

COSTING OF PUBLIC SECTOR HOSPITAL SERVICES: A PROVIDER'S PERSPECTIVE

A Case Study of four District Headquarter Hospitals
under Social Health Protection Initiative
Khyber Pakhtunkhwa, Pakistan

MAY 2017



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The aim of this study was to calculate the hospital costs under various cost categories of major illness in four specialities of the public sector hospitals of Khyber Pakhtunkhwa. The findings from this study will serve as a baseline for evaluating cost structure which can further be used for strategic planning at the policy level for other health care financing interventions and will also allow hospitals to improve their price negotiations under the Social Health Protection Initiative.

Disclaimer:

This publication has been developed and produced with the support of the German Federal Ministry for Economic Cooperation and Development (BMZ) through the Support to Social Protection – Social Health Protection project implemented by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH. The views expressed in this publication do not necessarily represent those of GIZ Pakistan.

Preface

Measuring per capita costs of health care services is a big challenge; it requires that one captures all relevant expenditures, indexes them appropriately to local market circumstances and will be able to measure actual costs in a health care system whose current methods of pricing and discounting obscure them.

Although public secondary and tertiary care hospitals in Khyber Pakhtunkhwa are the major expenditure items of public healthcare resources, there is dearth of knowledge on the costs of the healthcare services, such as running the in-patient hospital services. This is one of the major limitations in improving allocation efficiency which lowers the effectiveness of scarce resources. The lack of information on the cost of hospital services has restricted the Health Department, Government of Khyber Pakhtunkhwa in terms of optimization and stewardship for the Hospital Managers to improve technical efficiency. Both the terms are pre-requisites to provide better health care.

Furthermore, costing of health care services plays a pivotal role in pursuit of the triple aim, such as decisions about how much to spend on health care or what coverage to provide and to whom. These aims necessitate the promise of equity, the gain in health in one subpopulation ought not to be achieved at the expense of another subpopulation. Such decision lies in the realms of ethics and policy and the current Government of Khyber Pakhtunkhwa, being known for their reforms especially in the health sector, has stepped-in into alternate mode of health care financing. Resultantly, a social health protection initiative called "Sehat Sahulat Programme" has been implemented, initially 52% population had been insured and now policy decision has been taken to extend the scheme to 65% population of the province.

In view of the forgoing, a costing study of health care services, especially secondary healthcare services was highly needed as the Government of Khyber Pakhtunkhwa was committed to expand the initiative. Thus, this assignment estimated the cost of provision of hospital care (both inpatient and outpatient services) in the four District Headquarter Hospitals and calculated total and average costs for five common diseases per specialty (Medical, Surgical, Gynecology & Obstetrician, and Pediatrics) in each hospital for both outpatients and inpatients coupled with unit/average costs of the various services e.g. diagnostics, hospitality, consumables (final cost centers) offered by hospitals and done comparative analysis.

The work is highly appreciable not only in terms of its ultimate objectives but it also explored some interesting inferences such as that high referral ratio due to limited level of facilitation in the hospitals, leads to high out-of-pocket expenditure which ultimately causes lower provider's cost and phenomena like overstaffing, found as the main cost diver in most of the hospitals is another interesting inference which needs to be looked into. The work is highly noticeable with the fact that it is the very first attempt to capture costs of public hospital services in KP as no one else has done any such effort in the province. Last but not the least, the performed assignment will facilitate the journey towards Universal Health Coverage.

The Health Department, Government of Khyber Pakhtunkhwa extends their gratitude to GIZ Pakistan on successful completion and dissemination of the study and the Technical Assistance.



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Secretary to Government of Khyber Pakhtunkhwa
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Abbreviations

AFI	Acute Febrile Illness
ALOS	Average Length of Stay
CHC	Chronic Hepatitis-C
DHIS	District Health Information System
DHQ	District Headquarter Hospital
DNS	Deviated Nasal Septum
ENT	Ear, Nose & Throat
HR	Human Resource
IPD	Inpatient Department
KP	Khyber Pakhtunkhwa
LRTI	Lower Respiratory Tract Infection
MCC	Medicines Control Council
OPD	Out Patient Department
OOPE	Out of Pocket Expenditure
OT	Operation Theatre
PMT	Proxy Means Test
PUO	Pyrexia of Unknown Origin
RTA	Road Traffic Accident
RTI	Respiratory Tract Infection
SHPI	Social Health Protection Initiative
URTI	Upper Respiratory Tract Infection
UTI	Urinary Tract Infection
WSSP	Water & Sanitation Services Peshawar

Executive Summary

In order to resolve the challenges of financial constraints faced in the utilization of health care services, governments have to generate enough resources to provide safety nets to the masses. The essential first steps to arrive at such a policy include generating first hand evidence on provider's cost of provision of health care services. This is not only imperative for an accurate pricing model but also for the optimal utilization of scarce financial resources.

Taking the example of Pakistan where the public sector hospitals are the major expenditure items of public healthcare resources, there is lack of knowledge on the costs of the healthcare services. This factor makes it one of the major limitations in improving allocation efficiency and thus the effectiveness of scarce resource utilization. This lack of information on the cost of hospital services and the limited capability of the hospital administration on cost data maintenance has also limited the ability of hospital managers to improve technical efficiency.

Given the above mentioned scenario, this study aimed at calculating the hospital costs under various cost categories of major illness in various departments of the public sector hospitals of Khyber Pakhtunkhwa. We have to point out that the challenges faced in collecting cost data from the public sector hospitals were severe due to the problem that the records are kept manually. It is very difficult to arrive at concrete results with only one single methodology. In order to get this essential task done, a methodological framework was exclusively developed for this study by incorporating several techniques including extrapolation of data, calculation of replacement costs and normative approach. The study broadly undertook a retrospective bottom-up micro costing methodology and documented the specific resources used to deliver a narrowly defined service or to treat a particular type of patient.

Results obtained from the analysis revealed the top five common illnesses in the specialties of paediatric, medicine, surgery and gynecology of the four target District Headquarter (DHQ) Hospitals in Chitral, Kohat, Malakand and Mardan under the Social Health Protection Initiative (SHPI) in KP. Along with the estimation of average cost per illness (under specific cost categories), Average Length of Stay (ALOS) of the patient per disease group and bed occupancy rates were also calculated. A comparative cost analysis was also done in order to draw inferences regarding variations in the cost structures in the target DHQs.

Final calculations revealed that in the paediatric specialty of the target DHQs, Gastroenteritis, Upper Respiratory Tract Infections and Malaria were found to be common top ranked illnesses. The average cost per disease group varies from district to district where Chitral is representing lower average costs in comparison to other DHQs. Similarly, in the Medicine specialty, the common illnesses found are Gastroenteritis, Diabetes, Hypertension, and Pyrexia of Unknown Origin. Among these illnesses, the highest average cost is calculated for DHQ Kohat (Rs. 3,771) for upper respiratory tract infection. DHQ Chitral on the other hand is treating the same illness by incurring a cost of Rs. 1,301 per patient.

In the Gynecology department, Normal Delivery, C-Section, Septic Wound (Labor), UTI in Pregnancy and missed abortion were found similar among the target DHQs. The highest average cost is calculated for C-Section in DHQ Mardan i.e. Rs. 12,759 whereas DHQ Chitral is incurring a cost of Rs. 8,062 for conducting the procedure. In the surgical department, RTA (injuries & fractures), appendectomy & cholecystectomy (open surgery) were found similar

ailments. The highest cost is calculated for DHQ Mardan for conducting appendectomy i.e. Rs. 6,280 whereas the average cost is incurred in DHQ Chitral which is calculated as Rs. 4,231.

The findings of the study showed that the cost structures and cost drivers widely vary across the target DHQs. Such factors include the number of human resources & their salary scale in each specialty, the level of facilitation at each hospital, differences in utility costs (e.g. the use of incinerators) and last but not the least, Average Length of Stay per illness. In the light of the abovementioned factors, it was revealed from the study that DHQ Chitral (being a hospital setting with limited number of Human Resource and other facilities) is incurring the lowest cost per patient for various disease groups. DHQ Mardan and Kohat on the other hand are incurring high costs for treating the same ailments.

Due to the limited scope of the study, this research did not take into account the out of pocket expenditure component. A separate study needs to be conducted in order to capture the out of pocket spending from patient's perspective to generate evidence on total provider's cost of provision of complete set of services. Moreover, other specialities that were not part of the scope of this study should be analysed in order to get an understanding of the disease burden pattern in their respective districts. A cumulative analysis of all specialities will bring more precise results for hospital shared resources. It is also revealed from this study that improving data maintenance techniques at hospital will ensure reliable and efficient analysis of cost data for future studies.

The study concludes that the evidence on cost categories of the hospitals is imperative for evidence based pricing model. This research will serve as a baseline study for evaluating cost structure which apart from generating a package cost can also be further used for strategic planning at the policy level for other health care financing interventions.

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1. BACKGROUND

Universal health coverage in today's world has become an essential target to be achieved. However, ensuring access to basic health services for an entire population without any financial hardship or barrier is a challenge that confronts many low- and middle-income countries. To resolve all these challenges and to achieve and sustain universal health coverage, governments have to generate enough resources to provide safety nets to the masses [1]. In a country like Pakistan where 40% of the population lives below the poverty line and 74% pays out of pocket to receive healthcare, statistics reveals that health care costs and financial barriers are the most common cause of lower utilization of maternal health care services by the lower socio-economic strata [2]. In the absence of safety nets or insurance mechanisms, this lower capacity to pay for health results in “catastrophic expenditure” pushing these families further into the poverty trap [3].

Many developing countries initially focused on generating resources to achieve universal coverage, however, there needs to be a critical evaluation of the costs borne by various providers for an effective reimbursement mechanism [4]. The way health purchasers (e.g., health ministries, social insurance funds, or private insurance funds) pay health care provider institutions to deliver covered services is a critical element of strategic health purchasing [5]. Moreover, as coverage expands many issues e.g. financial sustainability, efficiency, and quality of care quickly emerge. Therefore strategic health purchasing is critical to getting the most value for limited health funds. Implementing strategic provider payment systems is a policy priority of every country that is working toward universal coverage [1].

Taking the example of Pakistan where the public sector hospitals are the major expenditure items of public healthcare resources, there is lack of knowledge on the costs of the healthcare services which makes it one of the major limitations in improving allocation efficiency and thus the effectiveness of scarce resources [2]. This lack of information on the cost of hospital services has also limited the ability of hospital managers to improve technical efficiency. For a sound policy of provision of healthcare services free of cost to the population, there needs to be accumulation of knowledge on the provider’s costs so that scarce resources can be used optimally to provide better health care.

The available data from the public sector hospitals are usually not enough to provide concrete results on the cost structures. Moreover, due to poor information systems and lack of resources devoted to hospital management, there has been an over-reliance on expenditure review data (historical annual budget). Unfortunately this kind of data is only good for accounting purposes but not adequate to assess efficiency levels or accurate estimation of costs per patient for the services

Given the above mentioned scenario, the aim of this study was to calculate the hospital costs under various cost categories of major illnesses in various departments of the public sector hospitals of Khyber Pakhtunkhwa. The findings from this study will serve as a baseline study for evaluating cost structure which can further be used for strategic planning at the policy level for other health care financing interventions and it allows hospitals to improve their price negotiations under the Social Health Protection Initiative.

Social Health Protection Initiative

Financial coverage for protecting vulnerable population from health catastrophe has been an essential goal of the policy makers. Given its significance, the government of Khyber Pakhtunkhwa has decided to extend the coverage of the Social Health Protection Initiative to the entire province. The aim of the program is improving the health status of the targeted population through increasing access to quality health services by reducing out of pocket payments for health expenditures.

The premium for up to 51% of the population will be paid by the government of KP for secondary and tertiary healthcare services. Per year cost of the programme is anticipated at Rs. 2.7 million including premium and administrative cost.

Beneficiaries and Benefits

The household members enrolled for payment of this scheme by the government for the poorest households will be on the basis of 'priority' BISP criteria. Targeted beneficiaries will be those having PMT Score 24.51 or lower. Benefits up to a minimum of Rs. 240,000 per household per annum for secondary care and up to 300,000 per household for tertiary care will be provided.

Contracting and Pricing of Secondary Hospital Services

The services covered in the scheme will be the hospital services normally provided at the secondary and tertiary level such as Medicine, General surgery, Gynecology & Obstetrics, Ophthalmology and ENT etc.

For the efficient allocation and utilization of the financial resources for the scheme, it is essential that data on cost structures from the hospitals are collected and analyzed in order to arrive at cost per illness. In that manner a price listing can be achieved which will be beneficial for the service providers to be covered against their expenditures on treating patients of certain diseases. In the light of this argument, the specific objectives of this research are as follows:

Specific Objectives

The specific objectives in accordance with the terms of reference for the study were as follows:

- 1.** To estimate the cost of provision of hospital care (both inpatient and outpatient services) in the public sector DHQ level hospitals of Mardan, Malakand, Chitral and Kohat.
- 2.** To calculate total and average costs of 5 common diseases per specialty in each hospital (Medical, Surgical, Gynecology & Obstetrician, and Pediatrics) along with various cost categories.
- 3.** To derive results to assist policy makers and insurers on informed decision making on resource use and costs as a first step in estimating the cost of hospital packages.

2. METHODOLOGICAL FRAMEWORK AND ACTION PLAN

The study took place under three phases. The first phase carried out designing the detailed methodology as well as study instruments, templates and other essential data collection tools, the second phase focused on composition, training and pilot phase of the study followed by actual data collection. The third phase of the study carried out trimming/cleaning the data, analysis and final report writing. Further details of each phase is given as below:

Phase One: Methodology and Study Instruments

2.1. Study Design

This study undertook retrospective bottom-up micro costing methodology. Bottom-up costing documents the specific resources used to deliver a narrowly defined service or to treat a type of patient. This method calculates a total cost per service or patient and then, through repeated cost measurements, constructs an average cost for the service or patient type. The bottom-up approach although more complex and time consuming is perceived to generate more accurate cost estimates [1]. In the absence of proper data maintenance at public sector hospitals in the local settings, a bottom-up methodology was considered to be more appropriate.

2.2. Data Period

For a retrospective costing exercise, one year is typically the ideal data period as it captures one complete budgeting cycle and evens out seasonal fluctuations. This study analyzed hospital costs in the last recurring year 2015-2016.

2.3. Study site

Data was collected from the DHQ level public sector hospitals of four Social Health Protection Implementation districts of Khyber Pakhtunkhwa province namely Mardan, Chitral, Malakand and Kohat.

2.4. Sampling & Data Collection

The study constructed “average costs” for DHQ level of care in public sector hospitals by pooling necessary data. Calculation of costs were done for 5 common diseases per specialty in each hospital [(Medical, Surgical, Gynecology & Obstetrician, and Pediatrics, for both outpatients (OPD) and inpatients (IPD)].

2.5. Study Instruments

Instruments for the costing study vary in format ranging from paper-based questionnaires to data entry spread sheets on Excel. The main disadvantage of paper-based questionnaires is the significant data entry and processing work required to convert the data into a usable format for analysis. Due to the limited timeline available for the study, spread sheets and electronic templates with formulas for data entry were used. This in addition to efficiency also made sure to reduce the chances of errors in entry and calculations. Moreover, to ensure the reliability and validity of the instruments, variables were defined according to the scope of the study and flow charts as well as dummy tables were created.

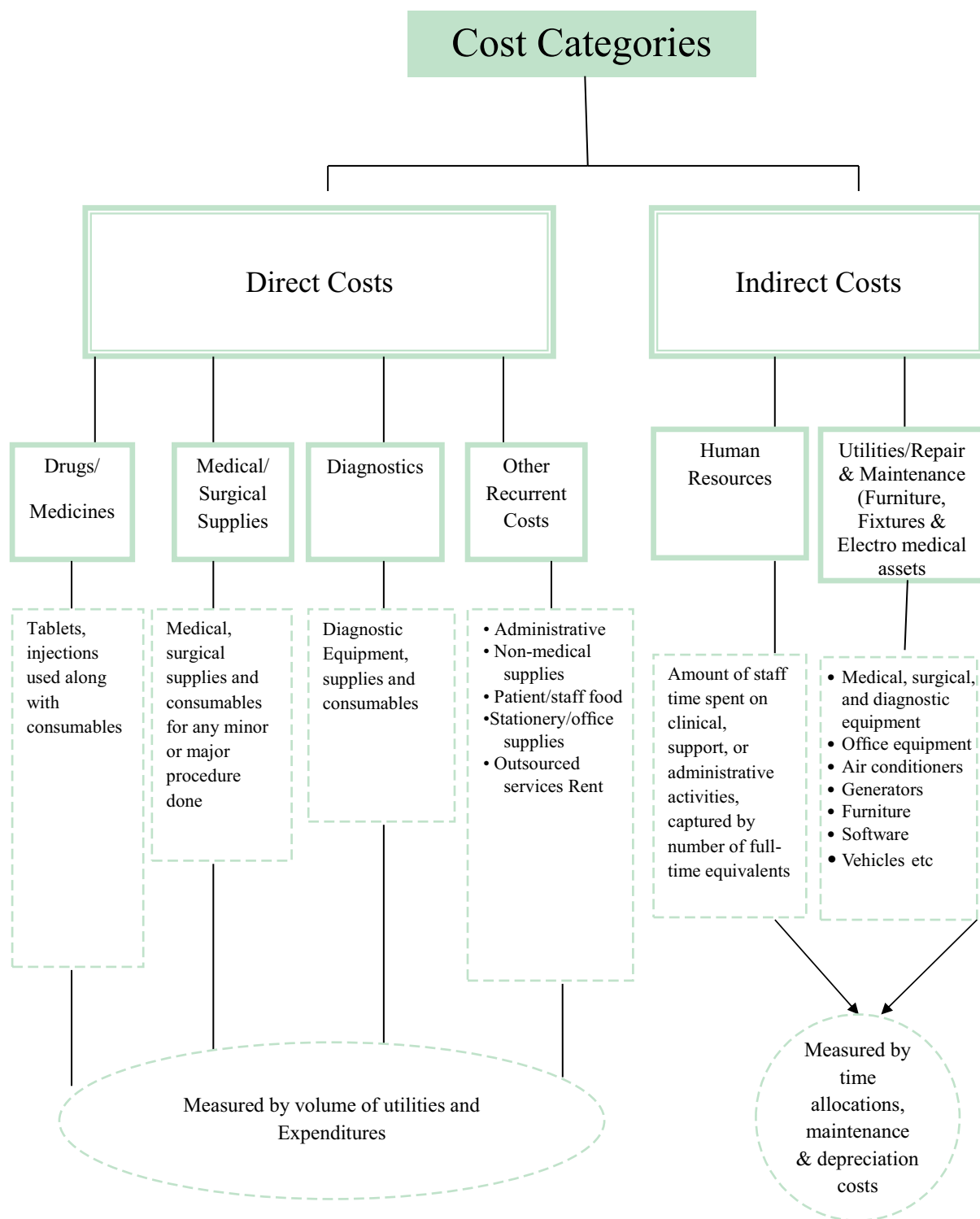
An initial visit to DHQ Mardan was made in order to have an insight into the way data is recorded and maintained by the DHQ level hospitals before the designing of the final instruments. Dummy tables created after the pilot visit ensured that data processing and analysis follow a logical sequence with minimum chances of errors and omissions. The dummy tables were later tested in the pilot phase.

2.6. Study Variables

Direct and indirect costs have been calculated on the basis of data categorization mode. Direct costs were calculated by applying bottom-up micro costing technique whereas for indirect costs top-down approach was utilized. Furniture, fixtures and the electro-medical equipment were listed for each illness and bed occupied where the costs were calculated through straight-line depreciation method.

