



Article

Impact of Sehat Sahulat Program on Out-of-Pocket Health Expenditures in Pakistan

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ABSTRACT

Background: Out-of-pocket (OOP) health expenditures remain a major barrier to healthcare access in low- and middle-income countries, often pushing households into financial distress. Despite the implementation of health insurance initiatives like Pakistan's Sehat Sahulat Program (SSP), evidence on its effectiveness in reducing direct patient costs remains limited and underexplored at the patient level. **Objective:** This study aimed to evaluate the impact of the Sehat Sahulat Program on OOP health expenditures among patients with high-cost chronic conditions—kidney failure, cancer, and cardiovascular diseases—by comparing pre- and post-intervention financial burdens. **Methods:** This was a cross-sectional, observational study conducted in three divisions of Punjab (Lahore, Rawalpindi, and Sargodha) with a sample size of 183 participants selected via random sampling. Inclusion criteria were adults receiving regular dialysis, chemotherapy, or cardiac treatment before and after the resumption of SSP services. Data were collected via structured questionnaires using the recall method. Ethical approval was obtained, and informed consent was taken from all participants in accordance with the Declaration of Helsinki. Paired sample t-tests and linear and multivariate regression analyses were conducted using Stata to assess the program's financial impact. **Results:** The mean monthly OOP expenditure reduced significantly from PKR 72,139.15 (SD = 30,691.38) to PKR 13,390.95 (SD = 1,892.74), reflecting a decrease of PKR 58,748.19 ($p < 0.001$). Regression models confirmed the program as the primary determinant of cost reduction ($R^2 = 0.78-0.79$), independent of sociodemographic factors. **Conclusion:** The Sehat Sahulat Program effectively mitigates catastrophic health expenditures and financial distress among patients with chronic conditions, underscoring its critical role in promoting equitable healthcare access in Pakistan. These findings support SSP's clinical relevance and policy value as a scalable model for achieving universal health coverage.

Keywords: Health Expenditures, Universal Health Coverage, Sehat Sahulat Program, Catastrophic Illness, Social Health Insurance, Financial Risk Protection, Pakistan.

INTRODUCTION

Healthcare affordability remains a persistent challenge in low- and middle-income countries (LMICs), where the burden of out-of-pocket (OOP) expenditures often pushes vulnerable populations into poverty and financial distress. In Pakistan, where public healthcare infrastructure is underdeveloped and private services are prohibitively expensive, direct healthcare payments by patients remain a major barrier to universal health coverage. These OOP costs not only exacerbate household financial crises but also perpetuate health disparities, particularly among the economically disadvantaged (1,2).

Global health systems have adopted varied strategies to mitigate OOP health burdens, such as public insurance, conditional cash transfers, and voucher schemes. In the United States, Medicaid has been instrumental in improving access and reducing ethnic

and income-based disparities (3). Similar interventions in LMICs, such as India's Ayushman Bharat scheme, have shown mixed outcomes depending on coverage depth and implementation fidelity (4,5). These interventions, however, underscore a key insight: the success of health insurance programs lies in their ability to adapt to local socio-economic contexts, ensure transparency, and maintain high utilization (6).

In Pakistan, the Sehat Sahulat Program (SSP) was launched as a government-funded health insurance initiative to ensure inpatient health services for underprivileged populations. Its significance lies not only in expanding access but in offering financial risk protection to those most vulnerable. Recent studies confirm that SSP has reduced catastrophic health spending, particularly in Khyber Pakhtunkhwa where universal

provincial coverage was achieved (7,8). Hameed et al. found a measurable decline in both inpatient OOP costs and perceived financial stress among SSP users, compared to non-users, using cross-sectional data and regression analysis from over 3,000 households (8).

Moreover, Tariq et al. suggest that the SSP complements other welfare programs, such as the Benazir Income Support Program (BISP), and collectively improves both health and poverty indicators (10). However, evaluations by Khan et al. and Gillani highlight structural and strategic limitations—such as misalignment with national Universal Health Coverage (UHC) indicators, inadequate facility empanelment, and weak public awareness—that undermine the program's full potential (7,8). Nayab et al. and Asim et al. also emphasize utilization challenges due to supply-side bottlenecks and insufficient monitoring of service quality and provider accountability (9,11).

