

**ANALYSIS OF SERVICE DELIVERY BY
EMPANELLED PRIVATE AND PUBLIC
HOSPITALS UNDER AYUSHMAN BHARAT-
AROGYA KARNATAKA SCHEME UNDER THE
SUPERSPECIALTY DEPARTMENTS OF
ONCOLOGY, CARDIOLOGY, NEUROLOGY AND
UROLOGY IN KARNATAKA FOR THE FY2022-
2023.**

Dissertation submitted to



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Master of Business Administration (MBA)

in

Hospital and Health Management

by

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Under the supervision and Guidance of

Dr. J P Singh

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DECLARATION BY STUDENT

I hereby declare that this dissertation titled **Analysis Of Service Delivery By Empanelled Private And Public Hospitals Under Ayushman Bharat-Arogya Karnataka Scheme Under The Super specialty Departments Of Oncology, Cardiology, Neurology And Urology In Karnataka For The FY 2022-2023** is the bonafide record of my original research work. I declare that it has not been submitted to any other university or institution for the award of any degree or diploma. Information derived from the published or unpublished work of others has been duly acknowledged in the text.

(Signature)

Name of Student

Date

CERTIFICATE

This is to certify that Dr. Sahana K Mohan in partial fulfilment of the requirements for the award of the degree of MBA (Hospital and Health Management from the IIHMR University, Jaipur) has successfully completed her internship at Karnataka State Health Systems Resources Centre (KSHSRC) during February 23- May 20, 2023.

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2. ABBREVIATIONS:

1. ABPMJAY-ArK-Ayushman Bharat Arogya Karnataka.
2. SAST- Suvarna Arogya Suraksha Trust
3. APL- Above Poverty Line
4. BPL- Below Poverty Line
5. ABPMJAY- Ayushman Bharat Pradhan Mantri Jan Arogya Yojana
6. UHC-Universal Health Coverage
7. SHA-State Health Agency
8. PTCA-Percutaneous Transluminal Coronary Angioplasty
9. PCNL-Percutaneous Nephrolithotomy
10. URSL-Ureteroscopic Lithotripsy
11. TURP-Transurethral Resection of The Prostate
12. CAD- Coronary Artery Disease
13. ASHA-Accredited Social Health Activist.

3. ABSTRACT:

Introduction:

Karnataka State Health Policy 2017 and the Vision Document 2025 envisages provision of cashless primary, secondary tertiary health care to the poor and vulnerable population. In-order to achieve this goal, the State launched Arogya Karnataka scheme with a family floater of Rs. 2 Lakhs/year. The National Health policy also launched the Ayushman Bharat Prime Minister Jan Arogya Yojane from 23-09-2018 with a family floater of Rs. 5 Lakhs/year. Arogya Karnataka was integrated with AB PM-JAY under the co-branded title of “Ayushman Bharat - Arogya Karnataka” The Ayushman Bharat-Arogya Karnataka Scheme (AB-ARK) aims to provide universal health coverage and quality healthcare services to its citizens.

Study objectives:

This study conducts a comprehensive analysis of the service delivery by empanelled private and public hospitals under AB-ARK in these super specialty departments for the fiscal year 2022-2023. This study presents an overview of the utilization and supply of super specialty packages under the ABPMJAY-Ark scheme in Karnataka. Data from the SAST portal for FY2022-2023 is analysed. This study aims to investigate the reasons behind the higher number of referrals in super specialty departments in Karnataka and identify factors influencing referral patterns. It also explores the impact of socio-economic and demographic factors on service utilization in these departments. By analyzing these factors, the research aims to provide insights into the broader implications of socio-economic and demographic characteristics on healthcare access. Additionally, it aims to identify districts in Karnataka with the highest number of portable cases in super specialty departments.

Results:

The study reveals that private empanelled hospitals (280) outnumber government hospitals (38) in providing services, resulting in higher pre-authorizations from private facilities. However, individual private hospitals have a lower average number of pre-authorizations compared to government hospitals due to the larger number of private hospitals in the state. Bengaluru Urban, Mysuru, Dharwad, Davanagere, Kalaburagi, Shivamogga, and Dakshina Kannada districts exhibit the highest pre-authorizations across all specialties, while Chamarajanagar, Chikkaballapur, Haveri, Ramanagara, Tumakuru, Raichur, and Chikkamagaluru show lower utilization, possibly due to low awareness and limited empanelled services. Portable pre-authorizations are higher in districts like Tumakuru, Haveri, Chikkaballapura, Chamarajanagar, Raichur indicating a need for beneficiaries to seek care elsewhere. The study also identifies the age group of 45-60 years as the highest service utilizers, with males predominating except in oncology. Beneficiaries from below poverty line backgrounds utilize services more than above poverty line beneficiaries. Oncology has the highest number of referral pre-authorizations, often originating from taluk hospitals.

Keywords: ABPMJAY-ARK, Oncology, Neurology, Cardiology, Urology

4. INTRODUCTION:

National Health Policy 2017 showed that there has been a **stark rise in out-of-pocket expenditure** (6.9% in rural areas and 5.5% in urban areas – OOP on healthcare as a proportion of total household monthly per capita expenditure). To reduce the financial burden on families and improve the affordability and accessibility of health services to the public, the government of Karnataka initiated a program called Arogya Karnataka on 2.03.2018. This program also aimed to achieve the “Universal Health Coverage” (UHC), which signifies that all people should have access to quality health services, when in need, without facing any financial burden. Government of India too initiated Ayushman Bharat under the similar objectives and thereby both the schemes were co-branded and named as “Ayushman Bharat-Arogya Karnataka scheme” and is being implemented in an Assurance Mode ¹ by Suvarna Arogya Suraksha Trust, the State Health Agency (SHA) from October 30, 2018. This scheme provided a financial coverage of Rs.5 lakhs on a family floater basis for people belonging to BPL and Rs.1.5 lakhs coverage for people belonging to the APL category. The government of India will contribute to 60% of the expenditure incurred for beneficiaries and Karnataka state will contribute to the remaining 40% of the expenditure. The 60% central share includes beneficiaries in the SECC data 2011 and remaining RSBY beneficiaries or 62 lakh families only. The 40% state share includes expenditure incurred for the 62 lakh families, in addition to 100% of remaining Eligible families and General Families. The integrated scheme covers Simple Secondary, Complex Secondary, Tertiary & Emergency Procedures. Primary treatments and simple secondary procedures which are limited to PHIs only. Complex Secondary procedures, Tertiary procedures, and Emergency procedures will be performed in PHIs and empanelled Private hospitals. For emergency procedures, patients can directly go to the empanelled hospitals of their choice and avail treatment without a referral being provided. The scheme aims at reduction of the out-of-pocket expenditure on health care through the support and participation of the private sector with the existing network of government hospitals.²

Over the years, the Karnataka government under the ABPMJAY-ArK scheme has adopted several practices to improvise the scheme to enhance service utilization, few such practices are the gatekeeping mechanism and online referral system. The gatekeeping mechanism requires government facilities to handle a set of 294 identified simple secondary procedures. This approach helps in strengthening the public healthcare system by ensuring that these procedures are carried out at government facilities only³. The other practice is the online referral system, this system allows an empanelled facility to refer the patient to another facility if they are not equipped to handle the services required by the patient. This system works on the Capability Gap Module analysis. The referral system is entirely upgraded to perform in an online manner. capability Gap module analysis provides information about the facilities available at a hospital. All District Hospitals, Government Medical College Hospitals, Taluk Hospitals, and Community Health Centres were to update under the Hospital Capabilities and Gaps on the availability

¹ <http://arogyakarnataka.gov.in/sast/english/index.php/site-map/2018-11-23-07-28-59/about-ABPMJAY-ArK>

² <https://biomedicineonline.org/index.php/home/article/view/1576/678>

³ [ORS.pdf](#)

of the 1650 procedures under ABPMJAY-ArK regularly, If a particular Complex Secondary Procedure or Tertiary care procedure is not available in a peripheral hospital, then the patient gets a referral to the District Hospital or Medical College Hospital in the state capital which has the facility to perform the procedure. Only if it is not available in the nearby District Hospital, then the hospital can provide a referral to the private empanelled hospitals. In case of Emergency Procedures, patients can approach public health institutions or empanelled private health facilities for care without any referral. The online referral module lists the hospitals closest to the referring hospital with the specific specialization available along with the distance and contact details. This system prevents an unhealthy nexus of the government and private institutions. When a higher number of referrals are seen from a facility, it shows that there is a gap in services available which needs to be addressed. It has been noted that a higher number of referrals are seen in the procedures that come in the super specialty category under Cardiology, Neurology, Oncology and Urology. Thus, understanding the utilization of services to analyse the service delivery gap under these specialities forms the basis of our study.

5. RESEARCH OBJECTIVES:

1. Understand the reason behind the higher number of referrals in the super specialty departments considered for the study in the state of Karnataka.
2. Understand the influence of the socio-economic and demographic factors on service utilization in the super specialty departments.
3. Identify the districts with the highest number of portable cases under those super specialty departments.