The study instruments captured the cost structures and categories for calculating provider costs by considering the variables broadly presented in Diagram I:

Diagram I: Cost Categorization for Analytical Framework



2.7. Selection of the Team

The data collection phase utilized 16 persons in total out of which 12 were the data collectors whereas 4 were the district leads. Since the time period was short and the data collection phase needed to be completed in a short span of time, data collection from all four districts took place simultaneously. Given the scarcity of expertise in costing study and health economics in general, the team selection was done carefully while assuring that the enumerators have some relevant background or experience and are preferably familiar with the study sites and local languages (See Annexure 1)

2.8. Sample Data Collection for Training

In order to make relevant and reliable training material to fully equip the team with essential skills, sample data was collected from Mardan DHQ from all the target specialties. Data was also collected on capital costs, radiology and laboratory in order to have extensive material to design dummy exercises for electronic templates. The sample data was provided in hard form to the enumerators in order to familiarize them with the data maintenance procedures at hospitals. This proved to be extremely helpful for the team to learn how to dig out data from relevant manual records of the hospital in actual settings.

Phase Two: Training, Pilot Phase & Field Work

2.9. Training the Enumerators

A training workshop of two days was conducted in order to build the capacity of the team to acquire required knowledge and skills to work in challenging environment. The training was provided to the team by the lead consultant and the financial expert on the electronic templates, instruments and proper utilization of the spread sheets. This was an important step to assure the reliability and validity of the data. Similarly, some medical expertise were also used during the training for the bottom-up costing of particular diagnoses or procedures. Targeted training was also provided given each role. In brief, the training modules focused on describing the data management plan, data collection instruments, data entry tools, dummy tables, and associated processes that are essential to ensure that team members carry out their functions consistently and correctly.

2.10. Pilot Phase

To check the reliability of the costing methodology and developed instruments, a pre-test was conducted which also served as a useful training activity for the enumerators, data processors, and analysts. The team spent two days on average in their assigned DHQs to collect and enter the data following the standardized procedures developed in the training phase. The results of the pilot phase revealed constraints that were present in these DHQs which were important to be dealt with before the final data collection phase. Moreover, the study instruments were also refined according to the differences in data maintenance by these hospitals and according to the need of each DHQ.

2.11. Data validation

Internal Validation: As mentioned above, the field surveyors/data collection teams were trained on data collection tools. For validation purposes, a standardized protocol in a form of

checklist was designed and provided to the data collectors in order to minimize inter-observer bias.

External Validation: All the study instruments were pilot tested before the actual data collection for the removal of any errors and to make sure the content representativeness of the research instrument.

2.12. Carrying out the Field Work

The field work was carried out in four districts of KP namely Chitral, Mardan, Kohat and Malakand simultaneously. The Number of enumerators and days required for data collection in each district varied given the population density of each district, number of patients being treated in each DHQ, data and record maintenance of the hospitals and the availability of the relevant staff at hospital to access records (see **Annexure 2**).

2.13. Issues/Constraints Faced & Coping Mechanisms

Despite the fact that the methodological framework was designed after visiting the study sites and understanding the data availability and maintenance patterns, a number of strategies were designed in order to deal with the additional issues faced at the actual data collection phase. Data recording and compilation in all four DHQ hospitals follow traditional manual pattern. The main identified problem was incomplete records and missing data on disease specific records. Moreover, the disease specific data records do not follow a standardized pattern in all DHQ hospitals. This situation was even more challenging in DHQ hospitals Malakand and Chitral

In DHQ Malakand year wise records were not kept and accessing exact patient charts for essential information was very hard. Help was taken by hiring additional human resource with medical background in order to access relevant information. The secondary source of data DHIS was not found adequate and it was decided to follow the primary source of data only for a reliable information.

In DHQ Chitral the issue was further intensified as single register was kept to record all illnesses of various specialties. Disease specific ranking and accessing sample charts were not possible as patient's records were also not available in proper form. The issue was resolved by hiring extra help and considering only two sample patient records per illness. The detail treatment plan per patient was also later verified through normative costing approach to remove any chances of error. Same was the case of Gynecology & Pediatrics specialty where same register has been maintained.

The second issue faced in DHQ Chitral was the unavailability of the capital asset data records. A list of all the machines and equipment of the specialties and radiology department was thus compiled manually by a separate survey. The purchase date information was collected by interviewing the relevant human resources. This normative data was later combined with replacement costs for each asset (machines and equipment) to calculate depreciation by straight-line method.

A similar issue was faced in DHQ Mardan where the purchase price data was not available for old machines whereas the new ones with records were not functional. In that case replacement costs were also calculated.

In DHQ Malakand, Mardan and Kohat, during data collection phase it was realized that there are illnesses treated in certain specialties with ALOS less than 24 hours. Such cases were considered to be sorted out as an additional "Day Care" category by enhancing the scope of study.

Additionally the status of DHQ Kohat has recently been changed to a teaching hospital. Apart from this change in the status of the hospital, the specialties of Gynecology & Pediatrics were also shifted to Liaquat Memorial Hospital (LMH) which is a separate setup from the main DHQ. Given this scenario, in district Kohat two separate hospitals were considered for the task. The specialties of Surgery and Medicine were surveyed at the DHQ whereas a separate analysis was done for LMH for the rest of the specialties. The capital and indirect costs of the Gynecology and Pediatrics represent costs of a separate hospital setting and therefore differ from the specialties of DHQ Kohat.

Phase Three: Analysis

2.14. Data Management and Outcome Analysis

The data collected from the team was collated, reformatted and cleaned in order to prepare for final analysis. Data cleaning means correcting inaccuracies in a data set, often by employing data verification techniques and it includes correcting erroneous values, identifying incomplete records, and removing irrelevant data.

Microsoft Excel was used for analysis as it is typically an adequate software package for cost data processing. Excel permits relatively easy manipulation of data and is widely used and understood, thus allowing for more transparent data capture and presentation. Various calculations took place by categorizing the data into relevant cost categories. Before going into the details of the findings, it is important to understand the limitations of the study given as follows:

2.15. Exclusions of the Study

- 1.** The study did not take into consideration the out of pocket spending by the patient. The calculations presented here reflect purely the providers spending on treating a particular illness.
- 2.** The study did not consider the purchase costs of donated assets as they are not borne by the provider. Only operational costs of such assets are considered.
- 3.** The study did not consider the cost of land and building. The public sector hospitals are provided land either in the form of donation or on subsidized rates. Such costs are not borne by the provider, therefore are not part of the analysis.

2.16. Limitations of the Study

- 1.** In the absence of complete patients' record at the hospital, the disease ranking and total percentage of the disease burden is calculated by utilizing extrapolation techniques.
- 2.** In the complete absence of disease specific information from the OPD setup of the hospital, disease ranking in OPD is done through normative techniques.
- 3.** In the absence of some of the capital assets data at target DHQs, replacement costs were calculated and used.

4. In the target hospitals, utilities are used on shared basis and the specialties lack separate billing system. Calculations for shared meters are done on the basis of covered area of each specialty.

5. Missing drug prices from the MCC list at the hospitals were collected from the market. The figures were used after adjusting for discounts (15%-10% reduction in its purchase price) to arrive at final calculations.

3. RESULTS

The findings from this research have been divided into two sections. Section-A represents the case of each District Headquarter Hospital, detail analysis of the target specialities and respective top five common illnesses. Section-B focuses on cross comparison between all four DHQs of cost structures and final figures determined. Each DHQ is discussed in detail along with the detail analysis of the target specialities, top five common illnesses and its disease burden, average length of stay and bed occupancy rates. These facts are followed by direct and indirect costs of common illnesses and cumulative average total costs per illness.

In section-B, a comparative cost analysis has been done for the common illnesses and their respective costs in the target DHQs. Inferences have been drawn while considering the differences in cumulative cost categories to understand the factors resulting in lower or higher average costs per illness in each hospital.

Variation in Costs: Why the average costs may vary across the districts ?

Before going into the details of the findings, it is important to highlight the facts responsible for variations in the cost structures. The average total cost calculated for various illness that are common among these specialities vary and are different from each other to a greater extent. The factors that can be responsible for these variations are outlined below:

- 1.** The number of Human Resources in each speciality in the target DHQs vary according to the locality of the hospital and number of patients reporting to the hospital. For example, DHQ Chitral has a limited number of HR availability in each speciality in comparison to other DHQs. This is one of the prominent cost driver in calculating average cost per illness.
- 2.** The level of facilitation at each hospital also varies. For example DHQ Chitral does not have all the diagnostic and secondary care facilitation available. This also results in having lower average cost per patients for various diseases.
- 3.** Out of pocket expenditure is another factor responsible for cost variations. In DHQ Mardan, most of the costs are borne by the provider therefore the patients have to spend less out of pocket. This is an important cost driver in case of such settings. This factor was determined during the normative data collection phase where each relevant department reflected upon the size of the out of pocket spending that exists.
- 4.** Utility cost incurred by the hospital while providing services is another important factor responsible for high or lower cost per illness. For example, the use of shared meters & incinerator for waste disposal in DHQ Mardan and Kohat are responsible for a higher indirect average costs for all illness categories.
- 5.** Average Length of Stay (ALOS) per illness is a direct cause of having higher or lower average costs per illness. Many of the diseases having ALOS higher than 3 days will have higher average cost per patient.
- 6.** The size of the facilities might vary which have great influence on the calculation of the indirect costs. This is another factor causing variation in cost structures across specialities of the target DHQs.

SECTION-A

THE CASE OF EACH DHQ

3.1 DISTRICT HEADQUARTER HOSPITAL CHITRAL

Chitral is one of the largest districts of KP, a mountainous region with low population density. DHQ Hospital Chitral is the only secondary level hospital setup serving overcrowded patients with limited number of specialities. These include Gynecology, Pediatrics, Medical, Surgical, ENT and Eye.

Facilities

DHQ Chitral lacks necessary facilities for treating complicated illnesses along with the unavailability of diagnostic equipment including CT Scan & MRI. Therefore the referral rate of patients to Peshawar and out of pocket spending are also very high. Both the specialities of Gynecology and Pediatrics have no functional operation theatre currently and have to do surgeries in a temporary setting which lacks advance level facilitation, therefore there is no facility of major surgical procedures. There is only one OT in the main DHQ setting which is shared by the surgical and ENT speciality. Patients for skin problems are also treated in surgical department due to lack of facilities and absence of separate department. The condition of equipment used in pathology and radiology are out dated where most of the purchases took place in 1970-80's. Due to the electric voltage problem, the new machines cannot be put to work and most of the tests are done in private diagnostic centres where the cost is borne by the patients through out of pocket spending.

Human Resources

Along with limited number of specialities, the human resource of the hospital is also very limited and many posts remain vacant. Taking the example of Gynecology, a large number of women reporting to the speciality are dealt by one senior Gynecologist. Moreover, the patients needing admission in the specialities of surgical, medical, eye and ENT are admitted in a single shared ward and hence the same patients and stock registers are maintained for data entry. A similar practice is followed by Pediatrics and Gynecology departments.

Utilities and waste disposal

There is no proper system of waste disposal and all of the waste that is generated from hospital is dumped in open air disposed in the river. No safety measures are taken in this regard. The hospital has limited access to electricity and there is no proper heating system, therefore wood is used for burning in severe winters. The hospital also lacks proper facilitation of internet and other similar means of communication.

The data collected from the DHQ was collated and certain calculations were made. The findings from target specialties of DHQ Chitral are represented in table 1:

Specialty 1: Pediatrics

Table 1: Disease ranking and bed occupancy rates

Ranking	1	2	3	4	5	Top 5	Total
Disease	Lower Respiratory Tract Infections (LRTIs)	Gastroenteritis	Malaria	Neonatal Sepsis	Upper Respiratory Tract Infections (URTIs)		
Yearly Patients	1089	1089	294	224	61	2453	3070
Percentage	35%	26%	10%	7%	2%	79%	100%
ALOS	3	3	2	6	2		
Bed Days/Year	3268	2358	588	1342	121	7677	8030

The top ranked illnesses in DHQ Chitral pediatrics speciality were found to be Lower Respiratory Tract Infections (Pneumonia), Gastroenteritis, Malaria, Neonatal Sepsis and Upper Respiratory Tract Infections (Tonsillitis). The table above shows the disease ranking as well as their relative percentage representation, Average Length of Stay (ALOS) and bed occupancy rates. The Lower Respiratory Tract Infections in Chitral represents 36% disease burden in the speciality with an ALOS of 3 days. The total bed occupancy rate was calculated to be 3268 out of 8030 total bed occupancy rate of the speciality

Direct Costs

The direct costs are divided into three categories including drugs, diagnostics and supplies. The highest average direct cost per patient is Rs. 1009 for Neonatal Sepsis due to high cost of medication whereas the lowest cost is incurred for treating Malaria which is Rs. 509.

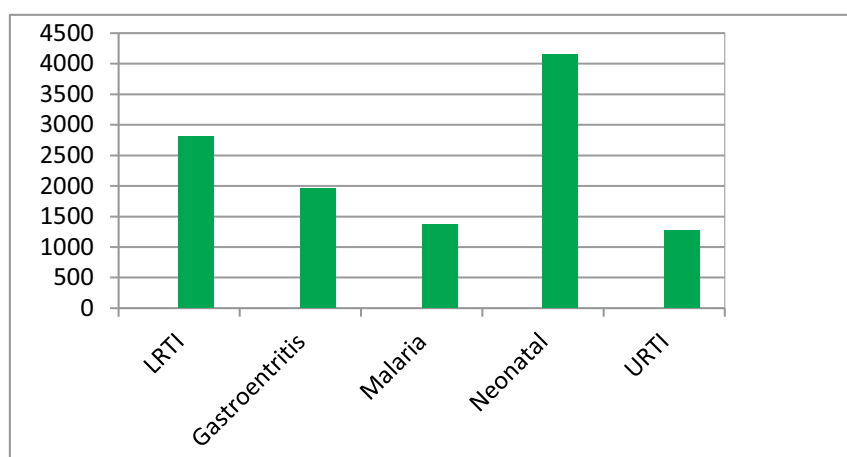
Indirect Costs

The highest average indirect cost is incurred by the hospital while treating Neonatal Sepsis which is Rs. 2071 due to high HR cost. The highest utility cost per patient is Rs.924.92 for Neonatal Sepsis due to high cost of heating materials used, whereas the lowest utilities cost is incurred for Malaria and URTI. Similarly, capital cost (furniture, fixtures and electro medical installation and its utilization) is also higher for Neonatal Sepsis.

Average Costs per Patient/per Illness

Given the details above, the highest average cost per patient goes to Neonatal Sepsis which is calculated as Rs.4169 while the lowest cost goes to URTI which is Rs.1301. Similarly, in this speciality the highest total cost per disease group goes to Gastroenteritis (Rs. 1,537,331) while the lowest cost goes to URTI (Rs. 79,330).

Chart 1: Average costs of common illnesses



Out Patient Department (OPD) Pediatrics

In OPD average cost per patient is calculated as Rs. 241 while total cost per disease group is Rs. 4,918,579 (See **Annexure 3** for detailed break-up).

Specialty 2: Medicine

Table 2: Disease ranking and bed occupancy rates

Ranking	1	2	3	4	5	Top 5	Total
Disease	Gastroenteritis	Pyrexia of Unknown Origin (PUO)	Pneumonia	Asthma	Diabetes		
Yearly Patients	1073	484	429	238	108	2331	276
Percentage	39%	17%	15%	9%	4%	84%	100%
ALOS	3	3	3	4	4		
Bed Days/Year	3218	1451	1286	952	952	7339	9855

The table above shows the disease ranking as well as their relative percentage representation in the Medical speciality of DHQ Chitral. Top five common illnesses were found to be Gastroenteritis, Pyrexia of Unknown Origin, Pneumonia, Asthma and Diabetes. The highest Average Length of Stay was for Asthma and Diabetes i.e. 4 Days, whereas due to high number of patients the highest bed occupancy rate goes to Gastroenteritis.

Direct Costs

The highest average direct cost is incurred while treating Diabetes due to high drug cost (Rs. 1454) whereas the lowest cost goes to Asthma (Rs. 672).

Indirect Costs

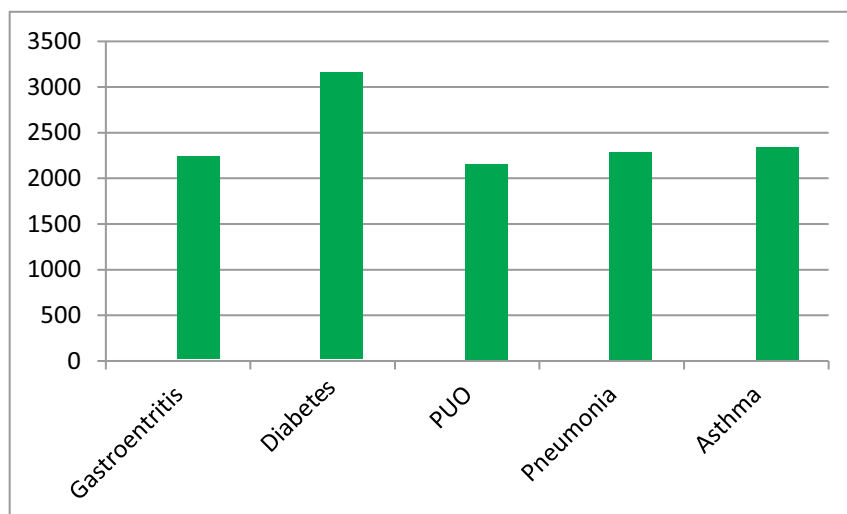
The highest HR cost goes to Asthma and Diabetes (Rs 1,010.12), whereas the lowest cost is incurred for Gastroenteritis, PUO and Pneumonia (Rs.815.71).The highest utilities cost per patient is Rs. 523.69 for Asthma and Diabetes due to high cost of electricity used, whereas the lowest utilities cost is incurred for Gastroenteritis, Pneumonia and PUO. In Medicines speciality the highest laundry cost is incurred for Asthma and Diabetes while lowest is for rest of the three diseases.

As compared to other diseases Asthma and Diabetes receive higher miscellaneous costs. In case of furniture and electro medical equipment the highest cost is incurred for Asthma and Diabetes as in Asthma, oxygen cylinders and supplies are used whereas in Diabetes, more diagnostic tests are required. The lowest cost goes to the rest of the three diseases. The highest average indirect cost goes to Asthma and Diabetes because of the higher cost of HR, utilities and capital costs.

Average Costs per patient/per illness

The highest average cost per patient goes to Diabetes (Rs. 3,194) while the lowest cost goes to PUO (Rs. 2179). In Medicine speciality the highest total cost per disease group goes to Gastroenteritis (Rs. 2,401,155) while the lowest cost goes to Diabetes (Rs. 344,178).

Chart 2: Average costs of common illnesses



Out Patient Department (OPD) Medicine

In OPD average indirect cost is 190 while total cost per disease group is Rs. 4,399,283 (See **Annexure 3** for detailed breakup).

Specialty 3: Gynecology

Table 3: Disease ranking and bed occupancy rates

Ranking	1	2	3	4	5	Top 5	Total
Disease	Failure To Progress Labor (FTP)	Missed Abortion	C-Section	Preeclampsia	UTI (in Pregnancy)		
Yearly Patients	2097	199	61	32	32	2422	3978
Percentage	53%	5%	2%	0.81%	0.81%	61%	100%
ALOS	2	2	5	3	2		
Bed Days/year	4194	398	307	97	64	5060	10220

The table above shows the disease ranking as well as their relative percentage representation, Average Length of Stay and bed occupancy. Top ranked illness in Gynecology speciality was found to be FTP Labor i.e. 52.71%. The highest Average Length of Stay was for C-Section (5 Days). Similarly according to the disease rank, the highest bed occupancy in number of days is for FTP Labor.

Direct Costs

The direct costs are divided into three categories including drugs, diagnostics and supplies. The highest drug cost goes to C-Section, whereas the lowest cost is incurred for Hypertension. The highest average direct cost per patient is Rs.1888 for C-Section due to high cost of medicines and supplies used.