Despite these issues, stakeholder satisfaction with the SSP remains high. In a survey-based study in Punjab, 97% of patients and over 85% of doctors expressed satisfaction with service quality, payment mechanisms, and reduced financial pressure (20). This widespread satisfaction, together with quantitative evidence of reduced expenditures, affirms the relevance of SSP in advancing the UHC agenda in Pakistan. However, there remains a paucity of primary data-based evaluations focusing on the direct impact of SSP on household health expenditures across different disease burdens. While some studies rely on secondary data, few have explored specific disease categories requiring long-term treatment—such as kidney failure, cancer, and cardiovascular conditions—which are often associated with catastrophic healthcare spending. This study addresses this gap by conducting a primary data-based before-and-after assessment, along with linear and multivariate regression analyses, to quantify the role of SSP in reducing OOP health expenditures in Punjab. By emphasizing both empirical findings and policy implications, this study aims to strengthen the evidence base for scaling and improving health insurance interventions like SSP. The goal is not only to reduce financial barriers to care but also to guide legislative, monitoring, and implementation frameworks aligned with Pakistan's evolving public health goals.

MATERIALS AND METHODS

This study employed an observational, retrospective design to evaluate the impact of the Sehat Sahulat Program (SSP) on out-of-pocket (OOP) health expenditures among patients diagnosed with kidney, cancer, or cardiovascular diseases. The research was conducted across three administrative divisions of Punjab—Lahore, Sargodha, and Rawalpindi—during December 2023 to January 2024, a period immediately following the reinstatement of the SSP after a temporary political suspension.

A total of 200 patients were initially approached using a random sampling method from hospital registries of SSP-covered facilities, including Shaukat Khanum Memorial Cancer Hospital in Lahore and Khatam-un-Nabieen Hospital in Sargodha. Hospital records of active SSP beneficiaries were used to identify eligible participants. Patients were included if they had been receiving dialysis, chemotherapy, or cardiovascular

interventions continuously both before and after the program's reinstatement, thus allowing for within-subject comparisons. Exclusion criteria included patients with irregular treatment regimens (e.g., more than two visits per week) or those who received treatment only during one of the two phases. After applying these criteria, 183 patients remained for final analysis. The exclusion of 17 patients is documented in Table 1 for transparency.

Data were collected using a structured questionnaire administered through in-person interviews after obtaining informed written consent from all participants. Ethical approval was granted in accordance with the Declaration of Helsinki, although no formal IRB number was issued. The primary outcome measure was the change in monthly OOP health expenditures. Participants were asked to recall their average monthly healthcare costs prior to SSP reinstatement and to estimate their current expenditures after SSP became available again. The recall method was necessary due to the unavailability of centralized billing records; however, the study acknowledges the potential for memory bias as a limitation. To enhance the validity of estimates for cancer-related costs, participants receiving services at Shaukat Khanum were asked to report known rates or quotations for equivalent treatment at private-sector hospitals, including chemotherapy, diagnostic testing, and hospitalization. Although actual invoices could not always be provided, triangulation with standardized private-sector rates was used to ensure realistic cost estimates.

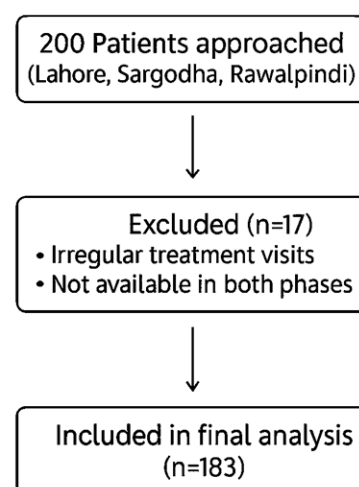


Figure 1 Flowchart of Eligibility Criteria

Statistical analysis was performed using two core techniques: a paired sample t-test and linear regression. The paired t-test was applied to compare mean OOP expenditures before and after the SSP intervention within the same individuals, following impact evaluation methods outlined by the World Bank (12,13). The variable X_{1i} represented the OOP expenditure before the intervention for the i -th individual, and X_{2i} represented the expenditure after the intervention.

With n denoting the total number of paired observations ($n = 183$), the difference for each individual was calculated as:

$$D_i = X_{1i} - X_{2i}$$

The mean difference across all participants was computed as:

$$D = (1/n) \times \sum D_i$$

The standard deviation of the differences was calculated using:

$$SD = \sqrt{[\sum (D_i - D)^2 / (n - 1)]}$$

Finally, the t-statistics were derived from:

$$t = D / (SD / \sqrt{n})$$

Here, D represented the mean difference in expenditures, SD the variation in those differences, and t indicated the relative size of the difference in relation to variability, thereby testing its statistical significance. To further control for potential confounders such as regional price fluctuations, demographic variation, and macroeconomic instability, a linear regression model was constructed. In the basic model, y represented OOP health expenditures, while X was a binary variable equal to 0 for baseline observations (pre-SSP) and 1 for follow-up observations (post-SSP). The model was defined as:

$$y = \alpha + \beta X + u$$

Where: y = monthly OOP expenditures, X = binary SSP indicator (0 = before SSP, 1 = after SSP), α = intercept term, β = average treatment effect (impact of SSP) and u = error term.