6. RESEARCH IMPLICATIONS:

1. Enhanced Referral Mechanisms: The study aims to understand the reasons behind the higher number of referrals in the super specialty departments in Karnataka. The research findings can help streamline the process of patient referrals, reduce wait times, and ensure that patients receive appropriate and timely care.
2. Targeted Resource Allocation: By investigating the influence of socio-economic and demographic factors on service utilization in super specialty departments, the study can provide valuable insights into healthcare disparities. Identifying the factors that affect service utilization will help the healthcare provider and policymakers to allocate the resource efficiently and effectively and make sure the services reach all the segments of the population.
3. Geographical Planning: Identifying the districts with the highest number of portable cases under super specialty departments can help in identifying areas which have higher health needs and thus helps in directing the resources to fulfill the needs. It can also help in strategic planning for the establishment of new healthcare facilities or expansion of existing ones to ensure there is adequate coverage for portable cases in the districts.
4. Improved Health Outcomes: Ultimately, the research implications can lead to improved health outcomes for the population in Karnataka. By addressing the factors influencing referrals, understanding the impact of socio-economic and demographic factors, and targeting areas with high portable cases, the healthcare system can be optimized to better meet the needs of patients. This can result in reduced healthcare disparities, improved patient satisfaction, and better health outcomes for individuals in the state.
5. To identify specialities that require special focus in terms of increase in the number of hospitals being empanelled under them for better accessibility of services to the beneficiaries.

6. REVIEW OF LITERATURE:

- Title: The Ayushman Bharat Pradhan Mantri Jan Arogya Yojana and the path to universal health coverage in India: Overcoming the challenges of stewardship and governance.

In a study published on March 7th, 2019, authors Blake J. Angell, Shankar Prinjal, Anadi Gupt, Vivekanand Jha, and Stephen Jan to explore the challenges of stewardship and governance in the Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (AB-PMJAY) and its role in achieving universal health coverage (UHC) in India. This study was based on systematic review of an existing literature and the key points covered in the review emphasizes the need for wide-ranging reforms across both public and private providers of healthcare in order for India to effectively meet its objective of providing UHC to its population. The success of the AB-PMJAY program is contingent upon a reformed and adequately resourced public sector that can lead the implementation, delivery, and monitoring of the scheme. One of the significant research gaps identified in the study pertains to the need for continuous monitoring of the AB-PMJAY program to ensure its alignment with its stated aims. The authors stress the need for regular monitoring and assessment to find out any deviations from the goal intended and make necessary modifications to maintain the effectiveness of the program.⁴

- Title: Trends in Cardiac Care utilisation under Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (PM-JAY).

This article by Pulkit Kumar Sehgal, Dr Sudha Chandrashekhar and Parul Naib explores the utilisation of cardiac packages under the PM-JAY scheme in India. The authors report a steady increase in the utilisation of cardiac packages across all states since the launch of the scheme. The early trends suggest that PM-JAY has enabled the poorest 40% of India's population to access cardiac care at empanelled public and private healthcare facilities. The scheme has helped reduce out-of-pocket spending and saved families from catastrophic medical expenditure, thus proving to be beneficial for them. The authors used exploratory analysis to examine all cardiac pre-authorisations covered under the cardiology and CTVS speciality from the period since the scheme was rolled out in the States/UTs until 1st March 2020. However, the article identifies a research gap in addressing cardiovascular diseases, which require concrete and sustained action in three key areas: surveillance and monitoring, prevention and reduction of risk factors, and improved management and healthcare through early detection and timely treatment.⁵

⁴ [AB-PMJAY GOVERNANCE AND STEWARDSHIP.pdf](#)

⁵ [Trends in Cardiac Care utilization under Ayushman Bharat.pdf](#)

- Title: Ayushman Bharat for Inclusive Health Insurance in India: A Critical Review.

Agrawal et al. (2022) conducted a critical review of Ayushman Bharat, also known as the Pradhan Mantri Jan Arogya Yojana, as a policy initiative for inclusive health insurance in India. The authors noted that pandemic highlighted the need for a robust healthcare system which provided both quality and affordable services in both rural and urban areas. It is seen that Ayushman Bharat scheme was a positive move towards achieving this goal. This paper used review of existing literature as the study technique. The study showed that there is a need to understand the challenges which beneficiaries face and the service providers during the process of implementation.⁶

- Title: Analysing variation in Breast Cancer service utilization, supply and underlying causes under PM-JAY.

In a study published in 2021, Dr Vipul Aggarwal, Shraiya Malik, Lakshya Arora, and Dr Ruchira Agrawal conducted an analysis to understand the variation in breast cancer service utilization, supply, and underlying causes under the Pradhan Mantri Jan Arogya Yojana (PMJAY) in India. The key points covered in the study highlight the wide differences in the utilization of breast cancer services across states, which is relatively lower compared to the incidence of breast cancer in India. The authors suggest that interventions to enhance the mobility of individuals, such as providing PMJAY-specific transportation, could potentially increase the utilization of breast cancer services. Additionally, the analysis reveals that beneficiaries often avail breast lump excision procedures under the specialty of general surgery but do not receive recommended follow-up treatments like chemotherapy or other drugs. This lack of follow-up treatments may be attributed to factors such as the malignancy level of the tumor or potential fraud. The concentration of services in a few hospitals can also pose challenges related to timely access to healthcare, particularly for follow-up care.

The authors employed exploratory analysis using data from the central data repository, including the National Data Warehouse and PMJAY data warehouse accessed through the National Health Authority's Transaction Management System or via APIs from implementing states. The parameters analyzed in the study included the utilization of services for breast cancer and the supply landscape for breast cancer services.

The study identifies several research gaps in the field. One concern raised is the potential gap in resources, such as equipment and staff, required to provide medical oncology services in hospitals. Another gap pertains to the issue of equity, where hospitals may have these services available and utilized by private and other patients but are not empanelled to offer medical oncology under PMJAY. The authors suggest that a deeper analysis, including audits and surveys, to diagnose the cause of inactivity

⁶ [Ayushman Bharat for Inclusive Health Insurance in.pdf](#)

in other hospitals empanelled for oncology services in the state will contribute to a more robust supply ecosystem.⁷

- Title: Cancer Care under AB PM-JAY: Focus on Radiation Specialty Packages Access and Utilization.

In a publication of unspecified year, Sudha Chandrashekar, Parul Naib, Shubha Shree Patra, Anmol Mishra, and Sheena Chhabra conducted an analysis focusing on cancer care under the Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (AB PM-JAY) with a specific emphasis on access and utilization of radiation specialty packages. The key points covered in this paper highlight that the primary challenge in accessing radiotherapy treatment in private institutions was the high cost of treatment and in public facilities it was due to non-availability of the advanced technology. The authors indicate that PM-JAY has effectively addressed this issue by empanelling both public and private healthcare providers, thus expanding access to radiotherapy treatment. The researchers employed an exploratory analysis approach for their study. They analyzed pre-authorisations data for radiation oncology packages obtained from the Transaction Management System on the dashboard. Parameters examined at the state level included pre-authorization and pre-authorisations submissions for oncology packages, age-gender dimensions, utilization of packages based on hospital type (private/public), and portability data between states. The authors identified certain research gaps. Firstly, it was not possible to determine the completeness of radiation treatment in terms of the number of fractions provided. Additionally, the study was unable to determine whether patients had received all necessary modes of treatment, such as surgery and chemotherapy, for their specific type of cancer.⁸

- Title: Empanelment of health care facilities under Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (AB PM-JAY) in India.
In the year 2022, Jaison Joseph, Hari Sankar D., and Devaki Nambiar conducted a comprehensive analysis on the empanelment of healthcare facilities under the Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (AB PM-JAY) in India. The paper reveals that Karnataka and Gujarat have a relatively high proportion of public facility empanelment compared to the total empanelment. Additionally, the review emphasizes that the public sector plays a significant role in providing care for tertiary care packages and specialties across states. Notably, chronic kidney disease emerges as a leading cause of mortality, yet nephrology as a specialty package was not included in the scheme. On the other hand, super-specialty packages like cardiothoracic surgery, medical oncology, and cardiology were more prevalent in empanelled tertiary care public hospitals compared to the private sector. The study also uncovers interesting findings regarding the distribution of specialties among

⁷ [breast cancer working paper.pdf](#)

⁸ [Cancer Care under AB PM-JAY.pdf](#)

empanelled hospitals. Approximately 40% of public facilities offered 2-5 specialty care services, while 14% of empanelled hospitals provided 21-24 specialties. Among the types of empanelled hospitals, primary health care facilities accounted for 40.4%, followed by secondary care facilities (including Community Health Centres, Urban Community Health Centres, and Sub District Hospitals) at 29.1%. District hospitals constituted 8.4% of the facilities, while medical colleges offering tertiary care accounted for 7.3%. Interestingly, the number of tertiary care facilities was found to be fewer than primary and secondary facilities in the sector.

