivariate analysis. This suggests that while health literacy is important, it may be mediated by other socio-economic or psychological variables in this population. Nevertheless, patient education remains a cornerstone of adherence-enhancing interventions (16, 23,24).

The findings of this study carry several important implications. Firstly, financial support programs are crucial. Implementation of subsidised cancer drug programs, partnerships with NGOS, and provision of government-backed insurance for oncology patients could directly impact adherence rates. Furthermore, the integration of psychological support services into oncology care is vital. Screening tools such as the K10 can help identify distressed patients early, allowing for timely referral to mental health professionals. Additionally, transport facilitation programs for rural patients, such as mobile oncology units or travel vouchers, may help bridge geographic disparities. Healthcare providers should be trained to proactively manage treatment side effects, including the use of antiemetics, nutritional support, and fatigue management strategies. The study also suggests a need to simplify treatment regimens where possible and enhance communication between patients and providers about the importance of medication timing, dosage, and symptom reporting. Incorporating community health workers or peer navigators into cancer care could improve follow-up and provide real-time adherence support. At the policy level, the results advocate for multi-sectoral collaboration, including the departments of health, transport, and social

welfare, to develop comprehensive cancer support services. Public health campaigns should target misconceptions, stigma, and lack of awareness about cancer and its treatment.

Limitations

Despite the value of the findings, certain limitations must be acknowledged. The cross-sectional design prevents causal inference; although associations are established, temporality cannot be confirmed. Additionally, self-reported adherence using MMAS-8 is subject to recall and social desirability bias, possibly overestimating adherence rates. Moreover, the study was conducted in urban-based tertiary care centres, potentially limiting generalizability to remote or district-level facilities. The absence of longitudinal follow-up also precludes evaluation of adherence patterns over time or post-intervention. Lastly, language and cultural barriers may have influenced patient understanding of questionnaires, although efforts were made to use validated Urdu versions of all instruments.

CONCLUSION

This study explored the factors influencing treatment adherence among cancer patients in Peshawar and identified practical strategies to enhance adherence. The findings revealed that financial burden, psychological distress, rural residency, treatment-related side effects, and transportation difficulties were significant contributors to non-adherence. Additionally, while socio-demographic factors such as education and gender showed some influence, economic and psychological factors demonstrated the strongest associations with adherence levels. These results reinforce the notion that treatment adherence in oncology is a multidimensional challenge requiring comprehensive intervention strategies.

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