Indirect Costs

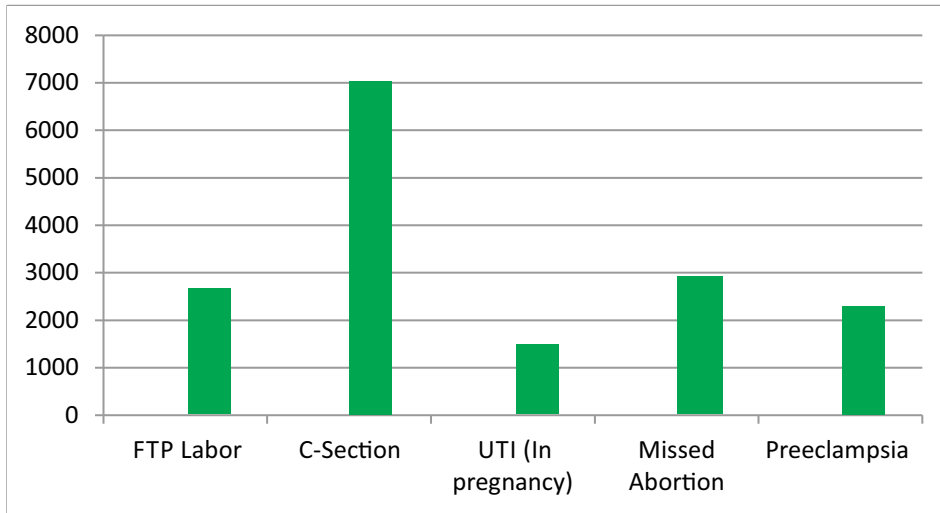
The highest HR cost goes to C-Section (Rs.2,381.36), whereas the lowest cost is incurred for UTI in Pregnancy (Rs.736.05). The highest utilities cost per patient is Rs.1231.35 for C-Section due to high cost of electricity used, whereas the lowest utilities cost is incurred for Missed abortion. In Gynaecology speciality the highest laundry cost is incurred for C- Section as compared to other diseases.

As compared to other diseases C-Section receives higher miscellaneous cost. In case of furniture and electro medical equipment the highest cost is incurred for C-Section while the lowest cost goes to Preeclampsia. The highest average cost goes to C-Section because of the higher cost of HR, utilities and furniture.

Average Costs per Patient/per Illness

In DHQ Chitral, the highest average cost goes to C-Section (Rs. 8,062) whereas the lowest average cost per patient is incurred while treating UTI in pregnancy i.e. Rs. 1,717.

Chart 3: Average costs of common illnesses



Out Patient Department (OPD) Gynecology

In OPD average cost per patient is Rs 122 whereas total cost per disease group is Rs. 3,695,798 (See Annexure 3 for detailed break-up)

Specialty 4: Surgery

Table 4: Disease ranking and bed occupancy rates

Ranking	1	2	3	4	5	Top 5	Total
Disease	Injuries (RTA)	Appendectomy	Abscess (Breast)	DNS Septoplasty	Cholecystectomy (open surgery)		
Yearly Patients	590	492	168	78	23	1351	2246
Percentage	26%	23%	7%	3%	1%	60%	100%
ALOS	3	3	3	3	3		
Bed Days/year	1770	1476	504	234	92	4076	10950

The table above shows the disease ranking as well as their relative percentage representation, Average Length of Stay and bed occupancy. Top ranked illness in Gynecology speciality was found to be RTI i.e. 26.27%. The highest Average Length of Stay was for C-Section (5 Days). Similarly according to the disease rank, the highest bed occupancy in number of days is for Cholecystectomy

Direct Costs

The direct costs are divided into three categories including drugs, diagnostics and Supplies. The highest drug cost goes to injuries (Rs. 491.5), whereas the lowest cost is incurred for DNS. The highest average direct cost per patient is Rs.1888 for C-Section due to high cost of medicines and supplies used.

Indirect Costs

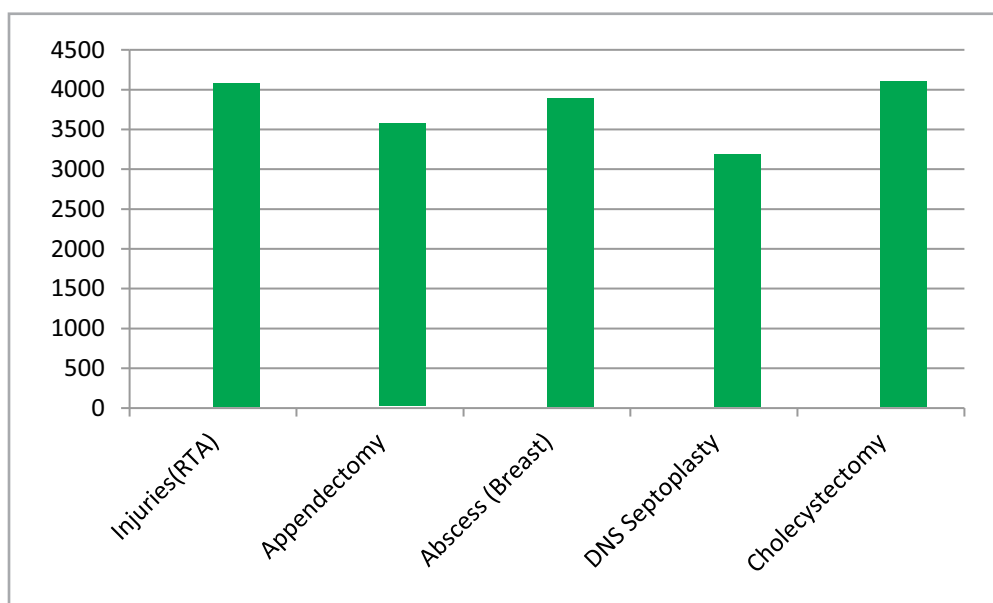
The highest HR cost goes to Cholecystectomy (open surgery) i.e Rs.1262.72, whereas the lowest cost is incurred for Appendix (Rs. 941.32). The highest utilities cost per patient is Rs. 512.55 for Cholecystectomy (open surgery) due to high cost of electricity used, whereas the lowest utilities cost (Rs. 384.41) is incurred for rest of the diseases. In Gynecology speciality the highest laundry cost is incurred for Cholecystectomy (open surgery) as compared to other diseases.

As compared to other diseases Cholecystectomy (open surgery) receives higher miscellaneous cost. In case of furniture and electro medical equipment the highest cost is incurred for Cholecystectomy (open surgery) as compared to rest of the diseases. The highest average indirect cost goes (open surgery) to Cholecystectomy because of the higher cost of HR, utilities and furniture.

Average Costs per Patient/per Illness

The highest average cost per patient goes to injuries (RTA) i.e. Rs. 4139 while the lowest cost goes to DNS Septoplasty (Rs. 3,223).

Chart 4: Average costs of common illnesses



Out Patient Department (OPD) Surgical

In OPD average indirect cost per patient is Rs. 284 whereas total cost per disease group is 1,156,197 (See **Annexure 3** for detailed break-up)

Specific Recommendations for DHQ Chitral

In the light of the above mentioned details, specific recommendations for DHQ Chitral can be made in the following manner:

- 1.** The data maintenance techniques need to be improved. In particular, separate records for each speciality needs to be maintained.
- 2.** Capital asset data should be made available at the hospital so that replacement costs are not required to be calculated.
- 3.** Incinerator should be put to use for waste disposal by making sure the proper power generation/supply set up. Similarly the rest of the available equipment which are not put to use due to electricity shortage must be utilized in order to achieve technical efficiency.
- 4.** Out of pocket spending was found to be high in DHQ Chitral. The hospital must be equipped with essential facilities and supplies in order to reduce burden on the patients' pocket as well as referral rates.

3.2 DISTRICT HEADQUARTER HOSPITAL MARDAN

Mardan is the second largest district in Khyber Pakhtunkhwa and Mardan city serves as a developed centre of the region. DHQ hospital Mardan is situated on the Shamsi Road which is one of the most eventful and business heart of the area. It is split into two parts and both sides of the road are occupied by the DHQ.

Facilities & Infrastructure

The hospital is facilitated with all the basic facilities. Availability of doctors and other medical staff are according to need and well managed. The hospital is well equipped to provide all the essential medicines and diagnostic facilities to patients, therefore the out of pocket expenditure by the patients is relatively low.

Human Resources

The hospital has a large number of Human Resources working. Each specialty has its own specialities, junior doctors, nurses and paramedical staff. Similarly the radiology and labs are also well equipped in terms of essential capital equipment as well as relevant human resources.

Utilities & Waste Disposal

The hospital has incinerator for waste disposal which is used twice a week. The solid waste disposal is done by the WSSP.

Specialty 1: Pediatrics

Table 5: Disease ranking and bed occupancy rates

Ranking	1	2	3	4	5	Top 5	Total
Disease	Gastroenteritis	Upper Respiratory Tract Infection	AFI (Acute Febrile Illness)	Fits (Epilepsy)	Measles		
Yearly Patient	8147	1032	467	353	192	10191	13731
Percentage	59%	7%	3%	2%	1%	74%	100%
ALOS	2	3	2.5	2.5	3		
Bed Days/year	16294	2838	1167	883	614	21796	8760

The table above shows the disease ranking as well as their relative percentage representation, Average Length of Stay and bed occupancy. Top ranked illness in Pediatrics speciality was found to be Gastroenteritis i.e. 59.33%. The highest Average Length of Stay was for Measles (3.2 Days). Similarly according to the disease rank, the highest bed occupancy in number of days is for Gastroenteritis.

Direct Costs

The direct costs are divided into three categories including drugs, diagnostics and supplies. The highest drug cost goes to URI (Rs. 329), whereas the lowest cost is incurred for AFI. The highest average direct cost per patient is Rs.764.81 for Epilepsy due to high cost of supplies used.

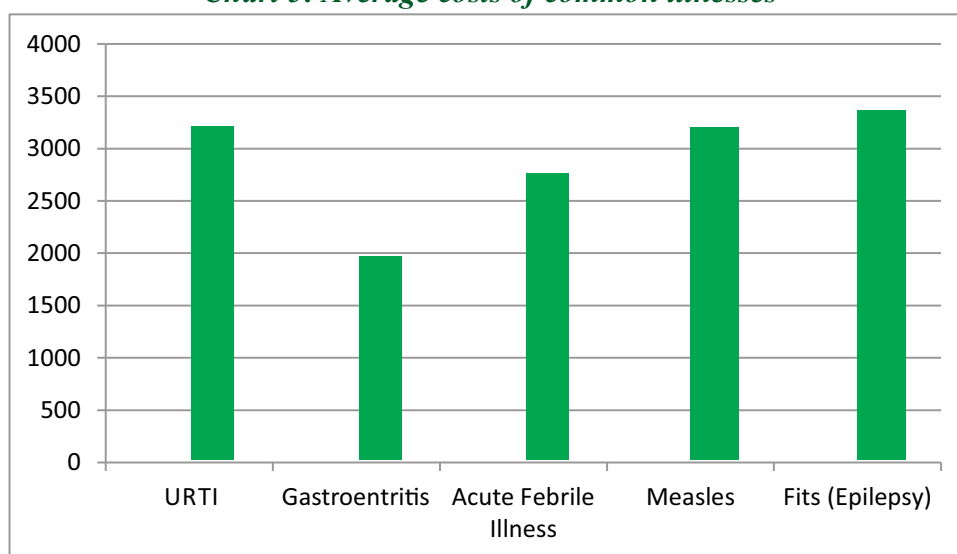
Indirect Costs

The highest HR cost goes to Measles (Rs. 1852.03), whereas the lowest cost is incurred for Gastroenteritis (Rs. 1562.54). The highest utilities cost per patient is Rs.183.14 for Measles due to high cost of electricity used, whereas the lowest utilities cost is incurred for Gastroenteritis. Similarly the highest indirect miscellaneous cost is incurred for Measles. In Pediatrics specialty the highest laundry cost is incurred for Birth Asphyxia while lowest is for Gastroenteritis. Whereas the highest waste disposal cost goes to Measles and the lowest cost is incurred for Gastroenteritis. In case of furniture and fixtures cost is similar for all the diseases of this specialty. The highest average cost goes to Measles because of the higher cost of HR, utilities and furniture.

Average Costs per Patient/per Illness

The highest average cost per patient goes to Fits (Epilepsy) (Rs. 3377) while the lowest cost goes to Gastroenteritis (Rs. 2012). In pediatrics specialty the highest total cost per disease group goes to Gastroenteritis (Rs. 16,395,373) while the lowest cost goes to Measles (Rs. 638479).

Chart 5: Average costs of common illnesses



Out Patient Department (OPD) Pediatrics

In OPD average cost per patient is Rs. 319 while total cost per disease group is Rs. 50, 60203 (See **Annexure 4** for detailed break-up).

Specialty 2: Medical

Table 6: Disease ranking & bed occupancy rates

Ranking	1	2	3	4	5	6	Top 5	Total
Disease	Gastroenteritis	PUO (Fever)	Hypertension	Diabetes Mellitus	Chronic Hepatitis-C	Anemia		
Yearly Patient	927	713	247	211	175	222	2495	3496
Percentage	26%	26%	7%	6%	5%	6%	71%	100%
ALOS	3	2	3	3	3.5	(Day Care)		
Bed Days/year	2780	1426	803	611	612	0	4206	13140

The table above shows the disease ranking as well as their relative percentage representation, Average Length of Stay (ALOS) and bed occupancy. Top ranked illness was found to be Gastroenterites i.e. 26.50%. The highest Average Length of Stay was for Chronic Hepatitis-C (3.5 Days). Similarly according to the disease rank, the highest bed occupancy in number of days is for Gastroenteritis.

Direct Costs

The direct costs are divided into three categories including drugs, diagnostics and supplies. The highest drug cost goes to chronic Hepatitis-C (Rs. 1745.5), whereas the lowest

cost is incurred for Gastroenteritis. The highest average direct cost per patient is Rs. 2,271.77 for chronic Hepatitis-C due to high cost of supplies used.

Indirect Costs

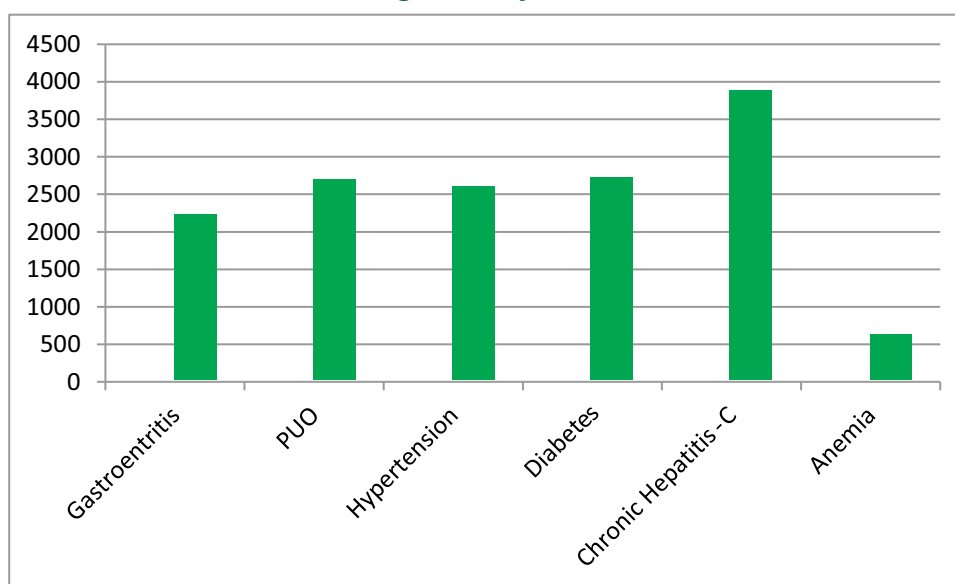
The highest HR cost goes to Hypertension (Rs.1596.48), whereas the lowest cost is incurred for Anemia (Rs.515). The highest utilities cost per patient is Rs. 19 for Hypertension, whereas the lowest utilities cost is incurred for Anemia. In Medicines specialty the highest laundry cost is incurred for Hypertension while lowest is for Anaemia. Similarly the highest disposal cost is incurred for Hypertension while lowest cost goes to Anaemia.

The miscellaneous indirect cost is highest for Hypertension and lowest for Anaemia. In case of furniture and electro medical equipment the highest cost is incurred for Hypertension while the lowest cost goes to Anaemia. The highest average cost goes to Hypertension because of the higher cost of HR, utilities and furniture.

Average Costs per patient/per illness

The highest average cost per patient goes to chronic Hepatitis-C (Rs. 3,898) while the lowest cost goes to Anemia (Rs. 637). In Medicine specialty the highest total cost per disease group goes to Gastroenteritis (Rs. 2,132,581) while the lowest cost goes to Anemia (Rs. 141,372).

Chart 6: Average costs of common illnesses



Out Patient Department (OPD) Medicine

In OPD the average indirect cost is 248 while total cost per disease group is Rs. 13,003,428 (See Annexure 4 for detailed break-up)

Specialty 3: Gynecology

Table 7: Disease ranking & bed occupancy rates

Ranking	1	2	3	4	5	6	Total	
Disease	Normal Delivery	Missed Abortion	C-Section	UTI In Pregnancy	Blood Transfusion	Iron Drip		
Yearly Patient	2169	252	92	34	76	79	2704	3496
Percentage	62%	7%	3%	1%	2%	2%	77%	100%
ALOS	(Day Care)	1.5	4.25	2.25	(Day Care)	(Day Care)		
Bed Days/year	2169	378	392	76	Nil	Nil	3222	13140

The table above shows the disease ranking as well as their relative percentage representation, Average Length of Stay and bed occupancy. Top ranked illness i.e. Gynecology specialty was found to be Normal Delivery i.e. 62.04%. The highest Average Length of Stay was for C-Section(4.5 Days). Similarly according to the disease rank, the highest bed occupancy in number of days is for Normal Delivery.

Direct Costs

The direct costs are divided into three categories including drugs, diagnostics and supplies. The highest drug cost goes to C-Section (1998), whereas the lowest cost is incurred for Normal Delivery. The highest average direct cost per patient is Rs.3696 for C-Section due to high cost of supplies used.

Indirect Costs

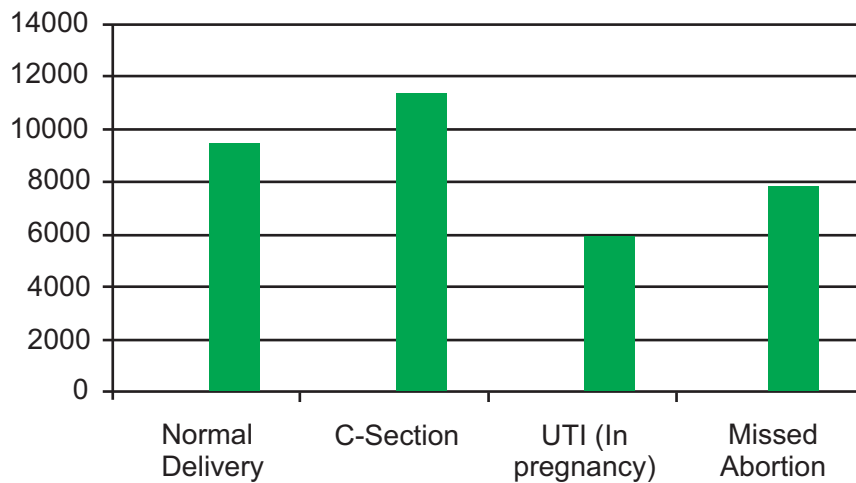
The highest average indirect cost in Mardan goes to C-Section given a higher Human Resource cost, whereas the lowest goes to treating UTI in pregnancy i.e. Rs. 3,897.

Average Costs per Patient/Illness

The highest average cost per patient goes to C-Section (Rs.11,509) while the lowest cost goes to UTI in Pregnancy (Rs 6,000). In Gynecology speciality the highest total cost per disease group goes to Normal Delivery(Rs. 20465256) while the lowest cost goes to UTI in Pregnancy (Rs. 202775).

The highest HR cost goes to C-Section(Rs. 7808.56), whereas the lowest cost is incurred for UTI in Pregnancy (Rs 3784.80). The highest utilities cost per patient is Rs. 264.54 for C-Section due to high cost of electricity used, whereas the lowest utilities cost is incurred for Normal Delivery. In case of furniture and medical equipment the highest cost is incurred for C-Section while the lowest cost goes to Normal Delivery. The highest average cost goes to C-Section because of the higher cost of HR, utilities and furniture.