The authors employed a secondary analysis of cross-sectional data using descriptive statistical methods for their study. Parameters analyzed included the state-wise distribution, type, and sector of empanelled hospitals, as well as the services offered through the PM-JAY scheme across all states and Union territories. The authors identified research gaps that warrant further investigation. Specifically, the reasons underlying the patterns of empanelment and the impact of empanelment on service access, utilization, population health, and financial risk protection require deeper exploration.⁹

- Title: Health Insurance in Private Hospitals Implications for Implementation of Ayushman Bharat

In 2020, Mita Choudhury and Pritam Datta conducted a literature review to examine the availability and spread of private hospitals in India and the implications of their empanelment in government-sponsored health insurance schemes, specifically focusing on the implementation of Ayushman Bharat. The paper highlights several key points. Firstly, the analysis reveals that the empanelment of private hospitals by insurance companies in India is relatively low, particularly in states with low per capita incomes. In these low-income states, the empanelment of private hospitals is concentrated in a few pockets, indicating limited access to private healthcare facilities for beneficiaries under Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (AB-PMJAY). The authors utilized exploratory data analysis for their study, considering three primary datasets. The ROHINI database compiled by the Insurance Information Bureau (IIB) of India, The Socio-Economic Caste Census (SEC) 2013-14 conducted by the Ministry of Statistics and Programme Implementation, data on private hospitals empanelled in state-sponsored insurance schemes of Andhra Pradesh, Telangana, Tamil Nadu, and Karnataka were analysed. Throughout the review, the authors identified significant research gaps. They noted the limited evidence on the availability of private hospitals across the country, mainly due to the lack of a comprehensive database. This knowledge gap underscores the need for further research to better

⁹ <https://pubmed.ncbi.nlm.nih.gov/34043664/>

understand the distribution and accessibility of private healthcare facilities, particularly in low-income states and rural areas.¹⁰

- Title: Early trends from Utilization of Oncology services: insights from Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (PMJAY)

This paper examines the early trends and insights derived from the utilization of oncology services under Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (PMJAY). The study was conducted by Sukhvinder Kaur, Dr. Nishant Jain, and Dr. P.C. Bhatnagar. The key points covered in the paper shed light on important aspects of oncology care under PMJAY. Nation-wise gap analysis w.r.t human resources mapping (oncologists), available infrastructure is critical for efficient delivery of cancer care. It reveals that major inequalities in access to cancer care due to the skewed distribution of well-equipped facilities across the country. These inequalities encompass trained human resources, infrastructure, and advancements in technology. As a result, a substantial number of patients have to travel long distances to seek treatment in premier hospitals, despite PMJAY covering the treatment costs. The authors also discuss the financial hardships faced by patients and their families, including the loss of workdays during treatment and recovery, travel expenses in cases of portability, and the financial burden beyond the coverage limit of 5 lakhs. Exploratory data analysis was employed as the technique for this study, with parameters focusing on two main areas: the utilization of oncology services/packages and the areas of demand and supply. Through their analysis, the authors identified research gaps which is the need for a deeper review at the state level to understand the utilization of specific oncology packages and tailor interventions accordingly.¹¹

- Title: Impact of India's publicly financed health insurance scheme on public sector district hospitals: a health financing perspective. This study examines the impact of India's publicly financed health insurance scheme, specifically the Pradhan Mantri Jan Arogya Yojana (PMJAY), on public sector district hospitals. The review was conducted by Shankar Prinja, Maninder Pal Singh, Vipul Aggarwal, Kavitha Rajsekar, Praveen Gedam, Aarti Goyal, and Pankaj Bahuguna. The key points covered in the review highlight the potential financial gains for public district hospitals with the gradual increase in coverage and service uptake under PMJAY. As the scheme expands, the financial benefits for public district hospitals are expected to increase. The authors emphasize

¹⁰

https://www.researchgate.net/publication/341026481_Health_Insurance_in_Private_Hospitals_Implications_for_Implementation_of_Ayushman_Bharat

¹¹ [early trends in utilization of oncology services.pdf](#)

the significance of district hospitals in providing healthcare services in India and suggest considering the findings to further incentivize these hospitals. Strengthening the public sector and reducing financial hardship for patients are identified as broader goals to be realized through the effective utilization of district hospitals. Secondary data analysis was employed as the technique for this review, with a focus on the 'Costing of Health Services in India' (CHSI) data and the data on the number and value of pre-authorisations paid in 2019 at public sector district and sub-district hospitals. The authors emphasize the need for future research to assess the improvement in service delivery by public district hospitals and the utilization of PMJAY revenue by states.¹²

- Title: Patterns of Stroke Care in ABPM-JAY beneficiaries in empanelled hospitals of PM-JAY Scheme.

This study explores the patterns of stroke care among beneficiaries of the Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (ABPM-JAY) in empanelled hospitals of the PM-JAY scheme and is authored by Dr. Prashant Mathur et.al.

The key point highlighted in this study is that the utilization of public or private hospitals for stroke packages by ABPM-JAY beneficiaries may vary based on the hospital's location, the availability of stroke management services, and the quality of services provided. These factors influence the overall utilization patterns observed in stroke care among beneficiaries.

The technique used for this review is exploratory data analysis and the parameters analysed include the availability of stroke services, the patterns of stroke among beneficiaries, and the utilization of stroke packages across multiple states in India. One of the gaps identified by this study is the need for a hospital-based assessment tool to assess and signify the level of care available in each of the empanelled hospitals. Such a tool would provide valuable information on the quality and capabilities of hospitals participating in the ABPM-JAY scheme in delivering stroke care.¹³

- Title: PM-JAY: The Role of Private Hospitals.

This study examines the role of private hospitals in the implementation of the Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (PM-JAY) and is authored by Di Dong, Pulkit Sehgal, Sheena Chhabra, Parul Naib, and Owen Smith. The key points covered in this review highlight the characteristics and contributions of private hospitals within the PM-JAY scheme. It is noted that private hospitals generally have fewer beds compared to public hospitals but are more likely to be empanelled for surgical packages and super-specialties. Additionally, private hospitals often report better infrastructure for clinical and support services, although data on this aspect is incomplete. The review further discusses

¹² [https://www.thelancet.com/journals/lansea/article/PIIS2772-3682\(22\)00140-8/fulltext](https://www.thelancet.com/journals/lansea/article/PIIS2772-3682(22)00140-8/fulltext)

¹³ [patterns of stroke care under PMJAY.pdf](#)

the role of private hospitals in PM-JAY implementation, emphasizing their higher numbers in terms of empanelment, pre-authorisations volume, and pre-authorisations value compared to public hospitals. Private hospitals contribute significantly to the provision of specialized services and packages, particularly in tertiary care. However, they make a relatively smaller contribution to extending the geographic reach of PM-JAY to underserved areas compared to the public hospital network. The technique employed in this review is exploratory data analysis, and the parameters analyzed are based on pre-authorisations data obtained from the Transaction Management System (TMS). While discussing the research gaps, the review identifies the importance of investigating the levers of strategic purchasing in PM-JAY. Areas such as package pricing, benefit package design, quality metrics, beneficiary empowerment, and incentives for new supply are highlighted as critical aspects requiring further research.¹⁴

- Title: Road to universal health coverage: unique model of Karnataka, India

This study authored by Pooja Sancheti, Suresh G. Shastri et.al, intends to identify the key performative characteristics and top initiatives of the state in relation to the AB-PMJAY-ArK scheme. The key points covered in this review highlights that empanelment of facilities is a vital component of every health insurance scheme in order to offer accessible and affordable care. In contrast to other states, Karnataka has the highest empanelled facilities, along with 500 private facilities. While PMJAY covered 1350 treatment packages, Karnataka through the integration included additional packages, a total 1650 treatment packages can be availed under any empanelled government or private hospital. And with the implementation of HBP 2022 shortly, the treatment packages will increase to 2743.

The AB-ArK cell's comprehensive model has improved public health institutions' performance and serves as a model for states.¹⁵

¹⁴ [pmjay role of private hospitals.pdf](#)

¹⁵ <https://www.ijcmph.com/index.php/ijcmph/article/view/10957/6678>

7. RESEARCH METHODOLOGY:

Research design: Descriptive analytical study design which involved analysis of secondary data available regarding the pre-authorisations raised under the super specialties considered for this study in the financial period of 2022-2023 from the SAST portal.

Secondary data analysis was conducted using Microsoft excel and Tableau software was used for further graphical analysis of the data.

The study did not use any personal identifiable information and hence maintains patient confidentiality

Study setting: Karnataka, Southern India.

Time period: Financial year 2022-2023 (April 2022-March 2023)

Study population: Pre-authorisations raised under Ayushman Bharat-PMJAY-Arogya Karnataka scheme in the super specialty departments of Cardiology, Neurology, Oncology, and Urology.

Inclusion criteria: Pre-authorizations raised of targeted beneficiaries under the super specialties of Cardiology, Neurology, Oncology, Urology.

Exclusion criteria: All the pre-authorisations raised under any other packages other than the super specialties considered in the study is excluded.

