ORIGINAL ARTICLE

Assessing the Sehat Card Plus programme database: An in-depth analysis of patient demographics, healthcare utilization, and financial expenditure in Khyber Pakhtunkhwa, Pakistan

Junaid Ur Rehman Siddiqui[1], Waqas Hameed[2], Shifa Salman Habib[3], Kiran Sohail Azeemi[4], Ali Hussaini[5], Asma Altaf Hussain Merchant[6], Adil Haider[7], Sameen Siddiqi[8]

Abstract

Objective: This study utilizes the Sehat Card Plus (SCP) programme's health insurance database in Khyber Pakhtunkhwa (KP) to assess demographic characteristics, healthcare utilization patterns, and disease profiles of beneficiaries. Additionally, it analyses processes related to claims, settlements with hospitals, and the financial expenditure of the programme.

Methods: The study employed the programme's third-party managed Management Information System (MIS) to obtain a sample of 100,029 beneficiary records from January 1st, 2021, to October 31st, 2022, across 10 designated study districts in KP province. After removing 5,642 duplicate records, the final dataset comprised 94,387 unique beneficiary records, subjected to descriptive statistical analysis.

Results: Among women, 25,745 (50%) of admissions were in the 15-45 years age group, while 14,189 (33%) of male admissions were in the 60 and above age group. The hospital mortality rate was 5,200 (5.5%), with an average cost per admission of PKR 31,395. KP government spent PKR 2.96 billion on 94,387 patients, allocating PKR 828 million to treat cardiovascular diseases. The average cost of treating ischaemic heart disease was PKR 89,919. Empanelled hospitals took an average of 51±52.8 days to send claims, and SLIC took 21±26.1 days to settle claims.

Conclusion: The third party administrators of the SCP programme maintain a robust database, capturing all hospital admissions under the SCP programme. However, improvements in database quality and the incorporation of new indicators are recommended for enhanced and independent programme monitoring and evaluation, especially with regard to equity.

Keywords: Health Insurance Database, Healthcare Utilization, Health Insurance Program Evaluation

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Introduction

The Sehat Sahulat Programme (SSP) has been implemented in the province of Khyber Pakhtunkhwa (KP) since 2015, initially covering the population below poverty line based on Benazir Income Support Programme (BISP) database.[1-3] In April 2020, it was upgraded as the Sehat Card Plus (SCP) programme to cover all legal and permanent residents of KP province.[1] KP health department established the SCP directorate for implementing the health insurance programme, however, due to limited human resources and technical capacity, the SCP directorate has outsourced the programme's monitoring and implementation to the third-party administrators, State Life Insurance Corporation (SLIC).[1]

As a result of this rapid transition of the SSP to SCP the earlier requirement of a 'means test' to identify the target population was replaced by the Computerized National Identity Card (CNIC) to verify provincial residence status.1 Hence, all CNIC holders with permanent residence in KP are now entitled to health insurance under the SCP programme for inpatient care in KP.[1] Among other responsibilities, SLIC maintains an electronic database of all inpatient admissions in KP province and is the primary source of information about the profile of patients, clinical procedures, costs, and the performance parameters of the SCP programme.

As part of the third party evaluation of the SCP programme, we requested SLIC to provide a sample of the database to undertake a descriptive analysis. The study aimed to analyse the healthcare and management outcomes of the SCP programme from a sample of inpatient admission records from the SLIC database.

Material and methods

The study through SLIC's MIS acquired a sample of 100,029 records of beneficiaries from the period of January 1st 2021, to October 31st 2022, across the 10 study districts selected from KP province for the evaluation. Districts Chitral, Malakand, Upper Dir, and Swat were selected from the Upper KP region, districts Abbottabad, Peshawar, and Swabi were selected from the Central KP region and

[1-5,7]Department of Community Health Sciences, Aga Khan University, Karachi, Pakistan; [6]The Clinical and Translational Research Centre, Medical College, Aga Khan University, Karachi, Pakistan; [8]Medical College, Aga Khan University, Karachi, Pakistan.

Correspondence: Sameen Siddiqi. e-mail: sameen.siddiqi@aku.edu

ORICID: 0000-0001-8289-0964

districts Bannu, Kohat, and Dera Ismail Khan were selected from the Lower KP region. There were 94,387 beneficiary records in the final dataset used for analysis after removing 5,642 duplicates.