Chart 7: Average costs of common illnesses



Out Patient Department (OPD) Gynecology

In OPD average cost per patient is Rs. 231 whereas total cost per disease group is Rs. 3,660,076.50 (See **Annexure 4** for detailed break-up).

Specialty 4: Surgical

Table 8: Disease ranking & bed occupancy rates

Ranking	1	2	3	4	5	Total	
Disease	Appendectomy	Abdominal Pain	Hemorrhoids	Kidney Stone	Hernia		
Yearly Patient	790	548	404	280	92	2114	5804
Percentage	14%	9%	7%	5%	2%	37%	100
ALOS	2.25	2	2.5	3	2.75	-	-
Bed Days/year	889	548	504	419	126	2486	4745

The table above shows the disease ranking as well as their relative percentage representation, Average Length of Stay and bed occupancy. Top ranked illness in Pediatrics specialty was found to be Appendix i.e. 13.61%. The highest Average Length of Stay was for Kidney Stone (3 Days). Similarly according to the disease rank, the highest bed occupancy in number of days is for appendix.

Direct Costs

The direct costs are divided into three categories including drugs, diagnostics and Supplies. The highest drug cost goes to Appendix (Rs. 311), whereas the lowest cost is incurred for Hernia. The highest average direct cost per patient is Rs. 619.25 for Appendix due to high cost of supplies used.

Indirect Costs

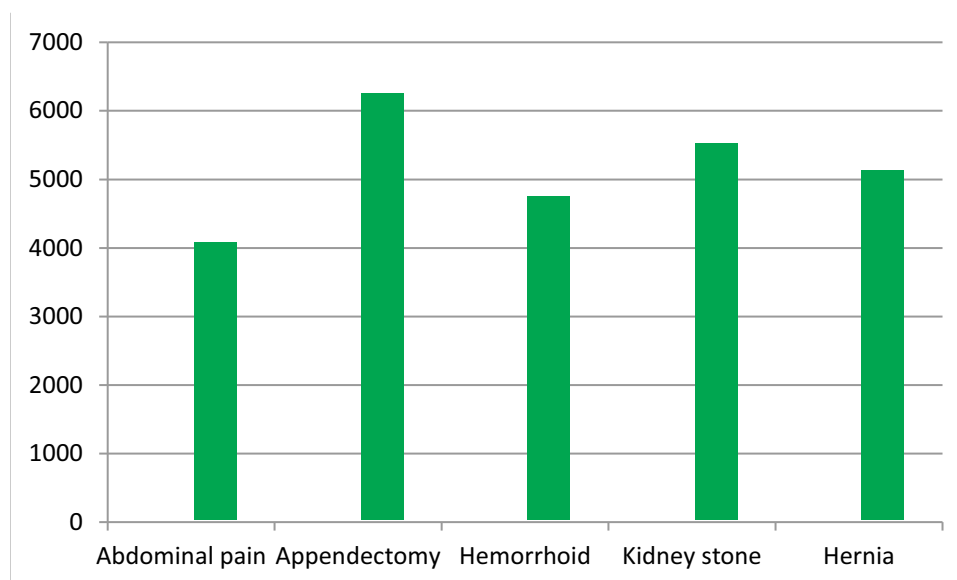
The highest HR cost goes to Kidney stone i.e. Rs 3168, whereas the lowest cost is incurred for abdominal pain (Rs.1724.61). The highest utilities cost per patient is Rs. 68 for Kidney Stone due to high cost of electricity and water used, whereas the lowest utilities cost (Rs 45) is incurred for abdominal pain. In Surgical speciality the highest laundry cost is incurred for kidney stone whereas abdominal pain receives the lowest cost.

In the given speciality highest miscellaneous cost is incurred for Kidney Stone while lowest cost goes to abdominal pain. In case of furniture and fixtures. The highest cost is incurred for Kidney Stone whereas lowest cost is incurred for abdominal pain. The OT procedures and equipment cost is highest for appendix as compared to rest of the diseases. The highest average indirect cost goes to kidney stone because of the higher cost of HR, utilities and furniture & fixtures.

Average Costs per Patient/Illness

The highest average cost per patient goes to appendix i.e. Rs. 6280 while the lowest cost goes to Abdominal Pain (Rs. 4197). In surgical speciality the highest total cost per disease group goes to Appendix (Rs 239,295) while the lowest cost goes to Hernia (Rs. 228,650).

Chart 8: Average costs of common illnesses



Out Patient Department (OPD) Surgical

In OPD average indirect cost per patient is Rs. 232 whereas total cost per disease group is Rs. 3,682,715 (See **Annexure 4** for detailed break up).

Specific Recommendations for DHQ Mardan

In the light of above mentioned details, the specific recommendations for DHQ Mardan are as follows:

1. The gynecology department is fully equipped with essential facilitation and adequate HR. However, the number of C-Sections in the hospital were found to be very low. Similarly, the ALOS for the same illness was also found to be higher in comparison to all other DHQs. It is essential to look into the practices and procedures carried out in this specialty of DHQ Mardan.
2. The records of all new and old capital assets must be maintained in order to achieve reliable and valid costing results.
3. The data maintenance techniques were found to be better at DHQ Mardan, however, the staff related to data entry needs to be trained further and electronic record keeping should be encouraged.

3.3. DISTRICT HEADQUARTER HOSPITAL MALAKAND

Malakand is a gateway to district Swat, Dir and Bajaur Agency. It has been further divided into two sub divisions i.e. Swat Ranizai and Sama Ranizai. The main tribes living in the district are Yousufzai, Uthman khel, Piran-Syed, Gujar, Baizai and Ranizai. The growth rate is 3.36 percent and the density is 596 per square km in the district itself. Pashto is the dominant language spoken in the district. The literacy rate is low and most of the people are engaged in farming. The district consists of 28 union councils and two tehsils.

Facilities

DHQ Batkhela is the main hospital of district Malakand. It serves not only district Malakand but also the nearby districts upper and lower Dir along with Bajaur Agency. A new building is under construction within the same area which is not functional yet so it is using the old building. The hospital consists of several specialties including Pediatrics, Medical and Surgical Wards (male/female), Gynecology, Nursery Ward, Operation Theatre and Emergency. The hospital is also equipped with adequate diagnostic facilities. However, the entire hospital has a single operation theatre. Each specialty has been given a schedule for the surgeries to take place. Given the fact that the hospital has to cater health care needs of a huge population, many of these specialties are overburdened and in addition, having a single OT overburdens the facility further.

Utilities and Waste Disposal

The hospital is facilitated with electricity, gas and water. It also has generators in order to deal with the electricity shortage issues. Water is provided with the help of own tube wells. The hospital has purchased incinerator but is not functional yet.

Specialty 1: Pediatrics

Table 9: Disease ranking & bed occupancy rates

Ranking	1	2	3	4	5	6	Top 5	Total
Disease	Appendectomy	Acute Respiratory Illness (ARI)	Malnutrition	Malaria	Measles	Thalassemia		
Yearly Patient	2098	1202	479	155	143	675	4752	6350
Percentage	33%	19%	7%	2%	2%	11%	75%	100%
ALOS	1.5	2.5	2.25	1.25	1.75	(Day Care)		
Bed Days/year	3148	3005	1077	194	250	0	7674	6205

The table above shows the disease ranking as well as their relative percentage representation. Top ranked illness in Pediatrics speciality was found to be Gastroenteritis i.e. 33.04%. The highest Average Length of Stay was for ARI (2.5 Days). Similarly according to the disease rank, the highest bed occupancy in number of days is for Gastroenteritis.

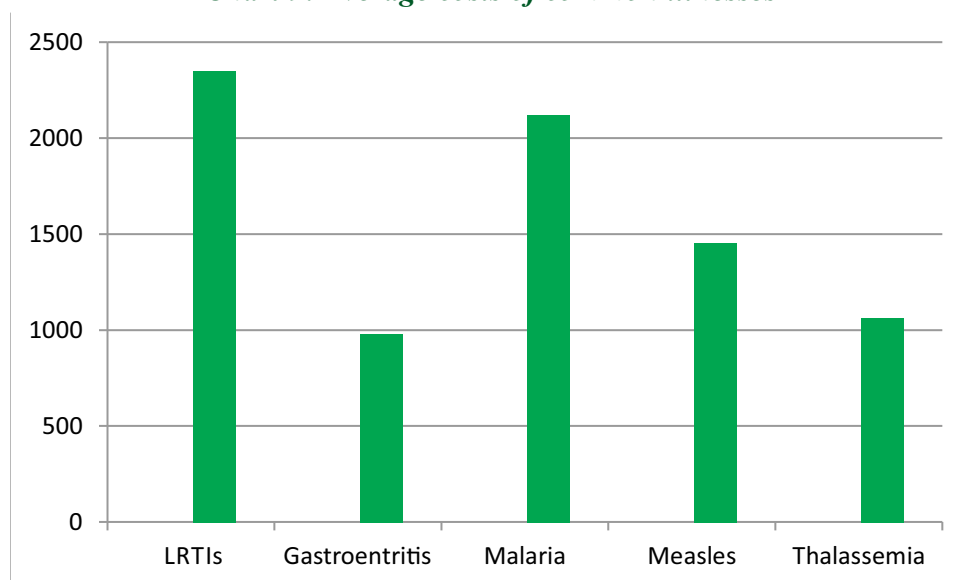
Direct Costs

The direct costs are divided into three categories including drugs, diagnostics and supplies. The highest drug cost goes to Measles (Rs. 316.50) whereas lowest cost is incurred for Malaria. Similarly the highest diagnostic cost goes for Measles (Rs. 882.47) whereas the lowest cost is incurred for Malnutrition (Rs. 205.40) and no diagnostic cost is incurred for Gastroenteritis. In Pediatrics speciality the highest supplies cost is incurred for Thalassemia (Rs. 353.83) and the lowest cost is incurred for Gastroenteritis (Rs. 47.20). The highest average direct cost per patient is Rs.1252 for Measles due to high cost of Drugs and Diagnostics.

Average Costs per Patient/Illness

The highest average cost per patient goes to Measles (Rs. 2532) while the lowest cost goes to Gastroenteritis (Rs. 998). In pediatrics speciality the highest total cost per disease group goes to ARI (Rs. 2858034) while the lowest cost goes to Malaria (Rs. 231388).

Chart 9: Average costs of common illnesses



Out Patient Department (OPD) Pediatrics

In OPD the furniture and fixture cost is Rs. 12.47. In OPD average cost per patient is Rs.57 while total cost per disease group is Rs. 2497543 (See **Annexure 5** for detailed break up).

Specialty 2: Medicine

Table 10: Disease ranking & bed occupancy rates

Ranking	1	2	3	4	5	Top 5	Total
Disease	Pyrexia of Unknown Origin	Gastroenteritis	Diabetes	Upper Respiratory Tract Infections	Hypertension		
Yearly Patient	506	442	205	189	183	48021	3272
Percentage	15%	14%	6%	6%	6%	-	100%
ALOS	2.25	2.75	3	2.5	2.75		
Bed Days/year	1139	1215	615	471	504	0	17520

The table above shows the disease ranking as well as their relative percentage representation. Top ranked illness in Medical Specialty was found to be Diabetes i.e. 15%. The highest Average Length of Stay was for Diabetes (3 Days). Similarly according to the disease rank, the highest bed occupancy in number of days is for Gastroenteritis.

Direct Costs

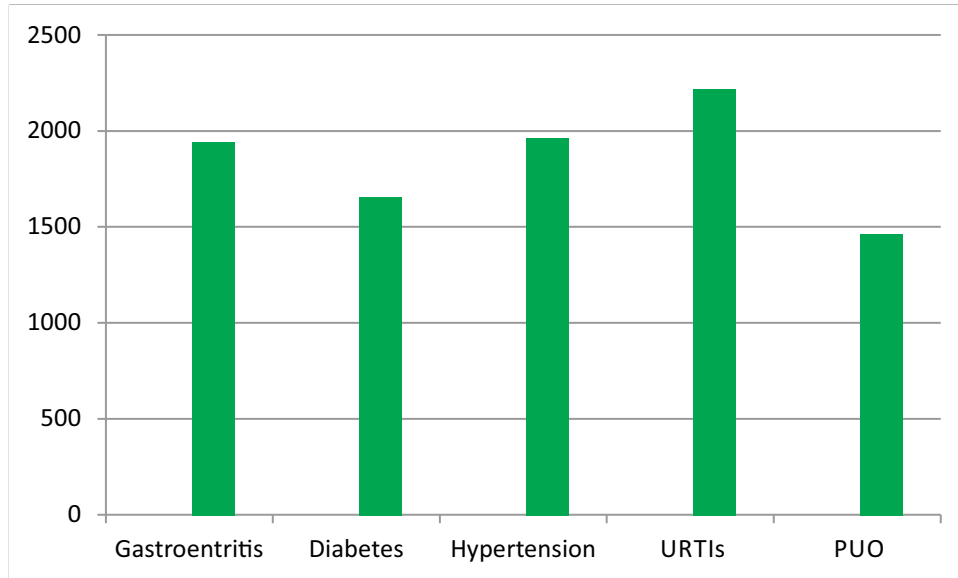
The direct costs are divided into three categories including drugs, diagnostics and supplies. The highest drug cost goes to Diabetes (Rs. 2,829), whereas the lowest cost is incurred for Malaria and Dengue which is considered as a special case over here. Similarly the highest supplies cost goes for Diabetes (Rs. 1197) while the lowest goes for Malaria (Rs. 79). In Medical specialty the highest Diagnostic cost is incurred for Gastroenteritis whereas the lowest cost is incurred for Malaria. The highest average direct cost per patient is Rs. 2829 for Diabetes due to high cost of supplies and drugs used.

Indirect Costs

The highest HR cost goes to Gastroenteritis (Rs. 1471), whereas the lowest cost is incurred for Diabetes (Rs. 1027.10). The highest utilities cost per patient is Rs. 1554 for Gastroenteritis due to high cost of electricity used, whereas the lowest utilities cost is incurred for Malaria and CVA/stroke. In Medicines specialty the highest laundry cost is incurred for Gastroenteritis while lowest is for Diabetes. Similarly waste disposal cost is highest for Gastroenteritis and lowest for Diabetes.

The miscellaneous indirect cost is highest for Gastroenteritis and lowest for Diabetes. In case of furniture and electro medical equipment the highest cost is incurred for Gastroenteritis while the lowest cost goes to Diabetes. The highest average cost goes to Gastroenteritis because of the higher cost of HR, utilities and furniture.

Chart 10: Average costs of common illnesses



Out Patient Department (OPD) Medicine

In OPD the average cost per patient is calculated as Rs.89 whereas the total cost is calculated as Rs. 4,285,602.

Average Costs per Patient/Illness

The highest average costs per patient is calculated for treating URTIs as Rs. 2,240. The lowest average cost goes to PUO i.e. Rs. 1,484.

Specialty 3: Gynecology

Table 11: Disease ranking & bed occupancy rates

Ranking	1	2	3	4	5	Top 5	Total
Disease	Normal Delivery	C-Section	Anemia	Abortion	Septic Wound (Labor)		
Yearly Patient	8551	497	227	37	34	8551	497
Percentage	82%	5%	2%	0.35%	0.33%	82%	5%
ALOS	1	3	1.5	2.5	3		
Bed Days/year	8551	1491	341	93	102		

The table above shows the disease ranking as well as their relative percentage representation. Top ranked illness was found to be Normal Delivery i.e. 81.77%. The highest Average Length of Stay was for C- Section (3.25 Days). Similarly according to the disease rank, the highest bed occupancy in number of days is for Normal Delivery.

Direct Costs

The direct costs are divided into three categories including drugs, diagnostics and supplies. The highest drug cost goes to Septic Wound (Rs. 1467.80) whereas the lowest cost is

incurred for Normal Delivery. In the Gynecology specialty the highest diagnostic cost is incurred for Normal Delivery (Rs. 1,168.64) whereas the lowest cost is incurred for Anemia (Rs. 216.89). The highest supplies cost is incurred for 1112 RSO C-section and the lowest cost is incurred for Normal Abortion (Rs. 29.29). The highest average direct cost per patient is Rs. 3267 for C-Section due to high cost of dignostics and supplies used.

Indirect costs

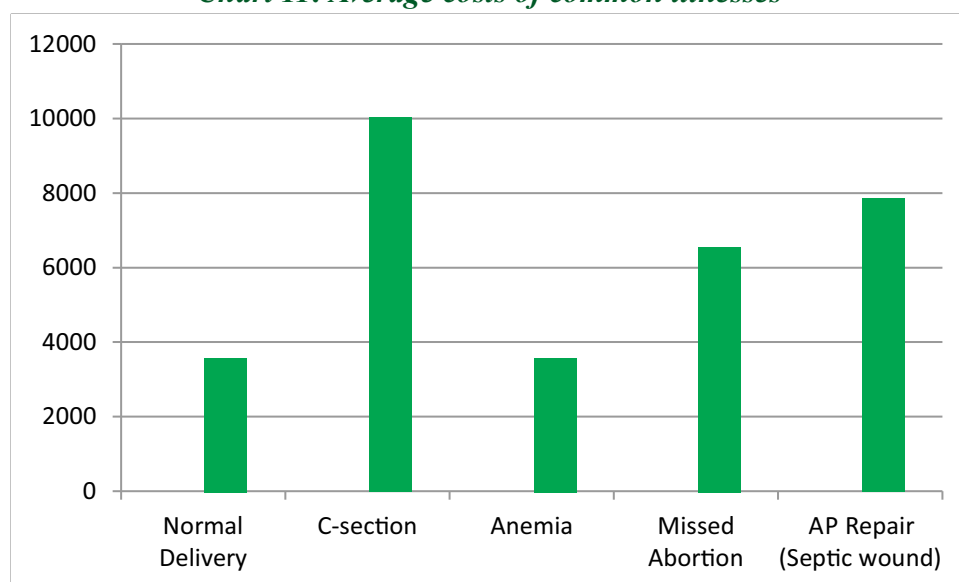
The highest HR cost goes to C-Section (Rs. 4529.10), whereas the lowest cost is incurred for Normal Delivery (Rs. 1682.7). The highest utilities cost per patient is Rs. 578 for AP repair septic wound due to high cost of electricity used, whereas the lowest utilities cost is incurred for Normal Delivery. In Gynecology specialty the highest laundry cost is incurred for AP-repair septic wound and C - Section while lowest cost is incurred for Normal Delivery. The highest OT equipment cost is incurred for Abortion while the lowest cost goes to Normal Delivery.

The highest miscellaneous cost is incurred for Septic Wound and C-Section while lowest cost is incurred for Normal Delivery. In case of furniture and electro medical equipment the highest cost is incurred for Septic Wound and C-Section while the lowest cost goes to Normal Delivery. The highest average cost goes to C-Section because of the higher cost of HR and furniture and fixtures.

Average Costs per Patient/Illness

The highest average cost per patient goes to C-Section (Rs. 9979) while the lowest cost goes to Normal Delivery (Rs. 3699). In Gynecology specialty the highest total cost per disease group goes to Normal Delivery (Rs. 31,628,345) while the lowest cost goes Abortion (Rs. 248,873).

Chart 11: Average costs of common illnesses



Out Patient Department (OPD) Gynecology

In OPD average cost per patient is Rs. 210 whereas total cost is found to be Rs. 10,482,010 (See **Annexure 6** for detailed break up).

Specialty 4: Surgery

Table 12: Disease ranking & bed occupancy rates

Ranking	1	2	3	4	5	Top 5	Total
Disease	Appendectomy	RTA (Injuries)	Cholestasis	Herniotomy	Hemorrhoid		
Yearly Patient	626	90	84	84	62	946	2294
Percentage	27%	4%	4%	4%	3%	41%	100%
ALOS	3.25	3	3.5	3	2.5		
Bed Days/year	2034	270	294	252	155	3005	12775

The table above shows the disease ranking as well as their relative percentage representation. Top ranked illness was found to be Appendix i.e. 27.29%. The highest Average Length of Stay was for Cholestasis (3.5 Days). Similarly according to the disease rank, the highest bed occupancy in number of days is for Appendix.