8. RESULTS:

I. NUMBER OF PACKAGES UNDER EACH SUPER SPECIALITIES:

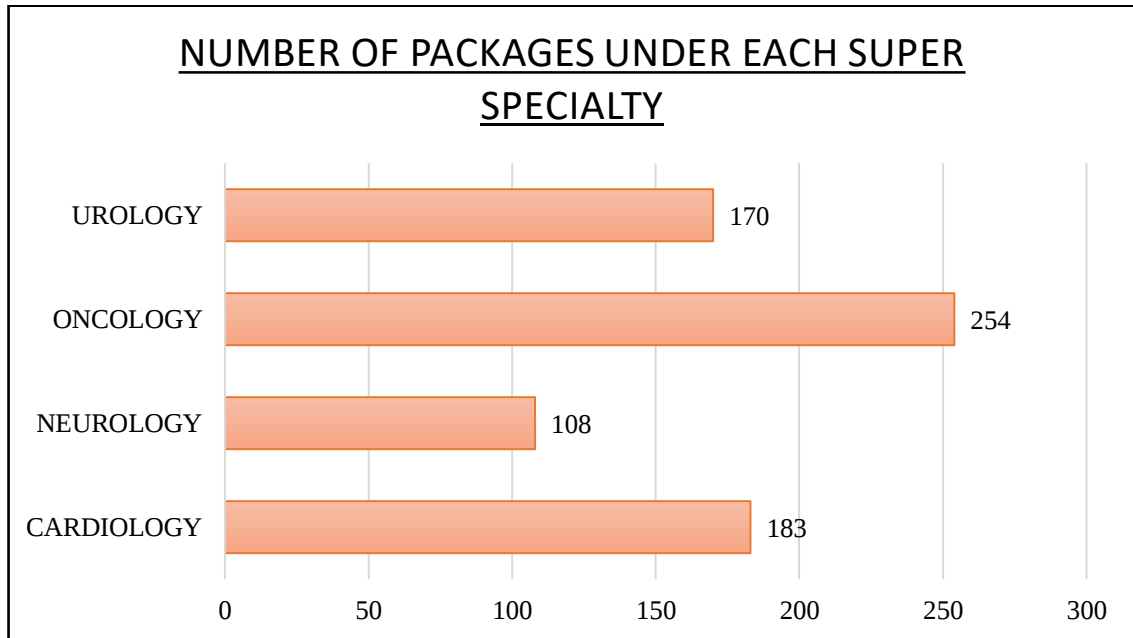


Figure 1. number of packages

The above graph shows the number of packages available in each super specialty department considered under this study which are Cardiology, Oncology, Neurology and Urology. ABPMJAY-ArK has 1650 packages under this scheme, these 4 super specialties have 715 packages under them in which oncology has the greatest number of packages of 254 and the least is seen under neurology which is 108. Urology and Cardiology have 170 and 183 respectively.

II. SUPPLY SIDE OF CARE:

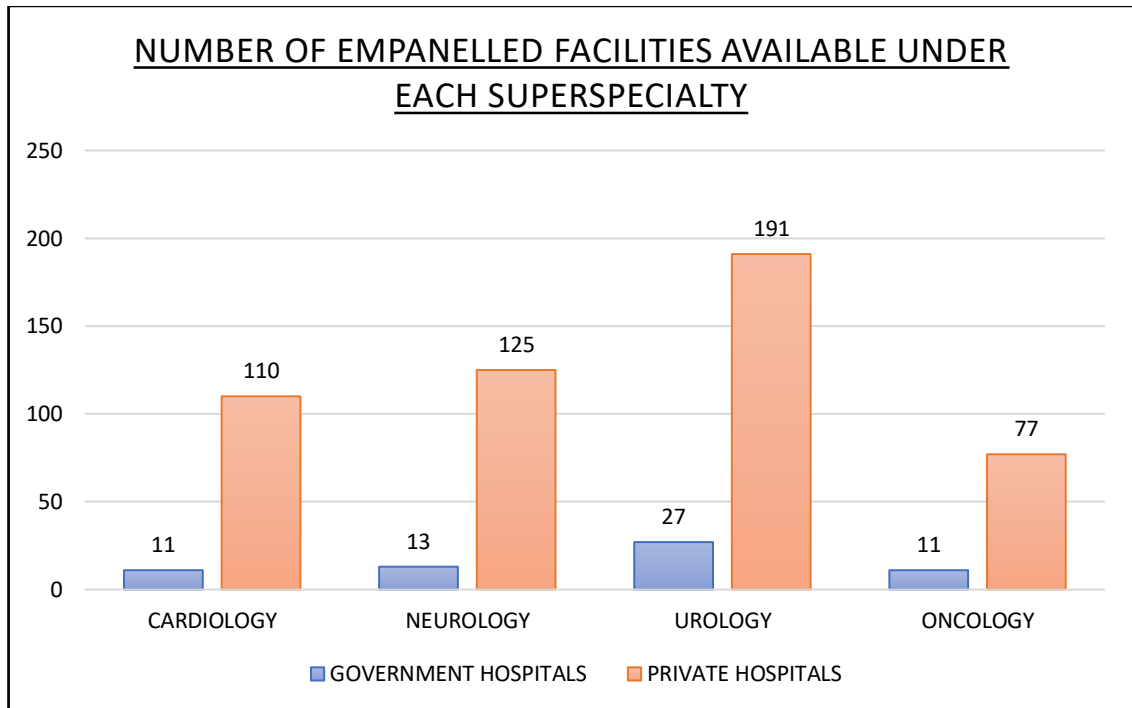


Figure 2: Number of empanelled hospitals

The above graph depicts the number of empanelled facilities delivering super specialty services available under the scheme. There is a total of 318 hospitals: **38 government hospitals and 280 private hospitals** providing services in these super specialty areas. Under cardiology, there are 121 facilities which has recorded pre-authorisations in the given study period. There are 138 hospitals which has recorded neurology pre-authorisations. Under urology services, there are 218 facilities which has recorded pre-authorisations. Oncology services are provided by 88 facilities in the state of Karnataka.

(It has to be noted that in Karnataka, under this scheme there are 3388 empanelled facilities providing services under all the specialities. Out of 3388; 2909 are government facilities and 479 are private facilities.)

III. SERVICE UTILIZATION IN TERMS OF PRE-AUTHORISATIONS VOLUME AND PRE-AUTHORISATIONS VALUE

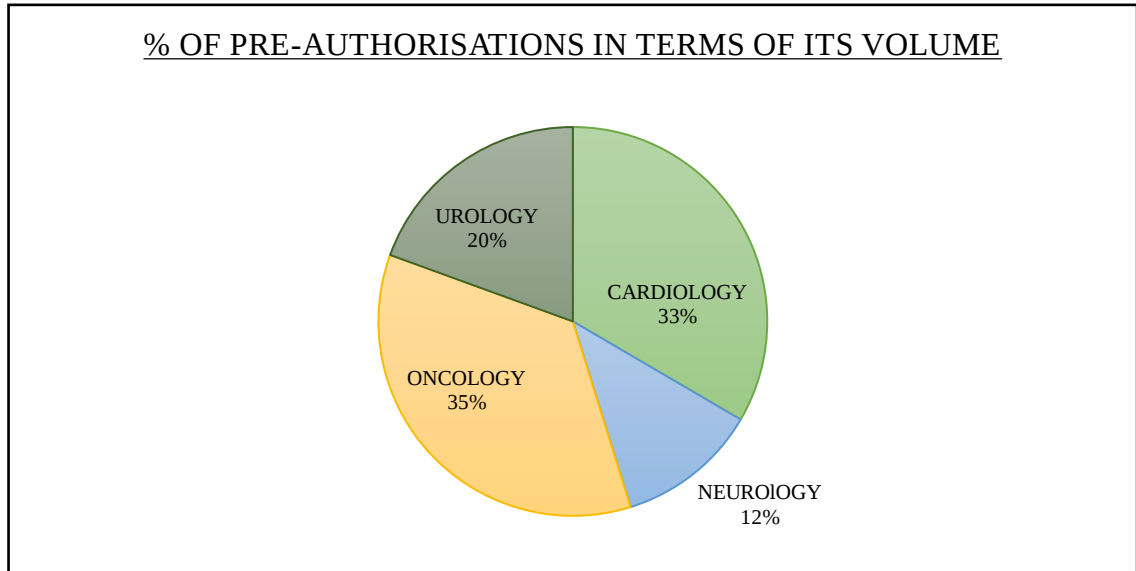


Figure 3 pre-authorisations volume-based utilization

Pre-authorisations volume is the total number of pre-authorisations raised by a department in the given time period. For this study we have considered a time period from April 2022 to March 2023. In this time period, the percentage of pre-authorisations raised by each super specialty is considered in the above graph. Oncology contributes to the maximum share of pre-authorisations volume raised which is 35% and neurology contributes to minimum share of 12% , cardiology corresponds to 33% and Urology is 20%.

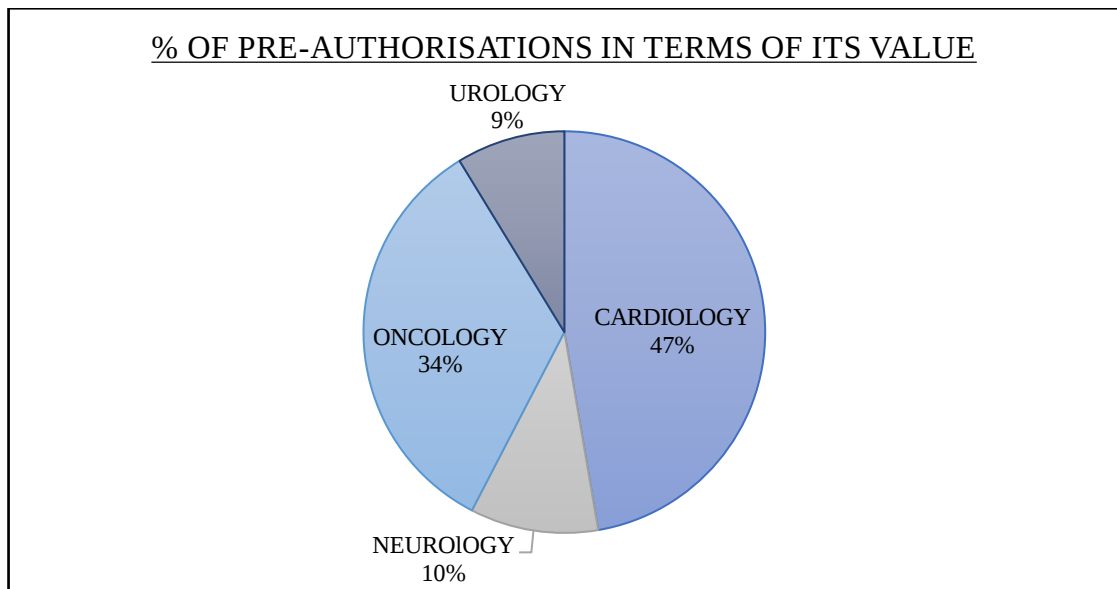


Figure 4 pre-authorisations value-based utilization

Pre-authorisations value is the total cost of the pre-authorisations generated in a given time period. Even though the % of pre-authorisations raised of cardiology is the second highest amongst other super specialties, the value of the pre-authorisations raised by cardiology contributes to the maximum share which is 47% . Oncology services stands second with nearly 34% followed by neurology and urology at 10% and 9% respectively.