The key variables available in the database provided included the beneficiaries' district of residence, age and sex; geographical district of hospital, hospital level (secondary/tertiary), hospital ownership (public/private); length of stay, treatment provided, treatment outcome, treatment cost quoted by the treating hospital, amount settled with hospital by SLIC, duration from hospital discharge to claim received by SLIC, duration from claim received to settlement released by SLIC, and ICD classification. The variables associated with treatment, treatment category, and hospital department contained missing and ambiguous values, making it impossible to ascertain the patients' medical condition, the provided treatment, and the specific medical department overseeing the case. The treatment variable had 842 unique values with the treatment described as "Multiple" being the most frequent treatment given to patients. However, cases in the database were partially coded to the three-character International Classification of Diseases (ICD) Version 10 under the ICD classification variable. To identify ICD-10 disease code, group and category for the treatments provided, ICD-10 three-character dataset with disease codes, groups, and categories was downloaded using the Center for Disease Control and Prevention web resources.[4] The database was merged with the ICD dataset using the three-character ICD classification variable, and disease profile was identified for 98.6% (n=93,091) of the cases using the variables ICD disease chapter (referred to as "broad disease category"), and ICD disease code (referred to as "disease"). Descriptive statistical techniques were used to analyse the dataset using Stata SE 14.2.

Results

Demographic Profile of SCP Beneficiaries

Table 1 provides the breakdown of the 94,387 inpatient admissions under SCP Programme from the 10 study districts of KP that were selected from the upper, central, and lower regions of the province. The sample of patients was uniformly distributed across all the 10 districts, ranging between 8,944 patients (9.5%) in Swabi to 10,151 patients (10.8%) in Bannu. Almost 51,282 (55%) of the admissions were women, the highest in district Chitral 6,101 (60.3%) and lowest in district Bannu 4,381 (43.2%).

A total of 25,745 (50.2%) of the admissions for women were in the age group 15-45 years, while almost 14,189 (33%) of men admitted were in the age group 60 and above. It is plausible that the younger age for admission of women is due to pregnancy and childbirth.

Hospital Admissions within Beneficiary District and Province

Out of the total of 94,387 beneficiaries, 59,642 (63.2%) received inpatient care under the SCP programme at empanelled facilities within their district, 28,852 (30.6%) beneficiaries visited empanelled facilities in other districts within KP while 5,896 (6.2%) beneficiaries visited empanelled facilities in other provinces. 8,126 (89.1%) patients in Upper Dir, 5,799 (57.1%) patients in Bannu, and 4,640 (50.6%) patients in Kohat received inpatient care from outside their own districts. Almost 25% patients from district Dera Ismail Khan (n=2,388) visited the nearby Bhakkar district of Punjab province, and 16.8% patients from district Abbottabad (n=1,513) were admitted outside the province, perhaps due to its proximity to Islamabad. Healthcare facilities from district Peshawar accounted for the largest patient-load with 27,618 (29.3%) beneficiaries from the ten study districts, which was also the only district where 18,892 (68%) patients were admitted to tertiary and 8,726 (32%) to secondary hospitals. The smallest patient-

Table-1: Demographic Distribution of Patients from the 10 Study Districts (n=94,387).

Beneficiary District	Male						Female						Overall	
	<5	5-18	19-45	45-60	>60	Total	<5	5-18	19-45	45-60	>60	Total		
Abbottabad	194	376	954	990	1,481	3,995	148	209	2,467	1,051	1,154	5,029	9,024	9.6%
Bannu	168	838	1,787	1,200	1,777	5,770	78	479	1,636	1,120	1,068	4,381	10,151	10.8%
Chitral	142	354	992	614	1,912	4,014	86	314	3,408	866	1,427	6,101	10,115	10.7%
D I Khan	44	286	1,194	1,130	2,263	4,917	25	233	1,791	1,251	1,524	4,824	9,741	10.3%
Kohat	70	423	1,002	893	1,611	3,999	77	306	2,533	957	1,297	5,170	9,169	9.7%
Malakand	172	890	1,450	715	962	4,189	71	726	3,135	742	912	5,586	9,775	10.4%
Peshawar	214	612	1,255	1,007	1,482	4,570	134	429	2,283	1,281	1,181	5,308	9,878	10.5%
Swabi	145	757	1,181	585	1,182	3,850	56	654	2,727	754	903	5,094	8,944	9.5%
Swat	402	802	1,217	416	618	3,455	200	771	3,113	652	282	5,018	8,473	9.0%
Upper Dir	424	834	1,492	695	901	4,346	291	618	2,652	625	585	4,771	9,117	9.7%
Total	1,975	6,172	12,524	8,245	14,189	43,105	1,166	4,739	25,745	9,299	10,333	51,282	94,387	100%
Percent of Total	2.1%	6.5%	13.3%	8.7%	15.0%	45.7%	1.2%	5.0%	27.3%	9.9%	10.9%	54.3%	100%	
Percent by Gender	4.6%	14.3%	29.1%	19.1%	32.9%	100%	2.3%	9.2%	50.2%	18.1%	20.1%	100%		