Direct Cost

In DHQ Malakand, the highest average direct cost is calculated for RTA Injuries i.e. Rs. 3001 due to high cost of diagnostics and supplies used. The lowest cost is incurred in treating Hernia which is Rs. 1024. The cost of diagnostic in Hernia is the lowest among all the diseases.

Indirect Costs

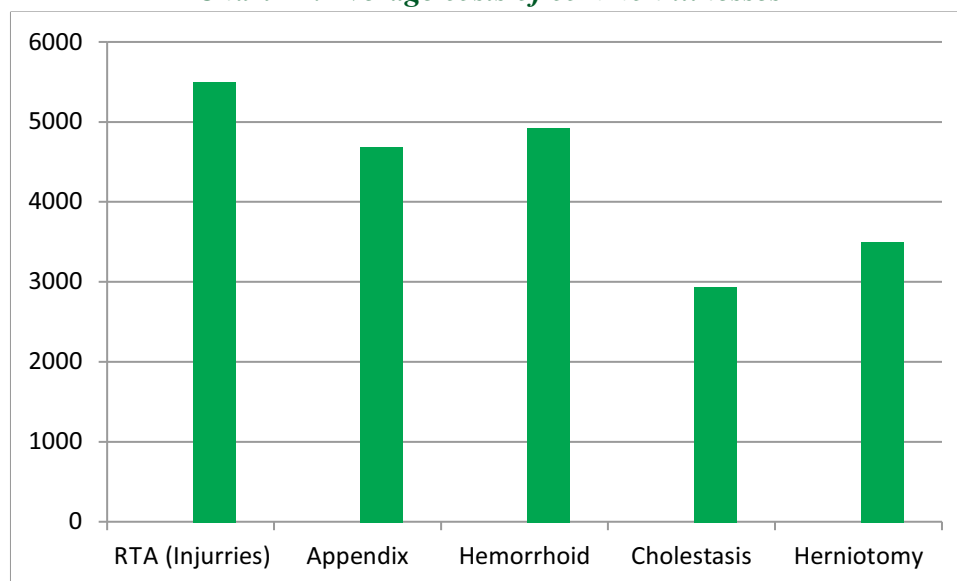
The highest HR cost goes to RTA injuries & fractures and Hernia i.e. (Rs. 1775.40), whereas the lowest cost is incurred for Cholestasis (Rs. 720.22). The highest utilities cost per patient is Rs. 203 for Appendix due to high cost of electricity, whereas the lowest utilities cost (Rs. 145) is incurred for Hemorrhoids. In Surgical Specialty the highest laundry cost is incurred for Appendix whereas Haemorrhoids receives the lowest cost.

In the given specialty highest miscellaneous cost is incurred for Appendix while lowest cost goes to Haemorrhoids. In case of furniture and fixtures, the highest cost is incurred for Appendix whereas lowest cost is incurred for Haemorrhoids. The OT procedures and equipment cost is highest for hernia as compared to rest of the diseases. The highest average indirect cost goes to Hernia because of the higher cost of HR and OT equipment.

Average Cost per Patient/Illness

The highest average cost per patient goes to RTA (injuries and surgeries) i.e. Rs. 5547 while the lowest cost goes to cholestasis (Rs. 2978). In surgical specialty the highest total cost per disease group goes to Appendectomy (Rs. 2938,208) while the lowest cost goes to Cholestasis (Rs. 250,170).

Chart 12: Average costs of common illnesses



Out Patient Department (OPD) Surgery

In OPD average indirect cost per patient is Rs. 176 whereas total cost per disease group is Rs. 3,834,633 (See **Annexure 5** for detailed breakup).

Specific Recommendations for DHQ Malakand

In the light of the above findings, following are the specific recommendations for DHQ Malakand:

- 1.** Data maintenance and record keeping system resulted in further making the task of data collection complicated. The patient charts in specific need to be kept in chronological order while further improving the overall record keeping methods.
- 2.** In the paediatric speciality, Measles was found to be an IPD case along with Malnutrition and Thalassemia. These illnesses are taking a huge chunk of financial resources of the hospital. Prevention of such ailments at community level can be extremely helpful in the reduction of costs for the hospital.

3.4 DISTRICT HEADQUARTER HOSPITAL KOHAT

The Hospital is located at the entrance point of Kohat city. The total allocated area of the Hospital is around 340 canals but more than 100 canals have been occupied by different institutes including Khyber Medical University, National TB Control and National Hepatitis Programs. Being given the status of a teaching hospital recently, it has many specialties i.e. Medical, Surgical, ENT, Eye and Emergency. Each of these specialties has their OPD and IPD. Beside these specialties the hospital has its Laboratory and Radiology center. The specialties of Gynecology and Pediatrics were previously parts of the hospital which have now been shifted to the center of the city called Liaquat Memorial Hospital. Given this scenario, separate study instruments were used to collect data from this hospital as a separate entity. The details of both the settings are outlined below:

Human Resources

The hospital is headed by Medical Superintendent with the support of Deputy Medical Superintendent and Departmental Heads. Because of the nature of the hospital each of the specialty has different types of medical staff i.e. Associate Professor, Assistant Professors, District Specialists and Medical Officers which are accompanied by allied medical professionals including Nurses, Dispensers and Technicians. In comparison to the medical staff the hospital faces the shortage of clerical staff and administration staff.

Utilities & Waste Disposal

According to the management the hospital uses three kinds of utilities i.e. electricity, gas and water. Among these utilities gas and electricity are supplied by Sui Northern Gas Limited and Water and Power Development Authority (WAPDA) respectively while the hospital has its own water tube well. The hospital has an incinerator for waste disposal which is fully functional.

LIAQAT MEMORIAL HOSPITAL (LMH) KOHAT

LMH occupies total area of about 100 canals. Being a small scale teaching hospital, it has the specialties of Gynecology, Pediatrics & Emergency Care. Each of these specialties has OPD and IPD. Besides these specialties the hospital has its laboratory and X-Ray center. The hospital is headed by Medical superintendent with the support of Deputy Medical Superintendent and Departmental Heads. The hospital has adequate human resources however, limited facilitation due to lack of funds. The hospital does not have its own incinerator and waste is handed over to the Municipal Committee.

The central position of the Kohat city makes the hospital quite overloaded because people of other Districts, of the Division and nearby. The surrounding areas of Federally Administrated Tribal Areas (FATA) also refer their patients to this hospital making it an overburdened setup.

Specialty 1: Pediatrics

Table 13: Disease ranking & bed occupancy rates

Ranking	1	2	3	4	5	Top 5	Total
Disease	Gastroenteritis	Upper Respiratory Infections (Tonsillitis)	Birth Asphyxia	Neonatal Sepsis	Pneumonia		
Yearly Patient	4938	792	519	329	270	6849	8458
Percentage	58%	9%	6%	4%	3.20%	81%	100%
ALOS	2	2.5	4	3.5			
Bed Days/year	9876	1981	2077	1152	541	15627	8760

The table above shows the disease ranking as well as their relative percentage representation, Average Length of Stay and bed occupancy. Top ranked illness in Pediatrics Specialty was found to be Gastroenteritis i.e. 58.38%. The highest average length of stay was for Birth Asphyxia (4 Days). Similarly according to the disease rank, the highest bed occupancy in number of days is for Birth Asphyxia.

Direct Costs

The direct costs are divided into three categories including drugs, diagnostics and supplies. The highest drug cost goes to Gastroenteritis (Rs. 1,679.50) whereas the lowest cost is incurred for Bronchitis (Rs. 1,127). Similarly the highest supplies cost is incurred for Bronchitis (Rs. 134.07) and the lowest cost is incurred for Neonatal Sepsis (Rs. 33). In the pediatrics specialty the highest diagnostic cost is incurred for Pneumonia (Rs. 80) and no such cost is incurred for Gastroenteritis and Neonatal sepsis. The highest average direct cost per patient is Rs. 1762 for Gastroenteritis due to high cost of drugs used.

Indirect Costs

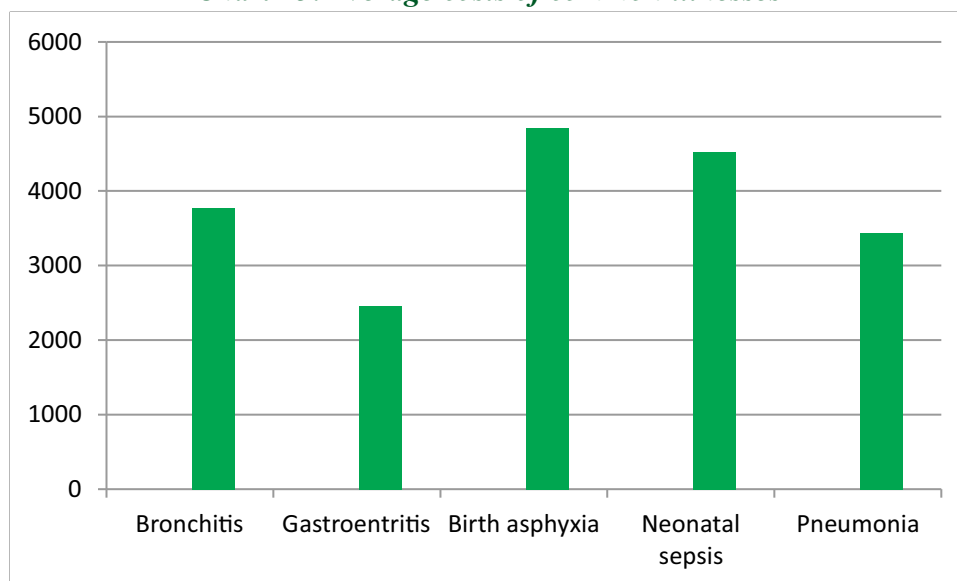
The highest HR cost goes to Birth Asphyxia (Rs. 2160.92), whereas the lowest cost is incurred for Gastroenteritis (Rs. 582.84). The highest utilities cost per patient is Rs. 951.41 for Asphyxia due to high cost of gas used, whereas the lowest utilities cost is incurred for Gastroenteritis. Similarly the highest indirect miscellaneous cost is incurred for Birth Asphyxia. In Pediatrics specialty the highest laundry cost is incurred for Birth Asphyxia while lowest is for Gastroenteritis.

In case of furniture the highest cost is incurred for Birth Asphyxia while the lowest cost goes to Gastroenteritis. The highest average cost goes to Birth Asphyxia because of the higher cost of HR, utilities and furniture.

Average & total costs

The highest average cost per patient goes to Birth Asphyxia (Rs. 4887) while the lowest cost goes to Gastroenteritis (Rs. 2493). In pediatrics specialty the highest total cost per disease group goes to Gastroenteritis (Rs.12,310,204) while the lowest cost goes to Pneumonia (Rs. 934819).

Chart 13: Average costs of common illnesses



Out Patient Department (OPD) Pediatrics

In OPD average cost per patient is Rs 221 while total cost per disease group is Rs. 9,913,799 (See Annexure 5 for detailed break up).

Specialty 2: Medical

Table 14: Disease ranking & bed occupancy rates

Ranking	1	2	3	4	5	Special Case	Top 5	Total
Disease	Diabetes	Gastroenteritis	Hypertension	Malaria	CVA/Stroke	PVO (Dengue)		
Yearly Patient	890	448	296	268	200	136	2238	4381
Percentage	40%	20%	13%	12%	9%	6%	51%	100%
ALOS	2	4.5	3	2.5	2.5	3		
Bed Days/year	1780	2016	888	670	500	408	6262	8030

The table above shows the disease ranking as well as their relative percentage representation. Top ranked illness in Medical Speciality was found to be Diabetes i.e. 39.77%. The highest Average Length of Stay was for Gastroenteritis (4.5 Days). Similarly according to the disease rank, the highest bed occupancy in number of days is for Gastroenteritis.

Direct cost

The highest average direct cost in medicine department is incurred while treating a diabetic patient. The lowest cost is incurred in the treatment of Dengue which here is taken as a special case due to seasonal epidemic.

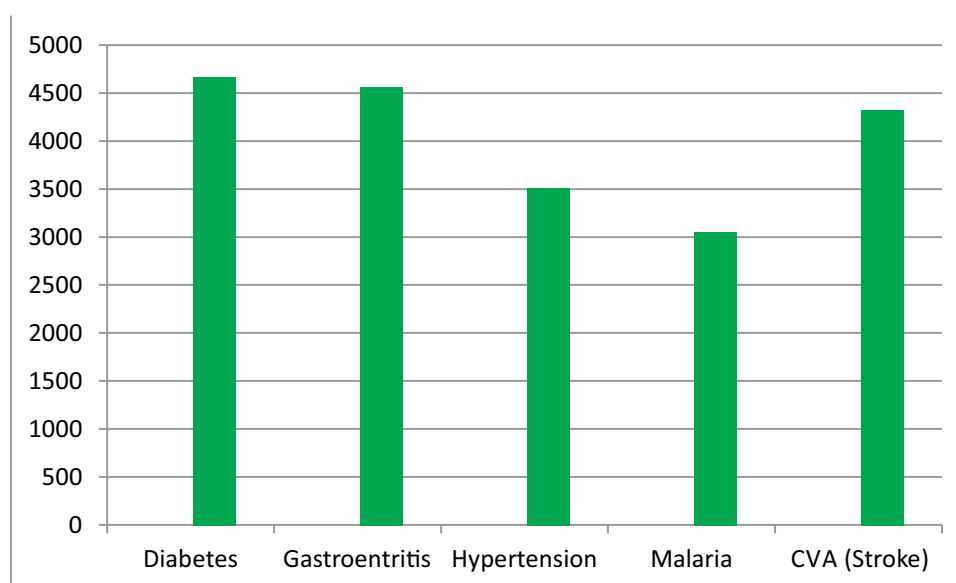
Indirect Costs

The highest average indirect costs goes to the treatment of Gastroenteritis (Rs. 3,389). The reason for the high cost is more HR allocation and high indirect costs in terms of utility. The lowest indirect cost is incurred while treating Diabetes (Rs.1,879).

Average & total costs

The highest average cost per patient goes to Diabetes (Rs 4708) while the lowest cost goes to Malaria (Rs. 3,113). In Medicine speciality the highest total cost per disease group goes to Diabetes (Rs. 4,190,098) while the lowest cost goes to Malaria (Rs. 834,408).

Chart 15: Average costs of common illnesses



Out Patient Department (OPD) Medicine

In OPD the average total cost is Rs. 215 while total cost per disease group is Rs. 1,493,856 (See **Annexure 6** for detailed break up)

Specialty 3: Gynecology

Table 15: Disease ranking & bed occupancy rates

Ranking	1	2	3	4	5	Top 5	Total
Disease	Normal Delivery	C-Section	Laparotomy	Hysterectomy	Septic wound (Labor)		
Yearly Patient	1565	1480	120	101	98	3365	3504
Percentage	45%	42%	4%	3%	3%	96%	100%
ALOS	Day Care	3.5	3	3.5	5	-	-
Bed Days/year	1565	5180	361	354	490	7950	4015

The table above shows the disease ranking as well as their relative percentage representation. Top ranked illness in Gynecology specialty was found to be Normal Delivery i.e. 44.68. The highest Average Length of Stay was for Septic Wound (5 Days). Similarly according to the disease rank, the highest bed occupancy in number of days is for C-Section.

Indirect cost

The highest HR cost goes to Septic Wound (Rs 4310.39), whereas the lowest cost is incurred for Normal Delivery (Rs 2272.16). The highest utilities cost per patient is Rs. 1631.63 for Septic Wound due to high cost of gas used, whereas the lowest utilities cost is incurred for Normal Delivery. In Gynecology specialty the highest laundry cost is incurred for Septic Wound while

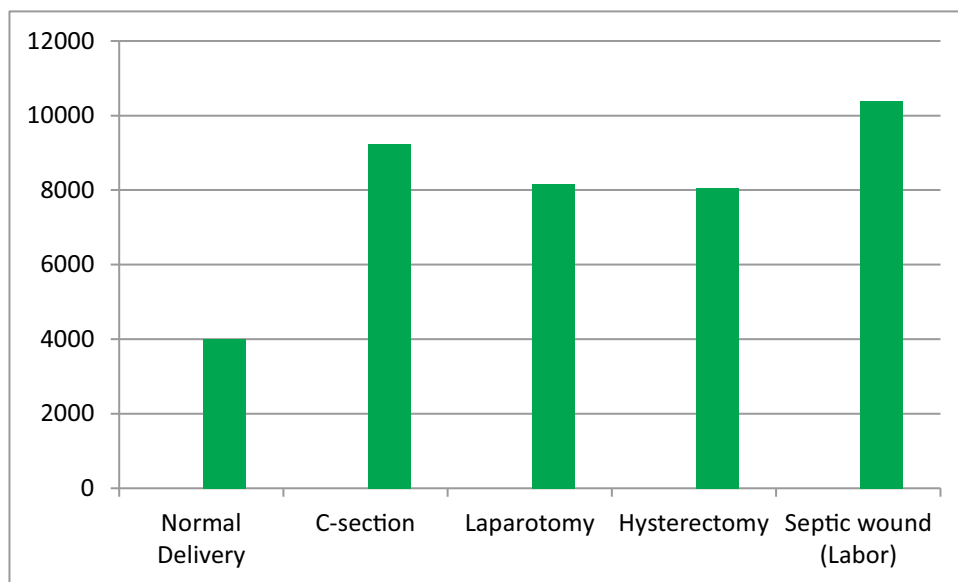
lowest cost is incurred for Normal Delivery. Whereas in Gynecology speciality highest OT procedures (equipment) cost remains the same for all diseases except Normal Delivery.

The highest miscellaneous cost is incurred for Septic Wound while lowest cost is incurred for Normal Delivery. In case of furniture and electro medical equipment the highest cost is incurred for Septic Wound while the lowest cost goes to Normal delivery. The highest average cost goes to Septic Wound because of the higher cost of HR, utilities and furniture.

Average Cost per Patient/Illness

The highest average cost per patient goes to Septic Wound (Rs. 10470) while the lowest cost goes to Normal Delivery (Rs. 4095). In Gynecology speciality the highest total cost per disease group goes to C-Section (Rs. 13804, 020) while the lowest cost goes Hysterectomy (Rs. 825,438).

Chart 15: Average costs of common illnesses



Out Patient Department (OPD) Gynecology

In OPD average cost per patient is Rs. 226 whereas total cost per disease group is Rs. 7067376 (See Annexure 6 for detailed break up).

Specialty 4: Surgical

Table 16: Disease ranking & bed occupancy rates

Ranking	1	2	3	4	5	Top 5	Total
Disease	Abdominal pain	Cholecystectomy (open surgery)	Bleeding (GI)	Hydrocelectomy	Appendectomy		
Yearly Patient	241	230	176	137	143	926	1605
Percentage	15%	14%	11%	9%	9%	58%	100%
ALOS	3	3.5	3.5	4.5	3.5	-	-
Bed Days/year	723	805	615	617	499	3258	13140

The table above shows the disease ranking as well as their relative percentage representation. Top ranked illness in surgical specialty was found to be Abdominal Pain i.e. 15.02%. The highest Average Length of Stay was for Hydrocelectomy (4.5 Days). Similarly according to the disease rank, the highest bed occupancy in number of days is for Gall Stones.

Direct Costs

The direct costs are divided into three categories including drugs, diagnostics and supplies. The highest drug cost goes to Gall Stone (Rs. 1114.75) whereas the lowest cost is incurred for (GI) bleeding. The highest cost for diagnostics is incurred for GI Bleeding and Hydrocele (Rs. 198.40) and the lowest cost is incurred for abdominal pain (Rs. 37). In surgical specialty the highest supplies cost is incurred for Gall Stone (Rs. 1020.29) whereas the lowest cost is incurred for Abdominal Pain (Rs. 476).

The highest average direct cost per patient is Rs. 2331 for gall stone due to high cost drugs and of supplies used.