IV. PRE-AUTHORISATIONS VALUE AND PRE-AUTHORISATIONS VOLUME BASED SERVICE UTILIZATION UNDER EACH SPECIALTY

CARDIOLOGY SERVICES:

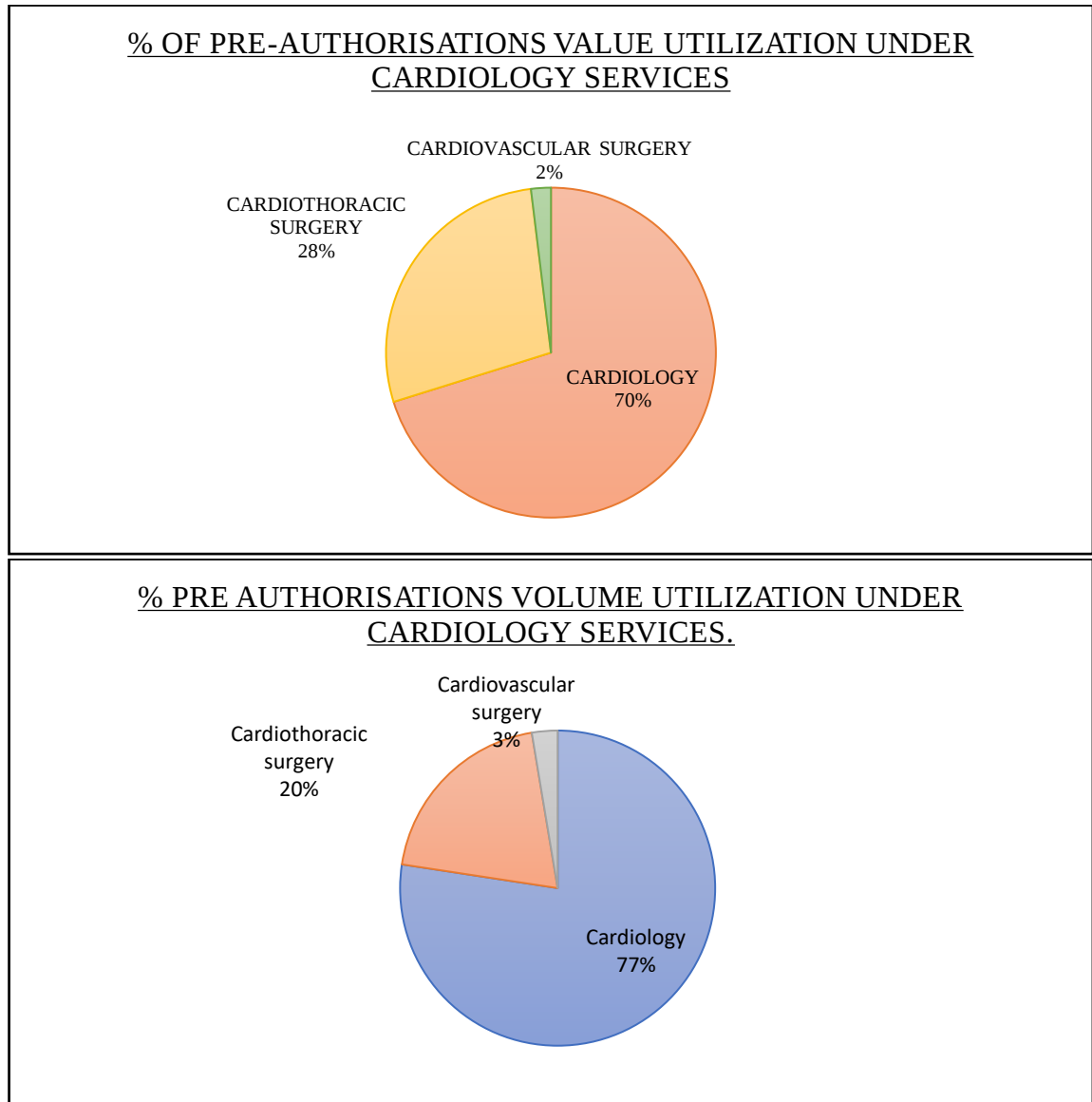


Figure 5 pre-authorisations value and pre-authorisations volume utilization under cardiology

Under the cardiology super specialty, the services are mainly of three types of namely cardiovascular surgery, cardiothoracic surgery and cardiology. Amongst these, the maximum pre-authorisations raised is under cardiology procedure accounting to nearly 77% of all cardiac pre-authorisations. This amounts 34751 pre auths. 77% of these pre auths volume correspond to a pre-auth value of Rs.22,637 lakhs which is 70%. This is followed by cardiothoracic surgery which contributes to 20% of pre-authorisations (8964 pre-authorisations) raised in terms of volume and translates to nearly 30% of pre authorizations value amounting to Rs 8995 lakhs. Cardiovascular procedures has

volumetric share of around 3% which is 1180 pre-authorisations and translates to less than 2% of in terms of pre auth value amounting to nearly 627 lakhs.

NEUROLOGY SERVICES:

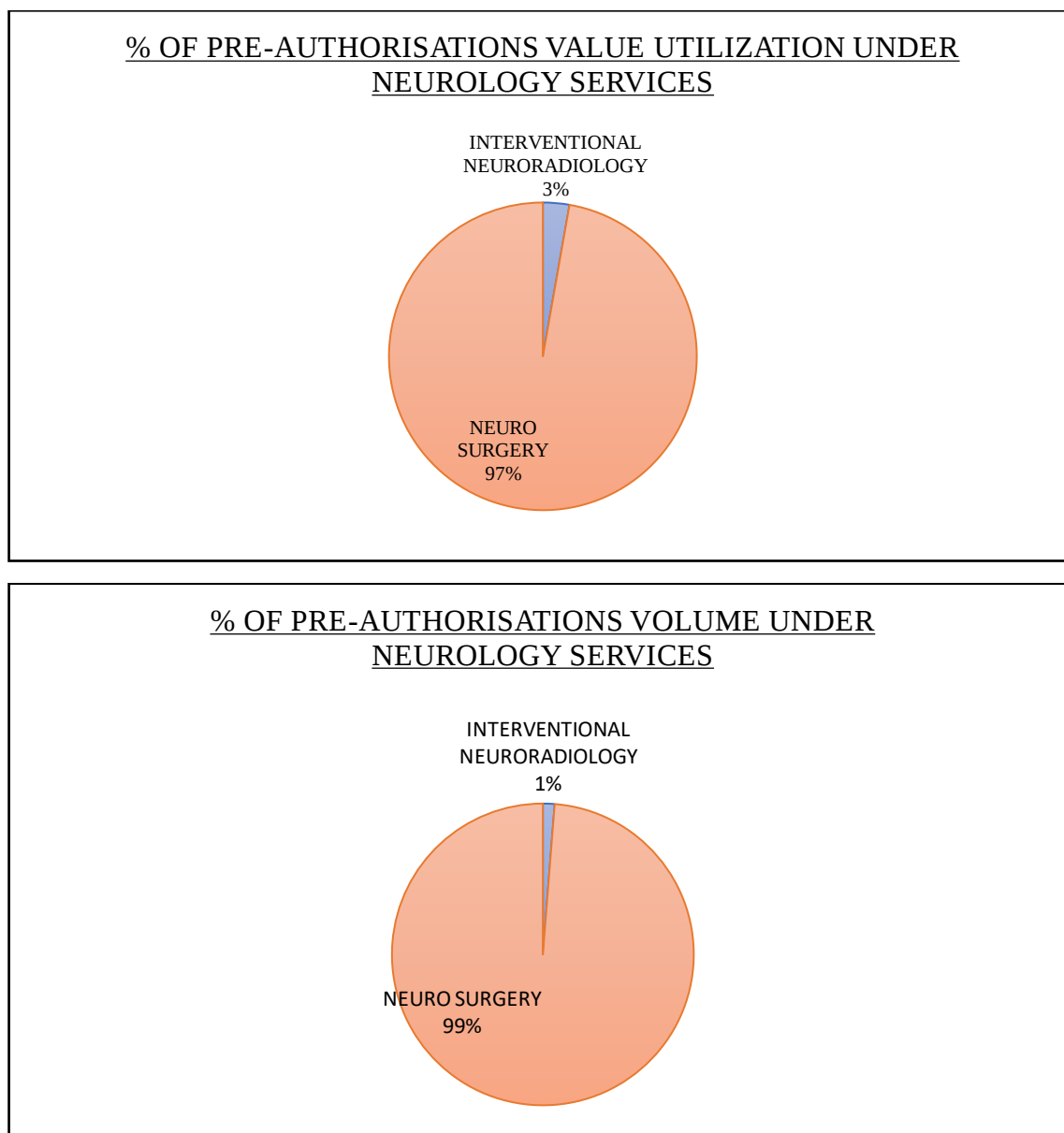


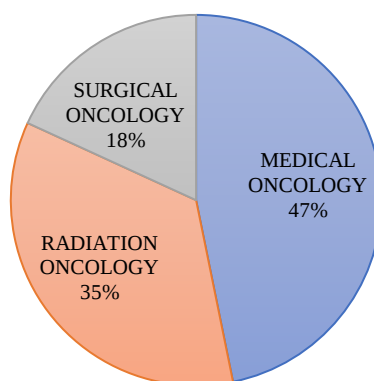
Figure 6 pre-authorisations value and pre-authorisations volume utilization under neurology services