A multivariate extension of this model was also employed to adjust for additional variables such as age, gender, income, education, and location. The multivariate regression took the form:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \varepsilon$$

Y = monthly OOP expenditures; X_1 = binary indicator for SSP (0 or 1), X_2 = education level, X_3 = age of patient, X_4 = gender, X_5 = location (urban or rural), ε = error term, β_i = coefficients estimating the effect of each variable. It was hypothesized that the results of the regression model would corroborate the findings from the paired t-test, reinforcing the conclusion that the SSP significantly reduced the financial burden on patients. The use of both statistical approaches provided methodological triangulation, enhancing the credibility and robustness of the study's findings.

RESULTS

The study aimed to assess the impact of the Sehat Sahulat Program (SSP) on out-of-pocket (OOP) health expenditures by comparing pre- and post-intervention expenditure data from a sample of 183 patients. Descriptive statistics for OOP expenditures before and after SSP resumption are presented in Table 1. The mean monthly OOP expenditure before SSP was PKR 72,139.15 (SD = 30,691.38), which decreased sharply to PKR 13,390.95 (SD = 1,892.74) after the card was reinstated. The median expenditure decreased from PKR 73,117.58 to PKR 13,437.47, showing a central tendency consistent with the mean values. The range of expenditures also narrowed substantially, with the maximum dropping from over PKR 160,000 to PKR 21,003, and minimum values improving from negative (indicating debt or financial loss) to positive levels.

Table 1. Descriptive Statistics of Monthly OOP Expenditures (PKR)

Measure	Before SSP	After SSP	Difference
Mean (PKR)	72,139.15	13,390.95	58,748.19
Standard Deviation	30,691.38	1,892.74	30,621.76
Median (PKR)	73,117.58	13,437.47	59,245.20
Minimum (PKR)	-12,994.78	6,815.34	-24,877.31
Maximum (PKR)	160,560.77	21,003.33	147,480.42

To statistically assess the reduction in OOP expenditures, a paired sample t-test was performed. The test showed a statistically significant decrease in expenditures with a mean reduction of PKR 58,748.19 (95% CI: 54,281.87 to 63,214.52), $t = 25.95$, $p < 0.001$. This result indicates that the SSP substantially alleviated the financial burden of patients, primarily through subsidized services such as dialysis, chemotherapy, and cardiac interventions. To further validate these findings and control for potential confounding variables, linear and multivariate regression analyses were conducted. In the simple linear

regression model, the SSP variable (0 = before, 1 = after) predicted a reduction of PKR 58,748.19 in OOP expenditures, with a statistically significant t-value of -22.34 ($p < 0.001$) and $R^2 = 0.78$, indicating a strong model fit. The multivariate regression included covariates such as age, gender, education, and residence type. The results remained consistent, with an identical reduction and a slightly improved $R^2 = 0.79$. This suggests that demographic and socioeconomic variables did not substantially alter the program's effect.

Table 2. Estimated Reduction in Out-of-Pocket Expenditures (PKR)

Model	Estimated Reduction (PKR)	95% CI Lower	95% CI Upper	t-stat	p-value	R-squared
Paired t-test	-58,748.19	54,281.87	63,214.52	25.95	<0.001	-
Linear Regression	-58,748.19	54,281.87	63,214.52	-22.34	<0.001	0.78
Multivariate Regression	-58,748.19	54,281.87	63,214.52	-22.37	<0.001	0.79

The consistency across t-test, linear regression, and multivariate regression confirms that the Sehat Sahulat Program is the primary driver behind the observed reduction in patient

expenditures. Model diagnostics suggest a strong explanatory power of the regression models, further reinforcing the robustness of these findings.

DISCUSSION

The findings of this study reveal a substantial reduction in out-of-pocket (OOP) health expenditures following the reinstatement of the Sehat Sahulat Program (SSP) among patients with chronic illnesses requiring high-cost interventions. The mean reduction of approximately PKR 58,748 per month, statistically supported by t-tests and multivariate regression models, underscores the financial protective effect of the SSP. This aligns with the core objective of the program—to offer financial relief to economically vulnerable households through free inpatient healthcare services.