Indirect costs

The highest HR cost goes to Hydrocele i.e Rs. 1417, whereas the lowest cost is incurred for abdominal pain (Rs.642.63). The highest utilities cost per patient is Rs. 795.31 for Hydrocele due to high cost of electricity and water used, whereas the lowest utilities cost (Rs 530.21) is incurred for Abdominal Pain. In Surgical specialty the highest laundry cost is incurred for Hydrocele whereas Abdominal Pain receives the lowest cost.

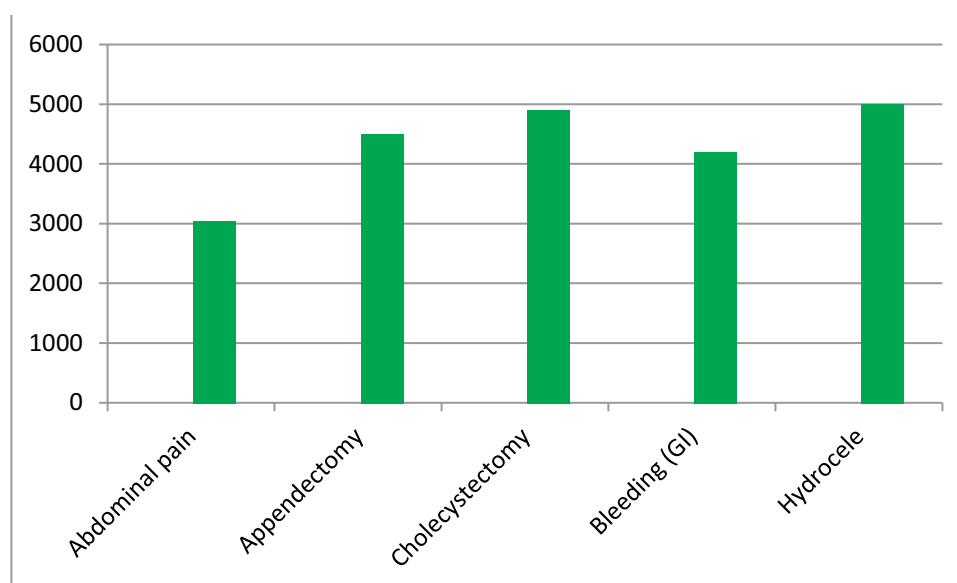
In the given specialty highest miscellaneous cost is incurred for Hydrocele while lowest cost goes to Abdominal Pain. Similarly the highest waste disposal cost is incurred for Hydrocele and lowest is incurred for Abdominal Pain. In case of furniture and fixtures, the highest cost is incurred for Hydrocele whereas lowest cost is incurred for Abdominal Pain. The OT procedures

and equipment cost are same for all the diseases of this speciality. The highest average indirect cost goes to Hydrocele because of the higher cost of HR, utilities and furniture & fixtures.

Average Cost per Patient/Illness

The highest average cost per patient goes to Hydrocele i.e. Rs. 4991 while the lowest cost goes to Abdominal Pain (Rs. 3,114). In surgical specialty the highest total cost per disease group goes to Gall Stone (Rs. 1,138,588) while the lowest cost goes to Appendectomy (Rs. 648,882).

Chart 16: Average costs of common illnesses



Out Patient Department (OPD) Surgical

In OPD average indirect cost per patient is Rs. 412 whereas total cost per disease group is Rs. 12,764,592 (See **Annexure 6** for detailed break up)

Specific Recommendations for DHQ Kohat

In the light of the above findings, followings are the specific recommendations for DHQ Kohat:

1. Given the recent change in the status of the DHQ, administrative issues were found making the task very difficult. There is an issue of missing records as well as the available records were also not kept in proper order. The data maintenance at both the hospitals needs to be improved to make the task of further research easy.
2. In the Gynecology specialty, the number of C-Section conducted was found to be very high, giving an overall rise to the total cost of the specialty.
3. The hospitals are using utility on shared basis which after allocation represents high costs on the part of the provider. There should be a separate billing system for each specialty.

SECTION-B

COST COMPARISON OF COST CATEGORIES (IPD) AMONG TARGET DISTRICTS

Specialty 1: Medicine

Common Illnesses

1. Gastroenteritis

Gastroenteritis is found to be a top ranked common illness in all the DHQs. The highest ALOS was found in Kohat i.e. 4 days and lowest ALOS in Malakand i.e. 2.75. Similarly the average cost per patient to treat Gastroenteritis is the highest in Kohat at Rs. 4618 whereas, Malakand is treating the same illness in Rs.1967.

There are various reasons for this difference in the cost structures. The first reason is reflected in the fact that the ALOS of a Gastroenteritis patient is quite high in DHQ Kohat giving a rise to cost per patient. Interestingly, diagnostic services and related costs are present in Kohat for Gastroenteritis patients whereas in Malakand, diagnosis tests are not recommended for this illness. Given a similar disease burden of Gastroenteritis in both the districts, the average cost per patient also varies due to high indirect cost in Kohat i.e. high utility and HR costs.

2. Diabetes

Diabetes is the second illness common among all the DHQs. The highest number of cases reported of diabetes were in Kohat (890) whereas the lowest were reported in DHQ Chitral (108). However, the ALOS is higher in DHQ Chitral (4 days) in comparison to Kohat (2 days). Even with a minimum ALOS in Kohat, the average cost of treating Diabetes is the highest i.e. Rs. 4618 in comparison to Malakand where a diabetic patient is treated in the lowest average cost i.e. Rs. 1669.

The cost varies due to high ALOS, direct and indirect costs (HR & Utility) in DHQ Kohat in comparison to Malakand. The drug cost in DHQ Kohat is Rs. 1,583 due to the provision of insulin injections to patients in comparison to Malakand where the total drug cost is Rs. 465 in the absence of provision of Insulin. Moreover, better diagnostic services are provided in Kohat in comparison to Malakand for the treatment of this particular ailment.

3. Hypertension

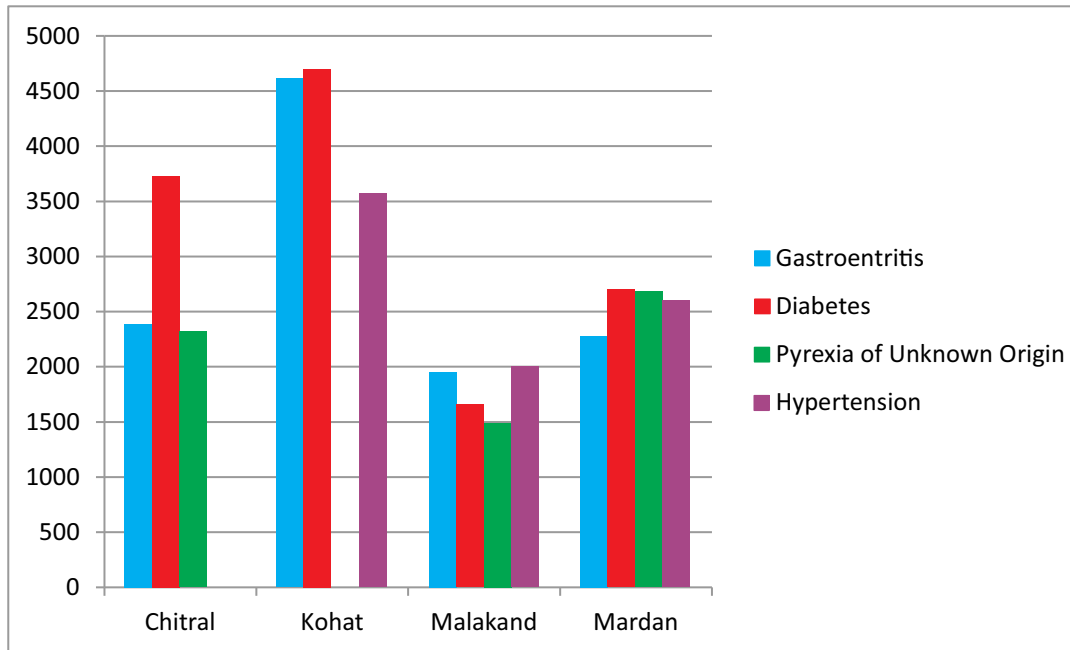
Hypertension is found a common illness in DHQ Kohat, Malakand and Mardan. With same ALOS, Kohat has the highest average cost of treatment i.e. Rs. 3000 in comparison to other DHQs which on average stands at Rs. 2000. The overall high cost in DHQ Kohat is reflected in high drug costs and higher utility bills in comparison to other DHQs.

4. Pyrexia of Unknown Origin (PUO)

PUO was found a common illness in DHQ Malakand, Mardan, & Chitral. The highest average cost of treatment is found in Mardan (Rs. 2688) in comparison to DHQ Malakand (Rs. 1484). This small variation in cost is not only due to the difference in HR costs in both the districts but also because of the fact that in DHQ Mardan antibiotics are provided by the

hospitals whereas in Malakand supportive treatment is provided by the hospital, the rest of the costs are out of pocket and are borne by the patients.

Chart 16: Comparative Average costs of common illness (Medicine)



Specialty 2: Pediatrics

Common Illnesses

1. Gastroenteritis

Gastroenteritis is a common illness among all the DHQs. ALOS was found to be similar for this illness in all DHQs, however, the average cost was higher in DHQ Kohat (Rs. 2493) whereas lowest in Malakand i.e. Rs. 998. The difference is due to high costs of drugs & supplies in DHQ Kohat, where the number of drugs provided and quantity consumed are higher by Gastroenteritis patients in comparison to DHQ Malakand.

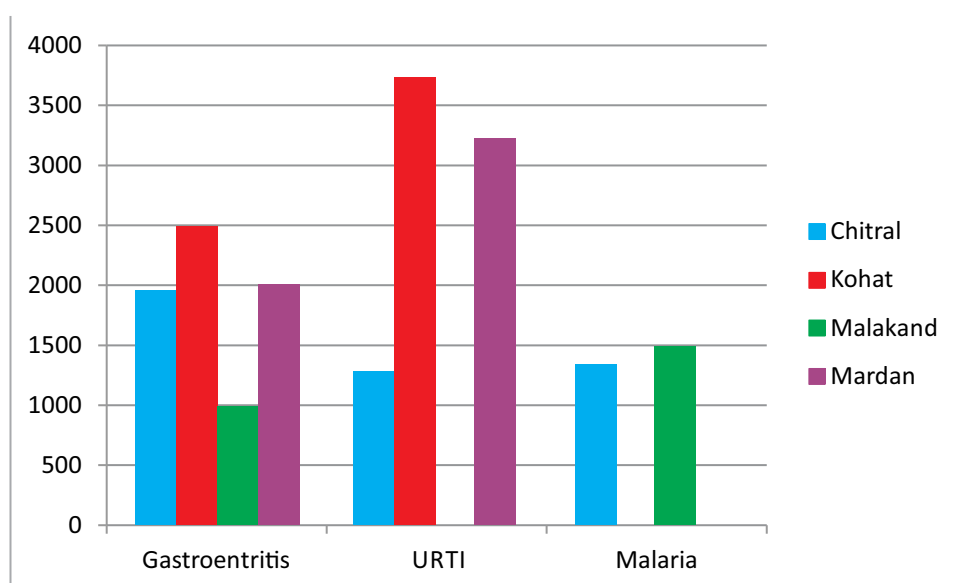
2. UpperRespiratory Tract Infections (URTIS)

URTI's were found to be common in district Kohat and Chitral. With the difference of one day in ALOS in both DHQs, the highest average cost was calculated for DHQ Kohat (Rs. 3462) in comparison to DHQ Chitral i.e. Rs. 2797. The cost difference is due to high HR and capital cost in DHQ Kohat.

3. Malaria

Malaria was found to be a common illness in DHQ Malakand & Chitral. With similar ALOS in both DHQ's, Malakand is incurring more cost while treating a malarial patient due to high HR cost in comparison to DHQ Chitral.

Chart 17: Comparative Average costs of common illness (Pediatrics)



Specialty 3: Gynecology

Common Illnesses

1. Normal Delivery

Normal delivery was found to be common among all districts, however, ALOS varies given the fact that in DHQ Kohat and Mardan patients were admitted with FTP (failure to progress labor), therefore, the ALOS per patient was more than 24 hrs in DHQ Chitral and DHQ Malakand. On the other hand for DHQ Kohat and Mardan, normal delivery was taken as a day care case as the ALOS of the patients were less than 24 hrs.

The lowest average total cost for normal delivery was found to be for DHQ Chitral that is Rs. 3602, despite the fact that it also has the highest ALOS i.e. 2 days whereas highest average total cost goes to DHQ Mardan i.e. Rs. 9435. This is due to the fact that DHQ Mardan has very high HR cost for Gynecology department in comparison to DHQ Chitral along with the fact that the number of delivery cases handled in the financial year 2015-16 in both the DHQs were almost similar. Moreover, the diagnostic cost in DHQ Mardan is also higher in comparison to DHQ Chitral.

2. Missed Abortion

Missed abortion was found to be a common illness in DHQ Chitral, Mardan and Malakand. Average total cost was found to be the highest for DHQ Mardan given high HR and diagnostic costs. In comparison, DHQ Chitral has the lowest average cost of treating a patient with missed abortion given lower HR and drugs cost.

3. Urinary Tract Infection - UTI (in pregnancy)

UTI was found to be a common illness in DHQ Mardan and DHQ Chitral. ALOS in both the districts is also the same, however, average total cost in DHQ Mardan is very high in comparison to DHQ Chitral. The difference in the cost structure is due to the high HR cost in

gynecology department in DHQ Mardan. Another factor is the difference between drugs cost where it is higher in DHQ Mardan in comparison to DHQ Chitral.

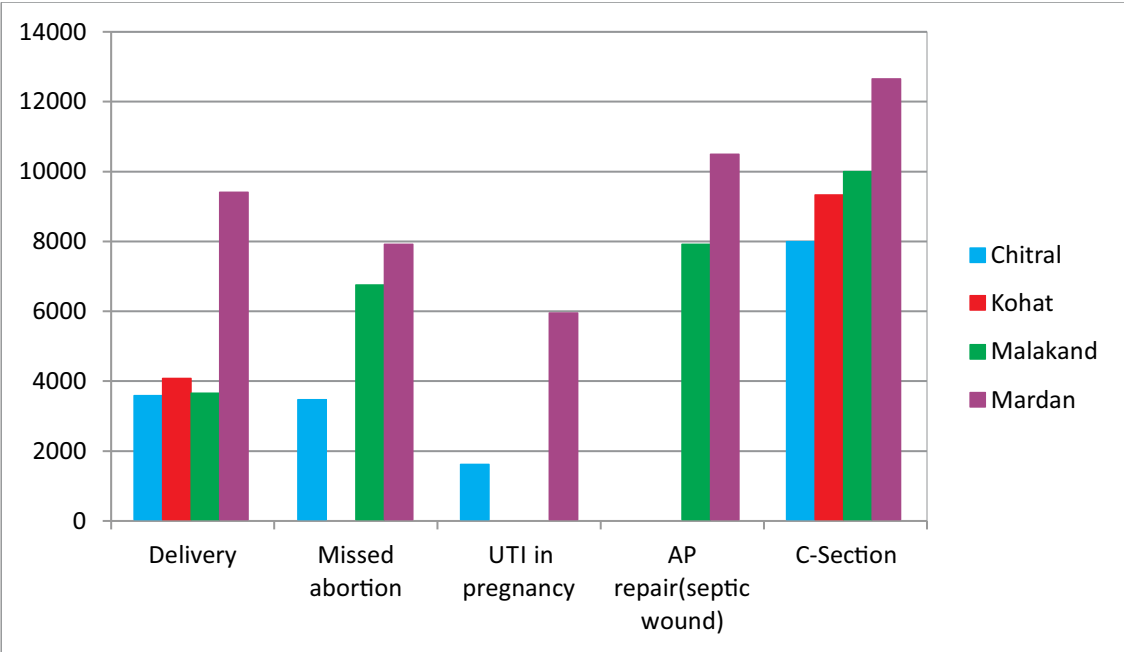
4. AP Repair (Septic Wound)

AP Repair was found to be common issue in DHQ Kohat and DHQ Malakand. ALOS was found to be higher in Kohat i.e. 5 days whereas in Malakand it was found to be 3 days. Given this difference, the average total cost is also higher in DHQ Kohat in comparison to Malakand. Moreover, HR and drugs cost is also slightly higher in Kohat in comparison to Malakand.

5. C-Section

C-Section was found to be common procedure in all DHQs. The higher average cost Rs. 12,759 was found in DHQ Mardan whereas the lowest average cost is calculated in DHQ Chitral i.e. Rs. 8062. The cost difference is due to the higher HR cost in DHQ Mardan as well as high drug cost.

Chart 18: Comparative Average costs of common illness (Gynecology)



Specialty 4: Surgery

Common Illnesses

1. Appendectomy

Appendix was found to be common illness among all DHQs. ALOS was found to be higher for DHQ Kohat i.e. 3.5 which is slightly different from other DHQs. Higher average cost goes to DHQ Mardan where the hospital is incurring a cost of Rs. 6000 per patient, whereas the lowest average cost goes to DHQ Chitral where the same ailment is treated in Rs. 3000. Apart from high HR and other indirect costs in Mardan, there is also difference in drugs and diagnostics in comparison to DHQ Chitral where these figures were found lower.

2. Road Traffic Accidents (RTAs)

RTA was found to be common among DHQ Malakand and Chitral with same ALOS. However, in DHQ Malakand, the average cost was reported to be slightly higher in comparison to DHQ Chitral. The difference in average cost is due to high indirect costs (HR, furniture & Fixtures) in DHQ Malakand in comparison to DHQ Chitral.

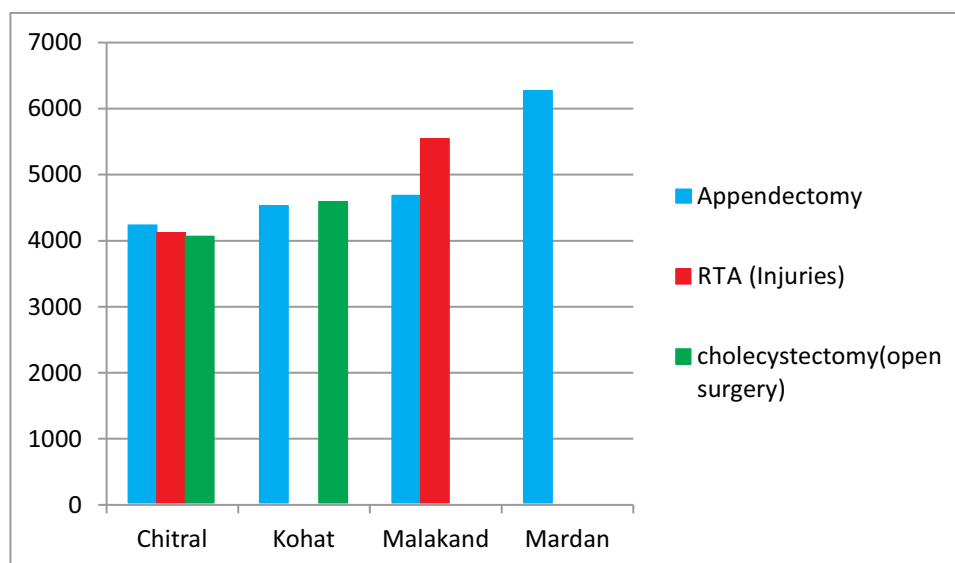
3. Hemorrhoids

Hemorrhoids were common among DHQ Malakand and DHQ Mardan with a similar ALOS of 2.5 days. The average cost is higher in Mardan given higher HR cost in comparison to Malakand.

4. Cholecystectomy (open surgery)

Gallstones were found to be common among DHQ Kohat and Chitral with similar ALOS. Similarly, the average cost per patient also varies slightly and all the cost categories follow almost the same pattern.