Under the Neurology services, the packages are under two divisions one is interventional neuroradiology and the other being neurosurgery. Neurosurgery occupies the most shares both volumetrically and fiscally, which is 15614 pre-authorisations corresponding to nearly 99% of overall neuro pre-authorisations amounting to nearly 6900 lakhs which translates to 98% of share. Interventional neuroradiology contributes to a small percent

of neurology pre-authorisations of around 1% which is nearly 198 pre-authorisations and amounting to 200 lakhs which is around 2.8% fiscally.

ONCOLOGY SERVICES:

% OF PRE-AUTHORISATIONS VALUE UNDER ONCOLOGY SERVICES



% OF PRE-AUTHORISATIONS VOLUME RAISED UNDER ONCOLOGY SERVICES

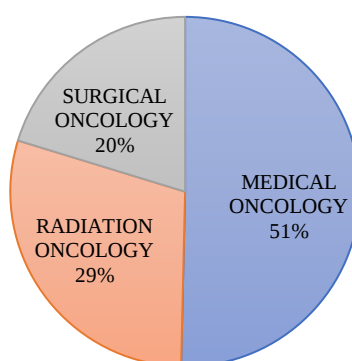


Figure 7 Pre-authorisations value and pre-authorisations volume utilization under oncology services

Oncology services are divided under three procedures namely medical oncology, radiation oncology and surgical oncology. Out of these 3, medical oncology contributes to nearly 51% of the pre-authorisations volume corresponding to 23923 pre-authorisations translating to 47% of pre-authorisations value which amounts to Rs 10,740 lakhs, this is followed by radiation oncology which contributes to nearly 30% of pre-authorisations raised which makes around 13945 pre-authorisations translating to near 35% of pre-authorisations value amounting to nearly Rs 8000 lakhs and surgical oncology contributes to nearly 20.3% of pre-authorisations volume which is around 9629 pre-

authorisations translating to 18% of pre-authorisations value amounting to nearly Rs 4000 lakhs.

UROLOGY SERVICES:

<u>Super specialty</u>	<u>Procedure</u>	<u>Pre-authorisations value(in lakhs)</u>	<u>Pre-authorisations volume</u>
<u>Urology</u>	<u>Genito Urinary Surgery</u>	<u>5959.15</u>	<u>26120</u>

Table 1 pre-authorisations value and pre-authorisations volume utilization under urology services

Urology services mainly consists of genitourinary surgery procedures which accounts to 26120 pre-authorisations in the given time period. It can be noted that 26120 pre-authorisations translates to Rs 5959.15 lakhs fiscally.

V. PUBLIC AND PRIVATE SERVICE UTILIZATION UNDER ALL SUPER SPECIALTIES:

CARDIOLOGY SERVICES:

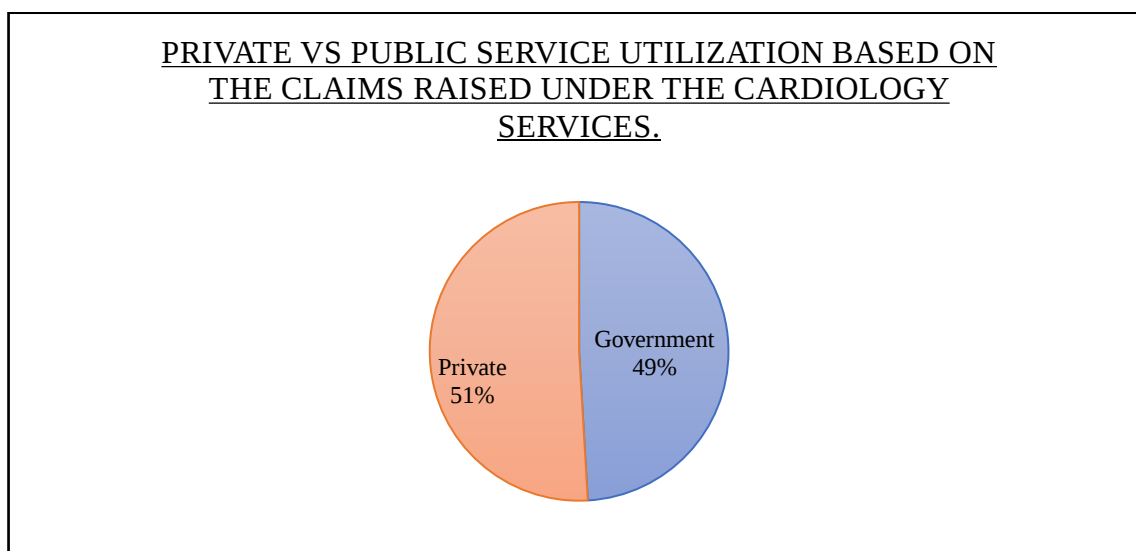


Figure 8 Public vs private service utilization under cardiology services

Private and public utilization of services under ABPMJAY-ArK scheme can be understood from the above graph. It is seen that under cardiology services there is a very small difference between the beneficiaries who use public facilities and private facilities to avail cardiac care. Private facilities occupy nearly 51% of service delivery and government occupies around 49%. It can be seen that in Karnataka there are only 11 government hospitals and 110 private hospitals which has shown cardiac pre-authorisations in the given time period. Out of which it can be seen that 110 private facilities raised 22863 pre-authorisations and 11 government facilities raised 22032 pre-authorisations.

At the country level, share of private hospitals (by volume) is higher in case of cardiac care as compared to all packages, as they account for 79% of all claims. This seems to indicate better access to quality cardiac facilities, specialists, medical personnel in private hospitals closer to the home of the beneficiary, as compared to public hospitals (Ref 5).

NEUROLOGY SERVICES:

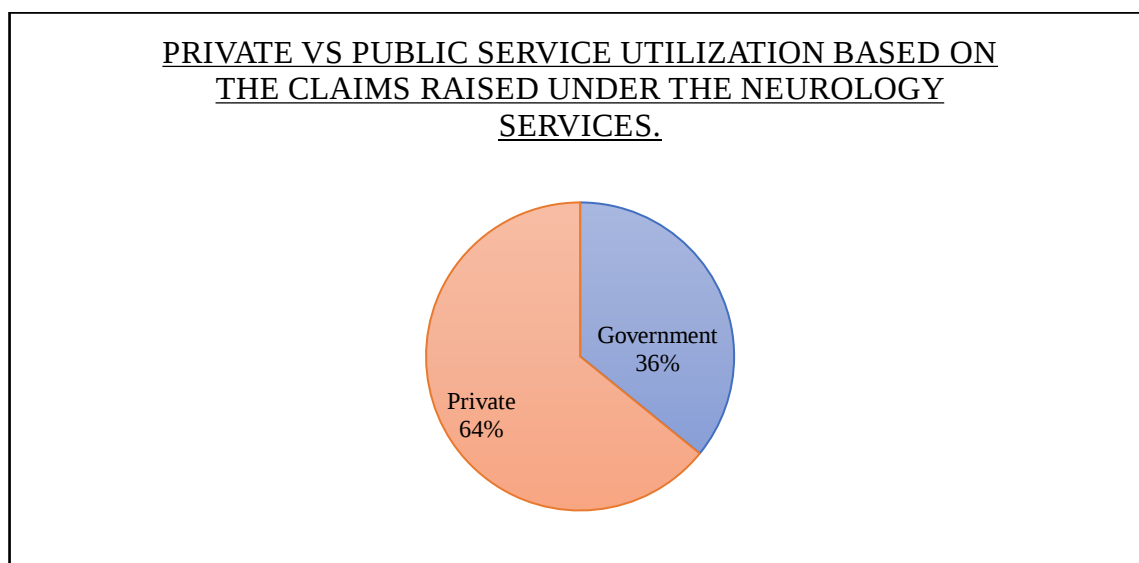


Figure 9 Public vs private service utilization under neurology services

Under neurology services, the service utilization is more inclined towards private facilities than public facilities. It can be seen that 64% of pre-authorisations raised under neurology services is from private facilities and the remaining 36% is contributed by government hospitals. In Karnataka, it has been noted that a total of 138 hospitals provide neurology related facility under ABPMJAY-ArK which has shown Neuro pre-authorisations in the given time period. Out of which, 13 are government facilities which has shown 5668 pre-authorisations and 125 are private hospitals with pre-authorisations of 10,144.