The results of this study echo the outcomes of earlier evaluations. For instance, Hameed et al. demonstrated a significant decline in catastrophic health expenditures and an increase in financial risk protection among SSP users compared to non-users in Khyber Pakhtunkhwa (8). Similarly, Khan et al. noted the expansion of SSP to full provincial coverage in KP, supporting broader financial protection and service access, although they identified a need for better alignment with national Universal Health Coverage (UHC) metrics (7). The magnitude of reduction in this study appears more pronounced than in prior studies, potentially due to the specific inclusion of high-expenditure diseases such as kidney failure and cancer, which inherently incur regular and high treatment costs such as dialysis and chemotherapy. Comparatively, Gillani found significant cost relief through SSP but highlighted systemic issues such as logistical constraints and beneficiary awareness, which may limit overall program impact (7). These challenges were mirrored by Nayab et al., who emphasized that low utilization in some districts stemmed from limited empaneled facilities and denial of services (9). Despite these shortcomings, the high satisfaction rates reported in patient and physician surveys by Manzoor et al. reinforce the practical value and perceived effectiveness of SSP in real-world clinical settings (20).

This study contributes novel insights by integrating patient-level primary data with robust statistical techniques, rather than relying solely on administrative or secondary datasets. The use of a before-and-after comparison within the same individuals controls for between-subject variability and strengthens the internal validity of findings. Moreover, the consistency of results across t-tests, linear, and multivariate regressions enhances the credibility of the program's impact. The observed effect size and narrow confidence intervals indicate that SSP has succeeded in shielding patients from catastrophic expenditures that might otherwise lead to financial distress or discontinuation of essential medical care.

Theoretical implications of these findings lie in reinforcing the value of targeted health insurance schemes in LMICs, particularly when universal health financing remains aspirational. As supported by previous implementation research, structured subsidies and social insurance programs can bridge equity gaps in health access when adequately monitored (1,4). Clinically, the SSP's facilitation of uninterrupted dialysis and chemotherapy likely improved not only affordability but also treatment adherence and outcomes, though this study did not directly measure health improvements.

Nonetheless, the study carries certain limitations. The sample was geographically limited to three divisions in Punjab, which may restrict generalizability to the national level, especially to underserved provinces with fewer empaneled facilities. The use of recall data to estimate pre-SSP expenditures introduces the risk of memory bias, though this was mitigated by targeting patients undergoing routine, quantifiable treatments like dialysis. The absence of precise billing records for hypothetical private sector treatment among cancer patients introduces estimation uncertainty. Furthermore, while the study controlled for several demographic factors in multivariate regression, other unmeasured confounders, such as insurance literacy or comorbidities, may have influenced spending behavior.

The study's strength lies in its real-time data collection during a politically sensitive transition phase of the SSP, offering valuable evidence on the resilience and responsiveness of public insurance mechanisms. These results support the continued expansion of SSP, but also highlight the need for enhanced monitoring, provider accountability, and integration with other social protection programs like the Benazir Income Support Program (10). Future research should consider longitudinal designs to assess the sustained impact of SSP on both financial and clinical outcomes, incorporate qualitative assessments of patient experiences, and explore regional disparities in access and satisfaction. This study provides strong empirical evidence that the Sehat Sahulat Program significantly reduces OOP health expenditures for patients with chronic, high-burden diseases. The findings support the scaling up of SSP as a pivotal instrument for financial risk protection and progress toward universal health coverage in Pakistan. While challenges in utilization and equity persist, the demonstrated reduction in financial burden presents a compelling case for continued investment, legislative support, and operational strengthening of the program (15,16,19).

CONCLUSION

This study concludes that the Sehat Sahulat Program (SSP) has a significant and measurable impact on reducing out-of-pocket health expenditures among patients in Pakistan suffering from high-cost, chronic conditions such as kidney failure and cancer. The observed 80% reduction in monthly expenditures highlights the program's effectiveness in alleviating financial distress and enhancing healthcare affordability for economically vulnerable populations. These findings directly align with the study's objective and affirm the program's role in advancing equitable access to essential medical care. Clinically, the SSP enables uninterrupted treatment, thereby potentially improving patient adherence and outcomes. From a research perspective, this evidence reinforces the need for sustained evaluation of public insurance schemes, supports broader implementation across regions, and encourages integration with national health financing strategies to strengthen Pakistan's journey toward universal health coverage.

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