load was observed in healthcare facilities of district Upper Dir where only 997 (1.1%) of the 98,437 beneficiaries availed inpatient care.

Hospital Admissions by Level of Care and Public-Private Ownership

Amongst the data provided by SLIC on 94,387 patients from the 10 study districts, 58,992 (62.5%) admissions were in private hospitals (secondary and tertiary), while 35,395 (37.5%) admissions were in public hospitals (secondary and tertiary). Almost two-thirds, 60,929 (64.6%), of admissions were in secondary hospitals, while one-third, 33,457 (35.4%), were in tertiary hospitals. Further analysis revealed that of all the 94,387 patients admitted, 43,701 (46.3%) patients were admitted in secondary private hospitals, 17,228 (18.3%) in secondary public hospitals, 15,279 (16.2%) in tertiary private hospitals, and 18,178 (19.3%) in tertiary private hospitals.

Disease Profile, Mortality Outcome and Cost of Care of Admitted Patients

Of the 94,387 cases available from the SLIC database, information on ICD-10 codes was not available for 1,297 (1.4%) records, resulting in their exclusion from analysis. Thus, 93,090 (98.6%) cases were analysed which had an ICD Classification at the level of broad disease groups and at disease level. Table 2 provides the list of most common health problems for which patients were admitted. The top six categories of diseases accounted for 67,014 (71%) of all 94,387 inpatient admissions. This included pregnancy, childbirth, and the puerperium (n=14,476, 15.3%), digestive system diseases (n=13,581, 14.4%), circulatory system diseases (n=12,293, 13.0%), respiratory system diseases (n=9,398, 10.0%), contact with health services (n=9,028, 9.6%), and eye and adnexa diseases (n=8,317, 8.8%).

Out of the 94,387 admissions, there were 5,200 deaths (in-hospital mortality rate of 5.5%). Barring the two cases of SARS with 50% mortality, the highest mortality was recorded for admissions due to neurological disorders at 816(42.6%), followed by cardiovascular disease, endocrinal and metabolic diseases, and infectious diseases. Further analysis by specific diseases based on ICD Classification revealed the highest hospital mortality to be due to polyneuropathies {443, (61.8%)}, cerebral infarction, 543(49.2%), chronic renal disease,275(24.6%), pneumonia, 221(15.3%) and type 2 diabetes mellitus, 139(10.9%). There was no major difference in the mortality rates for these disorders between the secondary and tertiary hospitals.

The average length of stay (ALOS) for the sample of patients was 2.3±5.8 days. The ALOS for admissions due to accidents and SARS was 8.0±5.7 days, followed by 5.0±12.1 days for admissions due to neurological disease, endocrine and metabolic diseases, and neoplasms. For admissions due to pregnancy, childbirth, and puerperium, and for eye and adnexa diseases the ALOS was 1.1±2.0 days.

Table-2: Disease Category Groups, Frequency, Cost, Length of Stay, and Hospital Mortality (n=94,387).