ONCOLOGY SERVICES:

PRIVATE VS PUBLIC SERVICE UTILIZATION BASED ON THE CLAIMS RAISED UNDER THE ONCOLOGY SERVICES.

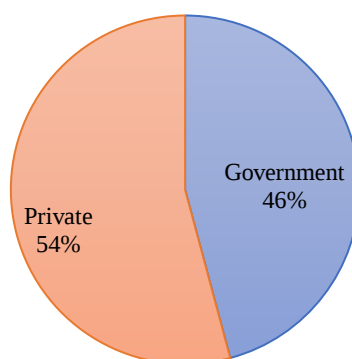


Figure 10 Public vs private service utilization under oncology services

Under the oncology services, 54.2% of pre-authorisations are received from the private facilities and around 45.8 % of pre-authorisations are received from government facilities. In Karnataka there are 88 hospitals which have reported pre-authorisations under oncology care. Out of these 88 hospitals, 11 belong to government facilities and 77 belong to private facilities. 54.2% pre-authorisations by private hospitals correspond to 25730 pre-authorisations and 45.8% correspond to 21767 pre-authorisations.

UROLOGY SERVICES:

PRIVATE VS PUBLIC SERVICE UTILIZATION BASED ON THE CLAIMS RAISED UNDER THE UROLOGY SERVICES.

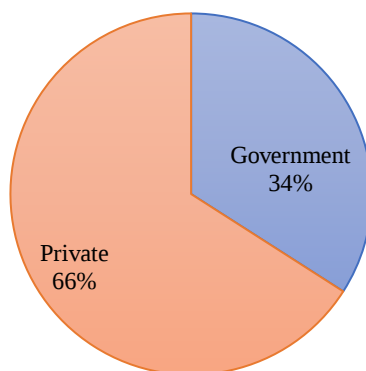


Figure 11 Public vs private service utilization under urology services

Under the urology services, 66% of pre-authorisations are received from private facilities and remaining 34% pre-authorisations are received from government facilities. There are 218 empanelled institutions in Karnataka which has recorded pre-authorisations under urology services. This includes 27 government hospitals and 191 private hospitals. 27 government facilities reported 8896 pre-authorisations and 191 private facilities reported 17224 pre-authorisations.

ALL SUPERSPECIALTIES:

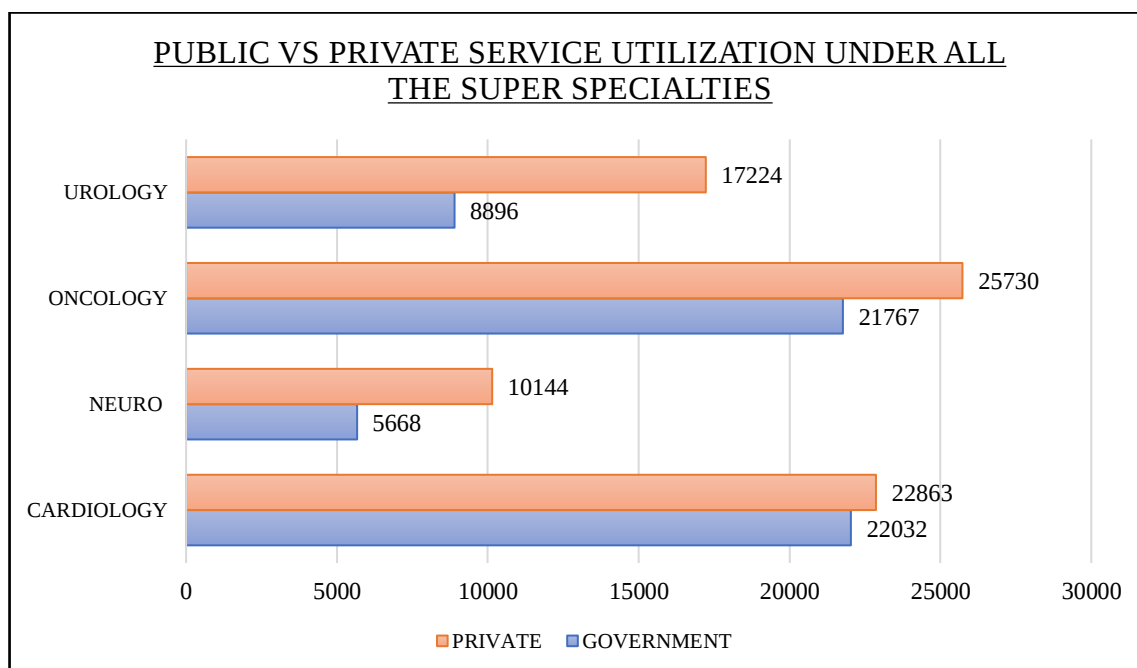


Figure 12 Public vs private utilization under all the super specialties

Based on the number of pre authorisations raised under public and private empanelled facility it can be observed that under all these super specialties private hospitals have recorded more pre-authorisations share than government facilities. This availing of services in private hospitals could be due to unavailability of services required by the beneficiary in a public hospital under these super specialties.

It can be noticed that 38 government hospitals have raised 58363 pre-auths resulting in an average pre-auth per facility to be 1500. There are 280 private hospitals empanelled which provide services under these 4 super specialties, 280 hospitals raise a pre-auth number 75961, thus average pre-auths per facility is 300.

VI. DISTRICT WISE SERVICE UTILIZATION:

CARDIOLOGY SERVICES:

TOP 5 DISTRICTS IN SERVICE UTILIZATION UNDER CARDIOLOGY SERVICES

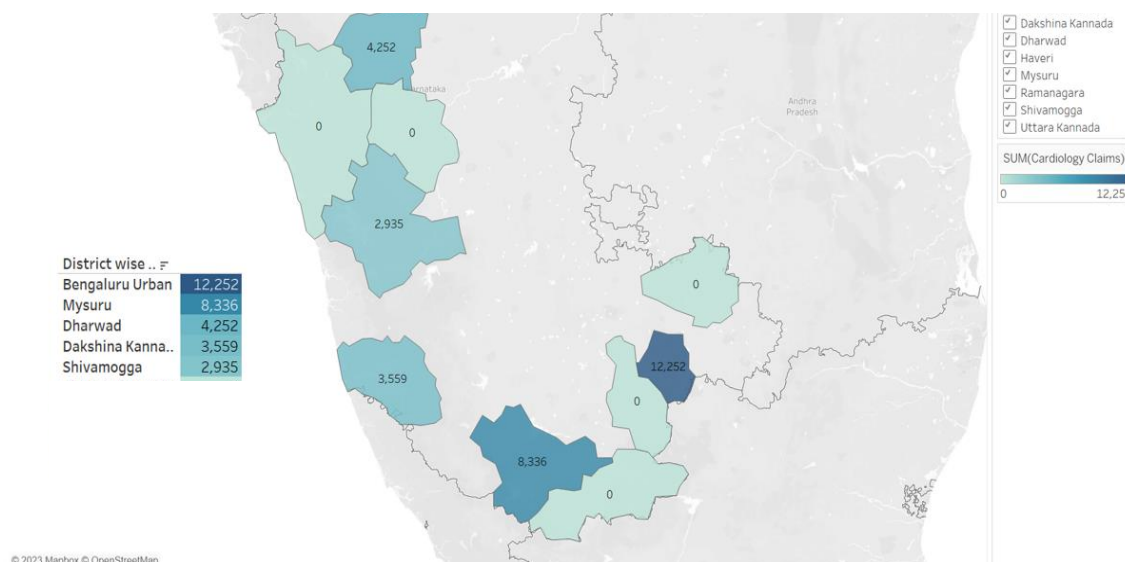


Figure 13 Top 5 and bottom 5 district service utilization under cardiology services

Under the cardiology services, the top 5 districts in terms of service utilization based on the number of pre-authorisations raised are Bengaluru Urban, Mysuru, Dharwad, Dakshina Kannada and Shivamogga. The probable reasons for higher number of utilizations in these districts could be because of the availability of empanelled facility which is equipped to provide the necessary service, it could also be due to increased awareness among the people regarding the diseases and about the existence of the scheme. These 5 districts together contribute to 31,334 pre-authorizations out of a total 44895 raised. 70% of overall pre-auths raised under cardiology in the state of Karnataka under this scheme is contributed by these 5 districts.

The bottom 5 districts are Chamarajanagar, Chikkaballapur, Haveri Ramanagara and Uttara Kannada. These districts have not recorded any pre-authorizations during the study time period. This could be due to the unavailability of the empaneled facility in these districts under cardiology services.