Chart 18: Comparative Average costs of common illness (Surgery)



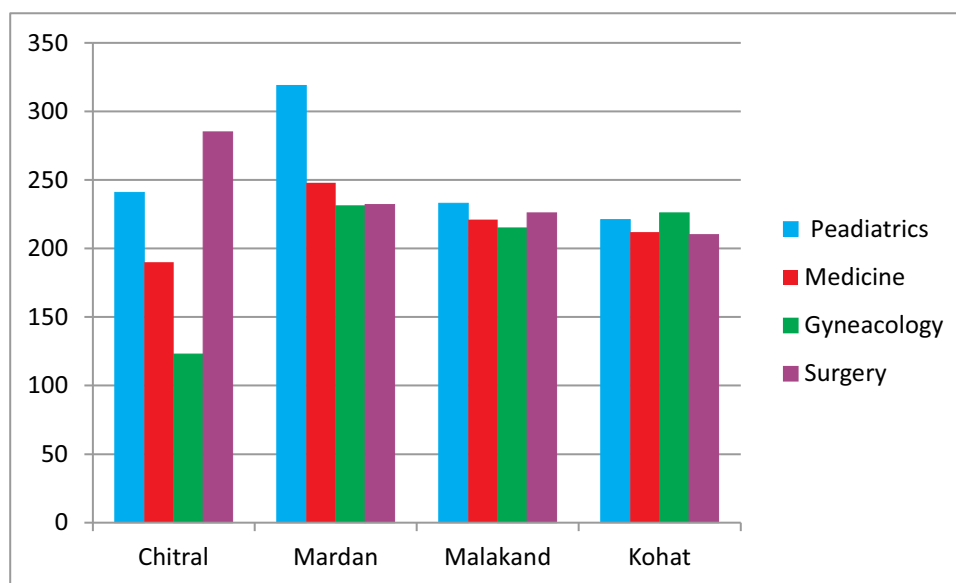
COST COMPARISON OF COST CATOGORIES (OPD) AMONG TARGET DISTRICTS

In the outpatient department of the target districts specialties, average cost per patient was calculated considering the direct and indirect expenditures incurred by the hospital. These expenditures include the capital costs and human resources allocations. Drugs, diagnostics and supplies are not considered as these costs are not incurred by the outpatient department of the hospitals.

OPD costs represents more or less a similar pattern among all DHQs and the respective specialties. DHQ Mardan , however, represents slightly higher cost in comparison to other districts. The difference in the OPD costs is due to the differences in Human Resource allocation and their respective costs. Being a central medical institute within an urban area, DHQ Mardan has higher number of HR and better level of facilitation.

The Gynecology department of DHQ Chitral represents lower average cost per visit in comparison to the rest of the DHQs. The difference is due to a limited number of HR and lower level of facilitations available in the Gynecology department.

Chart 19: Average cost comparison of per visit per specialty



4. CONCLUSION

The study collected and analysed cost data obtained from health care providers of the DHQs of Mardan, Malakand, Kohat and Chitral. Four specialties including Pediatrics, Gynecology, Medicine and Surgery were taken into consideration. The research identified top five common illnesses in all these specialities both for IPD and OPD of the hospitals.

Given the challenges in accessing essential data from the hospital records, this study incorporated various coping mechanisms to arrive at reliable and valid calculations. Extrapolation techniques, replacement costs and normative costing strategies had to be used where concrete evidence was not present.

The study revealed that the illnesses treated in these DHQs per speciality are more or less the same. However, in some districts the evidence generated on most common illnesses reflects the overall health status of the population of the districts and therefore can vary from region to region. An important factor identified from this study is the burden of those common illnesses which are ranked on top and represents more than 50% of the overall burden of illness on the hospital specialties. For example, Gastroenteritis was found to be such an ailment. If such diseases are prevented from occurrence, it will be very helpful in reducing financial burden on hospital settings as well as on patients along with improving the overall health of the population. Moreover, a number of other preventable illnesses were also found to be common including Measles and Malaria. Measles was found to be a common ailment reported in both IPD as well as OPD of DHQs. Other health issues including malnutrition and thalassemia also need to be addressed. If such cases are treated or prevented to occur at community level, it will reduce the disease burden on the hospitals to a greater extent.

The important cost drivers were also identified from this analysis which put an upward pressure on the finances of the provider. Human Resource, for example, has been identified as an important driver of the indirect cost. Similarly, better diagnostic facilities, lesser out of pocket spending by the patient and better maintenance of the hospital facilities are the factors responsible for a direct increase in cost for the provider.

5. RECOMMENDATIONS & WAY FORWARD

In the light of the evidence generated from this study, following recommendations are made:

1. DoH needs to define the service package and the drugs (costs & availability) very carefully while considering the standardization of the provision which otherwise results in higher or lower out of pocket spending OOPs and hence higher or lower provider costs.
2. Improving data maintenance techniques at hospital will ensure reliable and efficient analysis of cost data for future studies. It is an important step to make sure future evidence based policy interventions to be designed. Validity and efficiency of such studies are hard to achieve without achieving this objective.

3. Improving knowledge and capability of the administration staff of the hospital is essential in order to make sure records are maintained and kept for such analysis.
4. Computerized entry and maintenance of records is a must in order to make such studies efficient and error free.
5. Other specialties that were not part of the scope of this study should be analysed in order to get an understanding of the disease burden pattern in their respective districts. A cumulative analysis of all specialties will bring more precise results for hospital shared resources.
6. A separate study needs to be done in order to capture the out of pocket spending from patient's perspective to generate a complete set of evidence on Total Provider's Cost.
7. Enhancing the scope of the current study can help in arriving at generating a pricing list per specialty.

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Annexure 1

Table 1: Composition of Team

Personnel	Qualifications	Number
Lead Consultant	Health Economist with previous experience of costing studies	1
Financial Data Expert	Cost and Management Accountant with experience of managing and constructing templates for financial data with costing component	1
Data Collection Team	Team comprised of economists & statisticians with experience of data collection from health care facilities preferably familiar with the study sites and local language	12
Field Supervisors	Economists & statisticians with experience of data collection from health care facilities preferably familiar with the study sites and local language	4
Total		18

Annexure 2

Table 2: Mapping Out the Field Activity

Districts	Target Hospitals	Days	Personnel
Chitral	a. District Headquarter Hospital Chitral	10	4 Data Collectors 2 Medical Specialists 1 Field Supervisor
Mardan	a. District Headquarter Hospital Mardan	5	5 Data Collectors 1 Field Supervisor
Kohat	a. District Headquarter Hospital Kohat b. Liaqat Memorial Hospital Kohat City	8	5 Data Collectors 2 Medical Specialists 1 Field Supervisor
Malakand	a. District Headquarter Hospital Malakand	8	5 Data Collectors 2 Medical Specialists 1 Field Supervisor
Total	Hospitals Surveyed: 5	31	24

Annexure 3: Cost Summaries DHQ Chitral

1. DHQ Chitral Pediatrics IPD

Table 1: Average & Total Costs per Illness

Diseases	Lower Respiratory Tract Infections (LRTIs)	Gastroenteritis	Malaria	Neonatal sepsis	Upper Respiratory Tract Infections (URTIs)	OPD
Average Cost Per Patient (Rs.)	2,797	1,956	1,393	4,169	1,301	241
Total Cost per Disease Group (Rs.)	3,046,211	1,537,331	409,633	933,892	79,330	4,918,579

Table 2: Direct Costs per illness

Diseases	Lower Respiratory Tract Infections (LRTIs)	Gastroenteritis	Malaria	Neonatal sepsis	Upper Respiratory Tract Infections (URTIs)
Drugs	263	63.1	50.2	880.2	133.2
Diagnostics	609.80	193.70	326.28	80.17	96.12
Supplies Used	73.63	58	81.4	128.8	67.2
Average Direct Cost	1,677	835	590	2,098	497

Table 3: Indirect Costs per Illness

Diseases	Lower Respiratory Tract Infections (LRTIs)	Gastroenteritis	Malaria	Neonatal sepsis	Upper Respiratory Tract Infections (URTIs)	OPD
Human Resource	489.56	489.56	380.49	816.80	380.49	69.09
Utilities						
Electricity	80.28	80.28	53.52	160.56	53.52	85.00
Heating (Wood)	378.08	378.08	252.05	756.16	252.05	75.00
Water	7.78	7.78	7.78	7.78	7.78	11.00
Misc. Indirect Supplies	0.90	0.60	1.79	0.60	-	-
Waste Disposal	Nil					
Laundry	50.48	33.66	100.97	33.66	0.91	
Capital Costs						
Furniture, Fixtures & Electro Medical	113.42	113.42	75.61	226.84	75.61	
OT Procedure	Nil					
Avg. Indirect Cost	1,120	1,121	804	2,071	804	241

2. DHQ Chitral Medicine

Table 1: Average & Total Costs per Illness

Diseases	Gastroenteritis	Pyrexia of Unknown Origin (PUO)	Pneumonia	Asthma	Diabetes	OPD
Average Total Cost per Patient (Rs.)	2,381	2,321	2,885	2,951	3,734	190
Total Cost per Disease Group (Rs.)	2,553,737	1,122,763	1,236,635	702,733	402,385	4,399,283

Table 2: Direct Costs per Illness

Diseases	Gastroenteritis	Pyrexia of Unknown Origin (PUO)	Pneumonia	Asthma	Diabetes
Drugs	572.29	301.08	421.22	355.76	1,148
Diagnostics	244.96	527.72	971.89	693.43	702.46
Supplies Used	200.70	129.6	129.60	162.78	144
Average Direct Cost	1,018	958	1,523	1,212	1,994

Table 3: Indirect Costs per Illness

Diseases	Gastroenteritis	Pyrexia of Unknown Origin (PUO)	Pneumonia	Asthma	Diabetes	OPD
Human Resource	815.71	815.71	815.71	1,010.12	1,010.12	55.49
Utilities						
Electricity	240.46	240.46	240.46	320.62	320.62	111.00
Heating	133.27	133.27	133.27	177.70	177.70	23.00
Water	19.03	19.03	19.03	25.37	25.37	Nil
Misc. Indirect Supplies	52.08	52.08	52.08	69.44	69.44	Nil
Waste Disposal	Nil					
Laundry	41.14	41.14	41.14	54.85	54.85	Nil
Capital Cost						
Furniture, Fixtures & Electro Medical	61.00	61.00	61.00	81.33	81.33	0.86
OT Procedure Equipments	Nil					
Average Indirect Cost	1,363	1,363	1,363	1,739	1739	190

3. DHQ Chitral Gynaecology

Table 1: Average & Total Costs per Illness

Diseases	Failure To Progress Labor	Missed Abortion	C-Section	Preeclampsia	UTI in Pregnancy	OPD
Average Total Cost (per Patient Gyne)	3,602	3,847	8,062	2,574	1,717	123
Total Cost per Disease Group	7,552,805	765,550	495,179	82,811	55,243	3,695,798

Table 2: Direct Costs per Illness

Diseases	Failure To Progress Labor	Missed Abortion	C-Section	Preeclampsia	UTI in Pregnancy
Drugs	147.1	126.56	980.19	12.24	30.4
Diagnostics	1,007.77	1002.98	1,069.01	418.43	178.96
Supplies Used	793.71	106.22	784.17	0	0
Average Direct Cost	1,398.58	1,235.76	3,470.27	430.67	209.36

Table 3: Indirect Costs per Illness

Diseases	Failure To Progress Labor	Missed Abortion	C-Section	Preeclampsia	UTI in Pregnancy	OPD
Human Resource	1,281.38	1,590.19	2,381.36	985.81	736.05	97.51
Utilities						
Electricity	89.57	89.57	223.94	134.36	89.57	9.40
Heating	378.26	378.26	945.65	567.39	378.26	15.40
Water	24.70	24.70	61.76	37.06	24.70	-
Misc. Indirect Supplies	201.51	201.51	503.78	302.27	201.51	-
Waste Disposal						
Laundry	53.41	53.41	133.53	80.12	53.41	-
Capital Costs						
Furniture, Fixtures & Electro Medical	24.07	24.07	60.17	36.10	24.07	0.28
OT procedure Equipments	150.22	249.49	281.05	-	-	-
Average Indirect Cost	2,203	2,611	4,591	2,143	1508	123

4. DHQ Chitral Surgery

Table 1: Average & Total Costs per Illness

Diseases	Injuries (RTA)	Appendectomy	Abscess Breast	DNS Septoplasty	Cholecystectomy (open surgery)	OPD
Average Total Cost (per Patient Gyne)	4,139	4,231	3,911	3,220	4,069	285
Total Cost per Disease Group	2,442,087	2,081,702	657,090	251,132	93,589	1,156,198

Table 2: Direct Costs per Illness

Diseases	Injuries (RTA)	Appendectomy	Abscess Breast	DNS Septoplasty	Cholecystectomy (open surgery)
Drugs	983	753.16	835.62	183.96	744.44
Diagnostics	711.00	1077.86	788.13	661.16	690.28
Supplies Used	570	521.38	293.94	321.10	266.67
Average Direct Cost	2,264	2,353	1,923	1,169	1,701

Table 3: Indirect Costs per Illness

Diseases	Injuries RTA	Appendectomy	Abscess (Breast)	DNS Septoplasty	Cholecystectomy (Open surgery)	OPD
Human Resource	1,109.92	941.32	1,052.19	1,107.63	1,262.72	111.35
Utilities						
Electricity	247.95	247.95	247.95	247.95	330.60	85.00
Heating	119.34	119.34	119.34	119.34	159.12	75.00
Water	17.12	17.12	17.12	17.12	22.83	11.00
Misc Indirect Supplies	52.24	52.24	52.24	52.24	69.66	
Waste Disposal	Null					
Laundry	37.02	37.02	37.02	37.02	49.36	
Capital Costs						
Furniture, Fixtures & Electro Medical	36.23	36.23	36.23	36.23	48.31	2.57
OT Procedure Equipments	259.60	431.55	430.53	436.96	430.53	
Avg. Indirect Casts	1,875.35	1,878.70	1,988.56	2,050.42	2367.70	284.92

5. DHQ Chitral Outpatient Department

RANKING	1	2	3	4	5
Surgical	Joint and bone Diseases	Trauma	Acute Abdomen Pain	Kidney Stone	Hernia
Pediatrics	Malaria	LRTI's	Acute Hepatitis-A	UTI	Diarrhea
Medical	Hypertension	Chronic Obstructive Pulmonary Disease	Peptic ulcer	PUO (TB, Typhoid)	Angina
Gynecology	Regular antenatal Checkups	Vaginal discharge	Menstrual discharge	UTI in Pregnancy	Threaten Miscarriage

Annexure 4: Cost Summaries DHQ Mardan

1. DHQ Mardan Pediatrics

Table 1: Average & Total Costs per Illness

Diseases	Gastroenteritis	Upper Respiratory Tract Infection	AFI (Acute Febrile Illness)	Fits (Epilepsy)	Measles	OPD
Average Total Cost (per Patient Gynecology)	2,012	3,250	2,803	3,377	3,329	319
Total Cost per Disease Group	16,395,373	3,354,197	1,308,767	1,193,043	638,479	5,060,203

Table 2: Direct Cost per Illness

Diseases	Gastroenteritis	Upper Respiratory Tract Infection	AFI (Acute Febrile Illness)	Fits (Epilepsy)	Measles
Drugs	286.07	329	174.47	226.10	273.61
Diagnostics	Nil	616	501	415	286
Supplies	76.73	245.36	68.11	676.39	88.73
Avg Direct Cost	363	1,190	744	1,317	649

Table 3: Indirect Cost per Illness

Diseases	Gastroenteritis	Upper Respiratory Tract Infection	AFI (Acute Febrile Illness)	Fits (Epilepsy)	Measles	OPD
Human Resource	1,562.54	1,707.33	1,707.33	1,707.33	1,852.03	180.96
Utilities						
Electricity	21.93	137.09	137.09	137.09	164.50	115
Gas	No meter installed					
Water	2.48	15.53	15.53	15.53	18.64	23
General Medical & Misc. supplies	13.43	83.95	83.95	83.95	513.76	-
Waste Disposal	2.04	12.77	12.77	12.77	15.33	-
Laundry	10.70	66.90	66.90	66.90	80.29	-
Capital Cost						
Furniture & Fixtures	36.52	36.52	36.52	36.52	36.52	0.86
OT Procedures	Nil					
Avg. Indirect Cost	1,650	2,060	2,060	2,060	2,681	320

2. DHQ Mardan Medicine

Table 1: Average & Total Costs per Illness

Diseases	Gastroenteritis	Fever	Hypertension	Diabetes Mellitus	Chronic Hepatitis-C	Anemia	OPD
Average Total Cost (per Patient Gynecology)	2,301	2,688	2,617	2,710	3,898	637	248
Total Cost Per Disease Group	2,132,581	1,916,269	646,422	571,793	682,793	141,372	13,003,428

Table 2: Direct Cost per Illness

Diseases	Gastroenteritis	Fever	Hypertension	Diabetes Mellitus	Chronic Hepatitis-C	Anemia
Drugs	448.85	977.54	452.24	746.53	1,745.57	-
Diagnostic	-	163.19	263.31	139.98	308.15	-
Supplies Used	162.01	113.11	146.69	132.77	218.05	102
Average Direct Cost	611	1,254	862	1,019	2,272	102

Table 3: Indirect Cost per Illness

Diseases	Gastroenteritis	Fever	Hypertension	Diabetes Mellitus	Chronic Hepatitis-C	Anemia	OPD
Human Resource	1,544.44	1,336.31	1,596.48	1,544.44	1,492.41	515	109.83
Utilities							
Electricity	8.75	5.83	9.48	8.75	8.02	1	115
Gas	-	-	-	-	-	-	-
Water	8.95	5.96	9.69	8.95	8.20	1.2	23
General Medical & Misc. supplies	10.31	6.87	11.17	10.31	9.45	1	-
Waste Disposal	14.72	9.81	15.94	14.72	13.49	2	-
Laundry	38.54	25.69	41.75	38.54	35.33	5	-
Capital Cost							
Furniture & Fixtures	64.94	43.30	70.36	64.94	59.53	8.66	0.11
OT Procedures	Nil						
Avg. Indirect Cost	1,691	1,434	1,755	1,691	1,626	534	248

3. DHQ Mardan Gynecology

Table 1: Average & Total Costs per Illness

Diseases	Normal Delivery	Missed Abortion	C-Section	UTI (In Pregnancy)	OPD
Average Total Cost Per Patient (Rs.)	9,435	7,913	12,759	6,000	231
Total Cost per Disease Group (Rs.)	20,465,256	1,993,469	1,175,891	202,775	3,660,076.50

Table 2: Direct Cost per Illness

Diseases	Normal Delivery	Missed Abortion	C-Section	UTI (In Pregnancy)
Drugs	191.7	939	1998	855.3
Diagnostic	1,123.61	1,114.79	1,114.79	1,143.72
Supplies Used	655.7	645	1458	104.5
Average Direct Cost	1,827	2,698	4,571	2,103

Table 3: Indirect Cost per Illness

Diseases	Normal Delivery	Missed Abortion	C-Section	UTI (In Pregnancy)	OPD
Human Resource	7,518.59	5,094.87	7,808.56	3,784.80	428.65
Utilities					
Electricity	36.56	54.83	237.62	82.25	111.33
Gas	-	-	-	-	-
Water	4.14	6.21	26.92	9.32	-
Waste Disposal	3.41	5.11	22.14	7.66	-
Capital Cost					
Furniture & Fixtures	5.77	8.66	37.53	12.99	0.34
OT Procedures Equipments	40.18	45.17	55.14	-	-
Avg. Indirect Cost	7,608	5,214	8,187	3,897	540

4. DHQ Mardan Surgery

Table 1: Average & Total Costs per Illness

Diseases	Appendectomy	Abdominal Pain	Hemorrhoid	Kidney Stone	Hernia	OPD
Average Total Cost (per Patient Gynecology)	6,280	4,197	4,843	5,573	5,196	232
Total Cost per Disease Group	2,392,950	1,108,162	939,646	752,382	228,650	3,682,715