Broad Category of Diseases	Admissions n (%)	Average LOS	Average Cost	Mortality n (%)
Pregnancy, childbirth, and the puerperium	14,476 (15.3)	1	18,077	19 (0.1)
Digestive system diseases	13,581 (14.4)	2	20,542	410 (3.0)
Circulatory system diseases	12,293 (13.0)	2	67,407	1,460 (11.9)
Respiratory system diseases	9,398 (10.0)	2	22,504	526 (5.6)
Chemotherapy and Follow-up Care	9,028 (9.6)	4	42,004	495 (5.5)
Eye and adnexa diseases	8,317 (8.8)	1	15,666	0 (0.0)
Genitourinary diseases	6,362 (6.7)	3	25,485	327 (5.1)
Injury and poisoning	4,159 (4.4)	2	34,707	112 (2.7)
Skin and subcutaneous tissue diseases	2,315 (2.5)	2	10,310	57 (2.5)
Fever and abnormal clinical diseases	2,155 (2.3)	3	29,934	221 (10.3)
Musculoskeletal system and connective tissue diseases	2,059 (2.2)	2	36,953	23 (1.1)
Nervous system diseases	1,916 (2.0)	5	34,003	816 (42.6)
Neoplasms	1,778 (1.9)	5	32,419	58 (3.3)
Endocrine, nutritional, and metabolic diseases	1,461 (1.5)	5	14,564	174 (11.9)
Infectious and parasitic diseases	1,385 (1.5)	4	36,388	165 (11.9)
Congenital diseases	1,202 (1.3)	3	111,950	116 (9.7)
Blood disorders	521 (0.6)	3	11,499	41 (7.9)
Accidents	300 (0.3)	8	59,963	0 (0.0)
Ear and mastoid process diseases	283 (0.3)	2	19,084	0 (0.0)
Perinatal conditions	95 (0.1)	2	12,605	2 (2.1)
Mental and behavioural disorders	5 (0.0)	4	140,600	0 (0.0)
Severe acute respiratory syndrome (SARS)	2 (0.0)	8	535,000	1 (50.0)
Missing ICD Classification	1,297 (1.4)	4	31,369	177 (13.6)
Total	94,387 (100)	2	31,395	5,200 (5.5)

The average cost of treatment was PKR 31,395±66,012 per patient. SARS cases (n=2) had the highest average cost per patient at PKR 535,000±586,598, followed by treatment of mental and neurological disorders (n=5) at PKR 140,600±54,596 and treatment of congenital malformations and chromosomal abnormalities (n=1,202) at PKR 111,950±123,645. Given the average cost of PKR 31,395, the government of KP spent PKR 2.963 billion on the sample of 94,387 patients of which 0.83 billion or 28.0% were spent on treating cardiovascular diseases. The average cost of treatment for chronic ischaemic heart disease was PKR 89,919±104,714. For tertiary care hospitals the average cost per admitted patient was twice as high in private hospitals PKR 117,063 ±111,565 compared to public hospitals PKR 63,602±89,618. In general, the cost

Table-3: Breakdown of Claim and Settlement Amounts (n=87,417).

Range of Settled Amount (PKR)	n	Average Discharge to Claim Duration (Days)	Average Cost Claimed (PKR)	Average Amount Settled (PKR)	Average Difference in Cost (PKR) and Settlement	Average Claim to Settlement Duration (Days)	Volume of Settled Amount (PKR)
<10,000	16,845	63	5,465	5,469	558	22	92,132,942
10,000 - 49,999	62,976	47	20,287	20,100	1,442	20	1,265,811,887
50,000 - 99,999	2,434	65	68,523	67,748	10,510	18	164,899,560
100,000 - 1,000,000	5,124	55	222,773	221,008	15,390	21	1,132,444,685
>1,000,000	38	82	1,641,287	1,526,319	304,424	23	58,000,106
	87,417	51	31,395	31,038	2,494	21	2,713,289,180

PKR – Pakistani Rupee

of care for the same health problem was 20%-40% higher in private hospitals.

The database of admitted patients under SCP Programme did not report on COVID-19 cases as these were covered by a special public sector fund. It was only in the year 2020 that cases were treated by private hospitals and reimbursed under SCP Programme. COVID-High Dependency Unit (HDU) treated 629 cases for a total cost of PKR 163,233,344, 125 COVID-Intensive Care Unit (ICU) cases incurring a total cost of PKR 33,652,200, and 68 COVID-ICU with Ventilator support cases managed for a total cost of PKR 54,067,060. Cumulatively, a total of 822 cases were admitted, resulting in an aggregated cost of PKR 250,952,604.