Table 2: Direct Cost per Illness

Diseases	Appendectomy	Abdominal Pain	Hemorrhoid	Kidney Stone	Hernia
Drugs	1,243.68	796.68	894.19	814.14	598.40
Diagnostic	1,182.82	1,245.73	225.65	234.38	241.75
Supplies Used	891.49	122.69	395.77	761.68	804.20
Average Direct Cost	3,318	2,165	1,516	1,810	1,644

Table 3: Indirect Cost per Illness

Diseases	Appendectomy	Abdominal Pain	Hemorrhoid	Kidney Stone	Hernia	OPD
Human Resource	2,445.59	1,724.61	2,809.81	3,167.91	2,995.64	93.87
Utilities						
Electricity	25.24	22.44	28.05	33.66	30.85	115
Gas	-	-	-	-	-	-
Water	25.80	22.94	28.67	34.41	31.54	23
General Medical & Misc. supplies	98.21	87.30	109.12	130.95	120.03	-
Waste Disposal	45.48	40.43	50.53	60.64	55.59	-
Laundry	111.17	98.81	123.52	148.22	135.87	-
Capital Cost						
Furniture & Fixtures	40.46	35.97	44.96	53.95	49.46	0.89
OT Procedure Equipments	170.76	-	133.27	133.27	133.27	-
Avg. Indirect Cost	2,963	2,032	3,327	3,763	3,552	233

5. DHQ Mardan Outpatient Department

Ranking	1	2	3	4	5
Surgical	UTI	Kidney Pain	Stomach Pain	Backache	Hemorrhoids
Pediatrics	Fever	Fits	Neonatal Jaundice	Meningitis	Malaria
Medical	Hepatitis	Diabetese	Hypertension	Cardio Vascular Abnormality	Chronic Obstructive Pulmonry Disease
Gynecology	Antenatal Checkup	Pelvic Inflammatory Disease	Labor Pain	Irregular Cycle	Anemia

Annexure 5: Cost Summaries DHQ Malakand

1. DHQ Malakand Pediatrics

Table 1: Average & Total Costs per Illness

Diseases	Gastroenteritis	Acute Respiratory Illness (ARI)	Malnutrition	Malaria	Measles	Thalassemia	OPD
Average Cost per Patient	998	2,378	2,151	1,489	2,532	1,098	57
Total Cost per Disease Group	2,093,388	2,858,034	1,029,829	231,288	361,111	741,206	2,497,543

Table 2: Direct Costs per Illness

Diseases	Gastroenteritis	Acute Respiratory Illness (ARI)	Malnutrition	Malaria	Measles	Thalassemia
Drugs	225.95	223.56	298.98	182.16	316.50	-
Diagnostics	Nil	347.711	205.40	227.03	882.47	214.59
Supplies Used	47.20	109.16	88.32	77.28	52.79	353.83
Avg. Direct Costs	273	680	593	486	1,252	568

Table 3: Indirect Costs per Illness

Diseases	Gastroenteritis	ARI	Malnutrition	Malaria	Measles	Thalassemia	OPD
Human Resource	553.39	1,127.12	1,045.16	717.31	881.24	438.64	56.50
Utilities							
Electricity	79.59	265.29	238.76	132.65	185.71	42.45	0.22
Gas	2.01	6.69	6.02	3.34	4.68	1.07	0.11
Water	9.53	31.76	28.58	15.88	22.23	5.08	-
Misc. Indirect Supplies	35.97	119.89	107.90	59.94	83.92	19.18	-
Waste Disposal	Incinerator not in use.						
Laundry	32.43	108.11	97.30	54.06	75.68	17.30	-
Capital Costs							
Furniture & Fixtures	11.50	38.34	34.51	19.17	26.84	6.13	0.36
OT Procedure	Nil						
Avg. Indirect Cost	724	1,697	1,558	1,002	1,280	530	57

2. DHQ Malakand Medicine

Table 1: Average & Total Costs per Illness

Diseases	PUO	Gastroenteritis	Diabetes	URTI	Hypertension	OPD
Average Cost per Patient	1,484	1,967	1,669	2,240	2,002	89
Total Cost per Disease Group	751,245	868,913	342,082	422,205	366,542	4,285,602

Table 2: Direct Costs per Illness

Diseases	PUO	Gastroenteritis	Diabetes	URTI	Hypertension
Drugs	262.38	830.34	465.20	639.35	400.68
Diagnostics	272.40	-	183.36	550.32	601.78
Supplies Used	106.32	190.07	20.99	155.15	52.14
Avg. Direct Costs	641	1,020	669	1,345	1,055

Table 3: Indirect Costs per Illness

Diseases	PUO	Gastroenteritis	Diabetes	URTI	Hypertension	OPD
Human Resource	660.49	724.26	756	692.37	724.26	88.44
Utilities						
Electricity	77.11	94.24	102.81	85.68	94.24	0.49
Gas	7.96	9.73	10.61	8.84	9.73	-
Water	10.12	12.37	13.50	11.25	12.37	0.23
Misc. Indirect Supplies	39.98	48.87	53.31	44.43	48.87	-
Waste Disposal						
Laundry	34.46	42.12	45.95	38.29	42.12	-
Capital Costs						
Furniture & Fixtures	12.62	15.43	16.83	14.03	15.43	0.09
OT Procedure Equipments	Null					
Avg. Indirect Cost	843	947	999	895	947	89

3. DHQ Malakand Gyneacology

Table 1: Average & Total Costs per Illness

Diseases	Normal Delivery	C-Section	Anemia	Abortion	AP repair (Septic Wound)	OPD
Average Cost per Patient	3,699	9,979	3,806	6,726	7,987	210
Total Cost per Disease group	31,628,345	4,959,605	863,862	248,873	271,571	10,482,010

Table 2: Direct Costs per Illness

Diseases	Normal Delivery	C-Section	Anemia	Abortion	AP repair (Septic Wound)
Drugs	187.22	1,007.28	-	258.58	1,467.80
Diagnostics	1,168.83	1,147.76	216.89	1,132.41	394.61
Supplies Used	390.26	1,111.92	413.00	29.29	908.42
Avg. Direct Cost	1,746	3,267	630	1,420	2,771

Table 3: Indirect Costs per Illness

Diseases	Normal Delivery	C-Section	Anemia	Abortion	AP repair (Septic Wound)	OPD
Human Resource	1,682.71	4,529.10	2,666.32	3,182.53	3,045.58	204.65
Utilities						
Electricity	181.19	543.57	271.78	452.97	543.57	3.15
Gaas	14.41	29.58	14.79	24.65	29.58	0.10
Water	0.02	0.31	0.69	4.21	4.58	1.58
Misc. Indirect Supplies	9.02	171.25	85.63	142.71	171.25	-
Waste Disposal						
Laundry	12.55	238.40	119.20	198.67	238.40	-
Capital Costs						
Furniture & Fixtures	1.82	34.54	17.27	28.78	34.54	0.09
OT Procedure Equipments	50.76	1,165.36	-	1,271.49	1,149.06	-
Avg. Indirect Cost	1,952	6,712	3,176	5,306	5,217	210

4. DHQ Malakand Surgery

Table 1: Average & Total Costs per Illness

Diseases	Appendectomy	RTA Injuries & Fractures	Cholestasis	Herniotomy	Hemorrhoids	OPD
Average Cost per Patient	4,693	5,547	2,978	3,576	4,925	176
Total Cost per Disease Group	2,938,208	499,276	250,170	300,467	305,358	3,834,633

Table 2: Direct Costs per Illness

Diseases	Appendectomy	RTA Injuries & Fractures	Cholestasis	Hernia	Hemorrhoids
Drugs	615.87	547.14	957.37	467.21	1,080.98
Diagnostics	265.65	914.92	748.15	177.28	920.84
Supplies Used	1,281.00	1,539.12	271.86	380.00	512.50
Avg. Direct Cost	2,163	3,001	1,977	1,024	2,514

Table 3: Indirect Costs per Illness

Diseases	Appendectomy	RTA Injuries & Fractures	Cholestasis	Hernia	Hemorrhoids	OPD
Human Resource	1,713.40	1,775.40	720.22	1,775.40	1,686.65	175.86
Utilities						
Electricity	166.73	142.92	142.92	142.92	119.10	0.36
Gas	14.58	12.50	12.50	12.50	10.42	0.00
Water	21.59	18.51	18.51	18.51	15.42	0.00
Misc. Indirect Supplies	29.57	25.34	25.34	25.34	21.12	-
Waste Disposal						
Laundry	73.52	63.01	63.01	63.01	52.51	-
Capital Costs						
Furniture & Fixtures	21.40	18.34	18.34	18.34	15.28	0.15
OT Procedure Equipments	490.32	490.32	-	496.49	490.32	-
Avg. Indirect Cost	2,531	2,546	1,001	2,553	2411	176

5. DHQ Malakand Outpatient Department

Ranking	1	2	3	4	5
Surgical	Appendix Pain	RTA	Abdominal Pain	Hernia	Hemorrhoid
Pediatrics	Diarrhea	RTIs	Malnutrition	Malaria	Measles
Medical	PUO	Abdominal Pain	Chest Infection	Stomach Pain	HTN
Gynecology	Labor Pain	Irregular Cycle	Septic Wound	Threaten Abortion	Anemia

Annexure 6: Cost Summaries DHQ Kohat

1. DHQ Kohat Pediatrics

Table 1: Average & Total Costs per Illness

Diseases	Appendectomy	Abdominal Pain	Hemorrhoid	Kidney Stone	Hernia	OPD
Average Total Cost (per Patient Gynecology)	6,281	4,198	4,844	5,573	5,197	233
Total Cost per Disease Group	2,392,950	1,108,163	939,647	752,383	228,650	3,682,715

Table 2: Direct Cost per Illness

Diseases	Gastroenteritis	Bronchitis	Birth Asphyxia	Neonatal Sepsis	Pneumonia
Drugs	286.07	329.15	174.47	226.10	273.61
Diagnostics	-	615.68	501.12	414.83	286.18
Supplies Used	76.73	245.36	68.11	676.39	88.73
Avg. Direct Cost	363	1,190	744	1,317	649

Table 3: Indirect Cost per Illness

Diseases	Appendectomy	Abdominal Pain	Hemorrhoid	Kidney Stone	Hernia	OPD
Human Resource	2,445.59	1,724.61	2,809.81	3,167.91	2,995.64	93.87
Utilities						
Electricity	25.24	22.44	28.05	33.66	30.85	115
Gas	-	-	-	-	-	-
Water	25.80	22.94	28.67	34.41	31.54	23
General Medical & Misc. supplies	98.21	87.30	109.12	130.95	120.03	-
Waste Disposal	45.48	40.43	50.53	60.64	55.59	0
Laundry	111.17	98.81	123.52	148.22	135.87	0
Capital Cost						
Furniture & Fixtures	40.46	35.97	44.96	53.95	49.46	0.89
OT Procedure Equipments	170.76	-	133.27	133.27	133.27	0
Avg. Indirect Cost	2,963	2,032	3,328	3,763	3,552	233

2. DHQ Kohat Medicine

Table 1: Average & Total Costs per Illness

Diseases	Diabetes	Gastroenteritis	Hypertension	Malaria	CVA/ Stroke	PVO (Dengue)	OPD
Average Total Cost (Rs.)	4,708	4,618	3,575	3,113	4,393	3,157	215
Total Cost per Disease Group	4,190,098	2,069,072	1,058,158	834,408	878,692	429,367	1,493,856

Table 2: Direct Cost per Illness

Diseases	Diabetes	Gastroenteritis	Hypertension	Malaria	CVA/Stroke	PVO (Dengue)
Drugs	1,583.50	926.35	996.20	837.83	2,009	640.90
Diagnostics	48	94	-	15	86	33
Supplies Used	1,197	209	96	79	117	-
Avg. Direct Costs	2,829	1,230	1,092	932	2,212	674

Table 3: Indirect Cost per Illness

Diseases	Diabetes	Gastroenteritis	Hypertension	Malaria	CVA/ Stroke	PVO (Dengue)	OPD
Human Resource	1,027.10	1,470.98	1,204.65	1,115.88	1,115.88	1204.65	101.68
Utilities							
Electricity	328.03	738.07	492.05	410.04	410.04	492.05	111.00
Gas	252.99	569.23	379.49	316.24	316.24	379.49	-
Water	109.64	246.69	164.46	137.05	137.05	164.46	-
Misc. Indirect Supplies	74.29	167.16	111.44	92.87	92.87	111.44	-
Waste Disposal	11.97	26.93	17.95	14.96	14.96	17.95	-
Laundry	42.21	94.97	63.31	52.76	52.76	63.31	-
Capital Cost							
Furniture & Fixtures	33.24	74.79	49.86	41.55	41.55	49.86	2.45
OT Procedure Equipments	Nil						
Avg. Indirect Cost	1,879	3,389	2,483	2,181	2181	2,483	215

3. DHQ Kohat Gynecology

Table 1: Average & Total Costs per Illness

Diseases	Normal Delivery	C-Section	Laparotomy	Hysterectomy	Septic wound (Labor)	OPD
Average Total Cost (per Patient Gynecology)	4,095	9,326	8,234	8,156	10,470	226
Total Cost per Disease Group	6,410,924	13,804,020	989,579	825,438	1,026,525	7,067,376

Table 2: Direct Costs per Illness

Diseases	Normal Delivery	C-Section	Laparotomy	Hysterectomy	Septic wound (Labor)
Drugs	263	1333	1417	998.6	2465
Diagnostics	589.94	1,045.64	609.42	609.42	363.92
Supplies Used	813.8	1155	1292	1292	1292
Avg. Direct Costs	1,324	3,533	3,317	2,899	4,120

Table 3: Indirect Cost per Illness

Diseases	Normal Delivery	C-Section	Laparotomy	Hysterectomy	Septic wound (Labor)	OPD
Human Resource	2,272.16	4,273.64	3,599.95	3,777.56	4,310.39	192.09
Utilities						
Electricity	101.17	354.08	303.50	354.08	505.83	20.63
Gas	225.04	787.65	675.13	787.65	1,125.21	11.47
Water	0.12	0.41	0.35	0.41	0.59	0.02
Misc. Indirect Supplies	12.98	45.44	38.95	45.44	64.92	Nil
Waste Disposal	No disposal system in LMH. Waste is handled by Municipal Corporation.					
Laundry	15.84	85.76	65.97	45.14	55.14	Nil
Capital Cost						
Furniture & Fixtures	27.71	97.00	83.14	97.00	138.57	1.52
OT Procedure Equipments	115.64	149.72	149.72	149.72	149.72	Nil
Avg. Indirect Cost	2,770	5,793	4,916	5,256	6350	225

4. DHQ Kohat Surgery

Table 1: Average & Total Costs per Illness

Diseases	Abdominal Pain	Cholecystectomy (open Surgery)	Bleeding	Hydrocele	Appendectomy	OPD
Average Total Cost per Patient (Rs.)	3,114	4,950	4,241	4,991	4,548	412
Total Cost per Disease Group	750,419	1,138,588	744,611	683,852	648,882	12,764,592

Table 2: Direct Costs per Illness

Diseases	Abdominal Pain	Cholecystectomy (open Surgery)	Bleeding (Gi)	Hydrocele	Appendectomy
Drugs	943.50	1,114.75	420.00	713.00	730.75
Diagnostics	37.12	195.90	198.40	198.40	195.25
Supplies Used	476.00	1,020.29	1,002.79	1,002.79	1,002.79
Avg. Direct Costs	1,457	2,331	1,621	1,941	1,929

Table 3: Indirect Cost per Illness

Diseases	Abdominal Pain	Cholecystectomy (Open Surgery)	Bleeding	Hydrocele	Appendectomy	OPD
Human Resource	642.63	1,296.99	1,296.99	1,416.81	1,296.99	184.99
Utilities						
Electricity	323.23	377.11	377.11	484.85	377.11	111.00
Gas	65.36	76.25	76.25	98.03	76.25	45.00
Water	141.62	165.22	165.22	212.43	165.22	65.00
Misc. Indirect Supplies	326.01	380.34	380.34	489.01	380.34	-
Waste Disposal	17.28	20.16	20.16	25.92	20.16	-
Laundry	54.52	63.60	63.60	81.78	63.60	-
Capital Cost						
Furniture & Fixtures	86.51	100.93	100.93	129.76	100.93	2.43
OT Procedure Equipments	-	138.85	138.85	138.85	138.85	3.34
Avg. Indirect Cost	1,657	2,619	2,619	3,077	2619	412

Annexure 7: Comparative Cost of Common Illness

Pediatrics Inpatient Department

	CHITRAL	MARDAN	MALAKAND	KOHAT	INFERENCES
1. Gastroenteritis	Rs. 1,956 (ALOS 3)	Rs. 2,012 (ALOS 2)	Rs. 998 (ALOS)	Rs. 2,493 (ALOS)	1. High ALOS in Kohat 2. High cost of drugs & supplies 3. High utility cost
2. Upper Respiratory Tract Infection (Tonsillitis)	Rs. 1,301 (ALOS 2)	Rs. 3,250 (ALOS 3)	-	Rs. 3,771 (ALOS 2.5)	1. High HR cost & utility cost 2. High Drug cost
3. Malaria	Rs. 1,393 (ALOS)	-	Rs. 1,489 (ALOS 1.25)	-	Slight Difference in cost due to difference in HR cost
Total HR	12	45	25	34	
Incinerator (Waste disposal)	X	✓	X	✓	

Medical Inpatient Department

	CHITRAL	MARDAN	MALAKAND	KOHAT	INFERENCES
1. Gastroenteritis	2,381 (ALOS 3)	2,301 (ALOS 3)	1,967 (ALOS 2.75)	4618 (ALOS 4.5)	1. High ALOS in Kohat 2. High cost of drugs & supplies 3. High utility cost
2. Diabetes	3,734 (ALOS 4)	2,710 (ALOS 3)	1,669 (ALOS 3)	4,708 (ALOS 2)	1. High direct & Indirect Cost 2. Utility cost & high drug cost
3. Pyrexia of Unknown Origin	2,321 (ALOS 3)	2,688 (ALOS 2)	1,484 (ALOS 2.25)	-	1. Antibiotics VS Supportive treatment 2. High HR Cost
4. Hypertension	-	2,617 (ALOS 3)	2,002 (2.75)	3575 (ALOS 3)	1. High drug cost in kohat along with utility bills
Total HR	17	46	32	28	
Incinerator (Waste disposal)	X	✓	X	✓	

Gynecology Inpatient Department

	CHITRAL	MARDAN	MALAKAND	KOHAT	INFERENCES
1. Delivery	Rs. 3,602 (ALOS 3) (FTPL)	Rs. 9,435 (Day Care)	3,699 ALOS 1	4,095 (Day Care)	1. High ALOS in Kohat 2. High cost of drugs & supplies 3. High utility cost
2. Missed Abortion	3,847 (ALOS 2)	7,913 (ALOS 1.5)	6,726 ALOS 2.5	-	1. High HR cost & utility cost 2. High Drug cost
3. UTI in Pregnancy	1,717 (ALOS 2)	6,000 (ALOS 1.25)	-	-	Slight Difference in cost due to difference in HR cost
4. AP repair (Septic Wound)	-	-	7,987 (ALOS 3)	10,470 (ALOS 5)	
5,C-Section	8,062 (ALOS 5)	12,759 (ALOS 6.5)	9,979 (ALOS 3)	9,326 (ALOS 3.5)	
Total HR	17	44	47	56	
Incinerator (Waste disposal)	X	✓	X	✓	

Surgical Inpatient Department

	CHITRAL	MARDAN	MALAKAND	KOHAT	INFERENCES
1. Appendectomy	Rs. 4,231 (ALOS 3)	6280 (ALOS 2.25)	4,693 (ALOS 3.25)	4,548 (ALOS 3.5)	1. High cost of drugs & diagnostics 2. High utility & HR cost
2. Road Traffic Accidents (RTAs)	4,139 (ALOS 3)	-	5,547 (ALOS 3)	-	1. High indirect cost
3. UTI in Pregnancy	4,069 (ALOS 4)	-	-	4,950 (ALOS 3.5)	1. Stight difference due to high indirect cost
Total HR	18	53	34	22	
Incinerator (Waste disposal)	X	✓	X	✓	