Most frequent treatments provided were unilateral cataract extraction with IOL phacoemulsification, appendicectomy, chemotherapy, coronary angiography, normal delivery, and Caesarean delivery. Furthermore, the SCP programme also covered liver and renal transplant procedures, which are the two most expensive modalities of treatment. The reimbursed costs of liver and renal transplants were PKR 3.8 million and PKR 1.98 million, respectively.

Analysis of Settlements and Claims

Based on the SLIC data made available, 87,417 (92.6%) of the 94,387 cases had been settled. Analysis of the settled amount demonstrated that 72% of claims were in the range of PKR 10,000–50,000. Almost 6.0% of claims were between PKR 100,000 - 1,000,000 and only 0.04% were above PKR 1,000,000. The average time taken to send the claims by the empanelled hospitals from the date of discharge was 51 days to 52.8), while the average time taken to settle the claims by SLIC was 21 to 26.1) days. The difference in the amount claimed by the hospitals and settled or reimbursed by SLIC was progressively higher for larger claims. In this sample of admitted patients, the average amount of settled claim was PKR 31,038 and the total funds disbursed were just over PKR 2.7 billion, with almost PKR 1.3 billion for claims ranging between PKR 10,000 and 50,000 (Table 3).

Discussion

The findings of the current study highlight prevalent disease profiles in the province of KP, with common reasons for admissions including pregnancy and related issues, digestive, and circulatory diseases. In-hospital mortality, standing at 5.5%, highlights the gravity of neurological and cardiovascular disorders in the province, which exhibited the highest mortality rates. This aligns with research reviews on Low and Middle-Income Countries (LMICs), showing high mortality in cerebral neuropathies and revealing systemic health system weaknesses.[5]

Our cost analyses revealed significant expense variations, notably in private healthcare settings. A 2019 actuarial analysis of the programme had highlighted disparities between paid and claimed amounts, indicating prolonged reimbursement timelines for public hospitals from SLIC and a higher rate of rejected claims.[3] Moreover, the average stay decreased from 2.71 in 2016 to 2.28 in 2019, with public facilities experiencing longer stays (4.26 days) compared to private facilities (2.18).[3] In contrast, our study found a slightly increased average stay of 2.3 days, with private facilities accounting for 62.5% and public facilities 37.5%.[3]

The previously conducted actuarial analysis had highlighted a temporal lag in processing of claims under the programme.[3] Our study highlights improvements in payment disbursement systems, however, a substantial lag in claim submission by the hospital after the patient is discharged suggests a need for utilisation of the standardised digital system for this purpose. In addition, the efficiency of the process may be enhanced by building hospital staff capacity in implementing and utilizing such systems, or allocating additional trained human resources for processing of claims.

Additionally, it is imperative to address the challenge of case identification and management, as many cases were labelled "Multiple" under the treatment variable. The absence of provisions for recording the beneficiary's presenting ailment, coupled with the limited specificity of ICD-10 codes in the current MIS, hampers accurate data representation. To address this, the utilization of complete seven-character ICD-11 codes is recommended.

The SSP programme used to capture the poverty score for beneficiaries as it formed the eligibility criteria, however, after the scale-up of the programme, this variable was removed from the database. With coverage for high-cost

treatments (lung and kidney transplants) for all residents without tracking of beneficiaries' wealth status not only puts a question mark on the cost-effectiveness of the interventions but raises severe equity concerns.[6] Tracking beneficiaries' wealth standing post scale-up is critical as the programme runs the risk of falling on the pathway of regressive universalism whereby expansion to all residents may decrease healthcare access to the economically marginalised segments of the population.[6]

Conclusion

The SCP programme is increasing healthcare access in Khyber Pakhtunkhwa province, however, the programme monitoring needs to reincorporate measures for equity to ascertain the programme is headed in the direction of progressive universalism.6 The findings underscore the programme's impact in addressing prevalent health issues, with a focus on pregnancy-related concerns, digestive and circulatory diseases. The recorded in-hospital mortality rates, particularly in cases of neurological and cardiovascular disorders, emphasize the imperative of continuous quality improvement initiatives. The nuanced insights gleaned from this comprehensive study not only validate the programme's successes but also point toward opportunities for refinement and growth. As the programme continues to evolve, these findings serve as a valuable roadmap for enhancing its effectiveness, ensuring sustained positive health outcomes for the diverse population it serves and informing future research on the programmatic database.

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