NEUROLOGY SERVICES:

TOP 5 DISTRICTS IN SERVICE UTILIZATION UNDER NEUROLOGY SERVICES

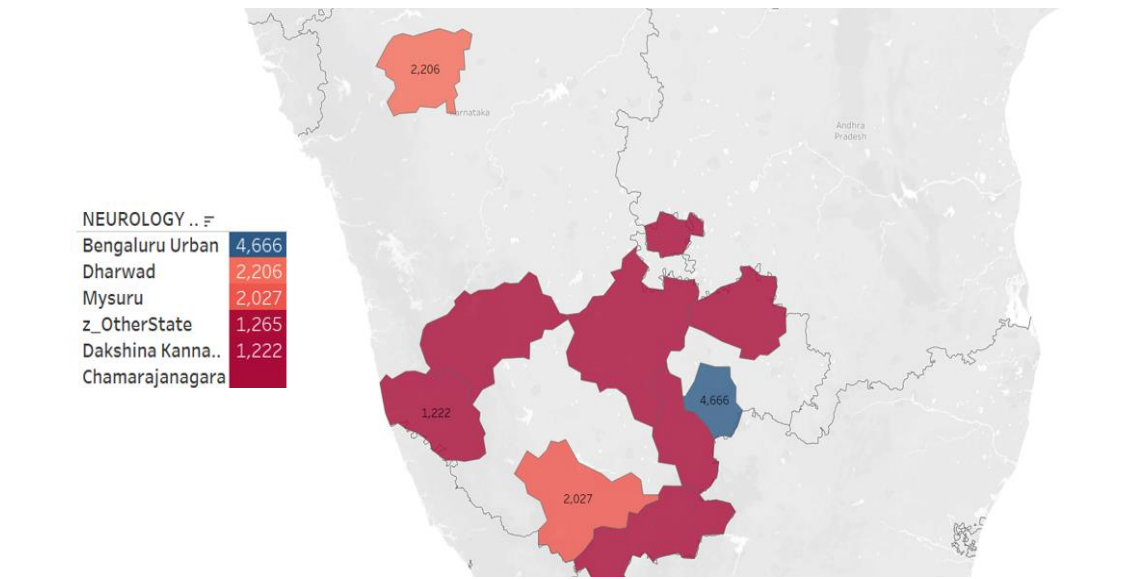


Figure 14 Top 5 and bottom 5 districts in service utilization under Neurology services

Under the Neurology services, the top districts in terms of service utilization under this scheme based on the number of pre-authorisations submitted during the study period are Bengaluru urban, Dharwad, Mysuru, Dakshina Kannada. These districts together contribute to 11386 pre-authorisations. Neurology overall has recorded 15812 pre-authorisations. Thus, it can be seen that 72% of all pre-authorizations are raised by these top performing districts.

Chamarajanagar, Chikkaballapura, Chikkamagaluru, Ramanagara and Tumakuru have not submitted any pre-auths during the study period which could be because of unavailability of facilities providing neuro care which are empanelled.

ONCOLOGY SERVICES:

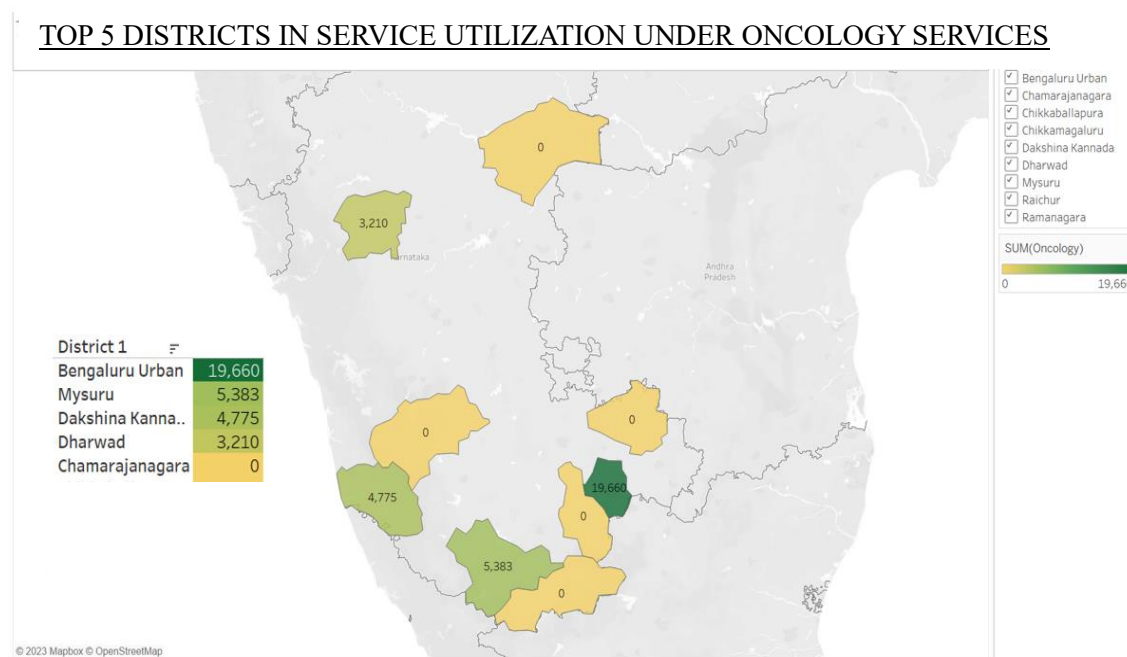


Figure 15 Top 5 and bottom 5 districts in service utilization under oncology services

Under the oncology services the top districts in terms of utilization of services based on the number of pre-auths raised are Bengaluru urban, Mysuru, Dakshina Kannada and Dharwad. These top districts amount to 33028 pre-authorisations which translates to nearly 70% of overall oncology pre-authorisations. Chamarajanagar, Chikkaballapura, Chikkamagaluru, Raichur, Ramanagara have not contributed towards any pre-authorizations raised under Oncology services, these are the districts with low service uptake under oncology in ABPMJAY-ArK scheme.

Concentration of services in major cities and unavailability of the same could contribute to the disparity in service uptake.

UROLOGY SERVICES:

TOP 5 DISTRICTS IN SERVICE UTILIZATION UNDER UROLOGY SERVICES

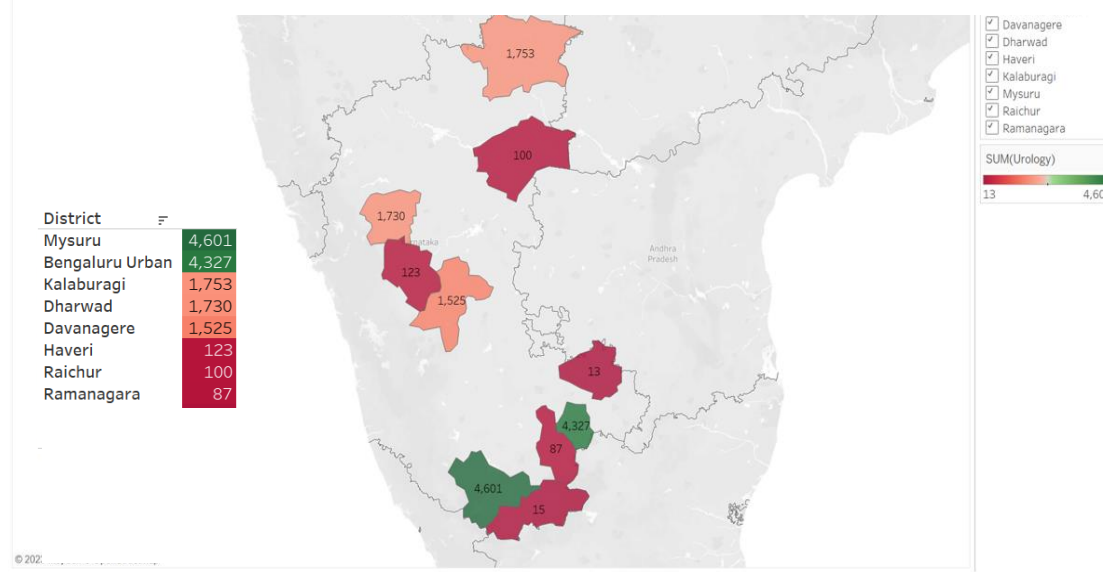


Figure 16 Top 5 and bottom 5 districts in service utilization under urology services.

Under the urology services, the top 5 districts contributing to higher number of urology pre-authorisations are Bengaluru urban, Davanagere, Dharwad, Kalaburagi and Mysuru. 53% of overall pre-authorizations raised are contributed by these districts.

The districts with least pre-authorisations submitted during the study period are Chamarajanagar, Chikkaballapura, Haveri, Raichur and Ramanagara. Together they contribute to around 338 pre-authorisations which translates to around 1.3%.

It can be noticed that under Urology, there is no such district without pre-auth submitted. Though a variation in the number can be noticed which can be associated to the fact that these districts have lesser number of empanelled hospitals that provide Uro care.

VII. TOP 5 GOVERNMENT AND PRIVATE HOSPITALS BASED ON SERVICE DELIVERY UNDER ALL SUPER SPECIALTIES:

CARDIOLOGY SERVICES:

<u>PRIVATE HOSPITALS UNDER CARDIOLOGY</u>	<u>NUMBER OF PRE-AUTHORISATIONS</u>	<u>GOVERNMENT HOSPITALS UNDER CARDIOLOGY</u>	<u>NUMBER OF PRE-AUTHORISATIONS</u>
KLES DR PRABHAKAR KORE HOSPITAL AND MRC	1498	JAYADEVA HOSPITAL, BANGALORE_	10423
KMC HOSPITAL	1200	JAYADEVA HOSPITAL, MYSORE_	5799
SDM NARAYANA HRUDAYALAYA	1028	JAYADEVA HOSPITAL, KALABURGI_	2524
KASTURBA HOSPITAL UDUPI	972	KARNATAKA INSTITUTE OF MEDICAL SCIENCES, HUBLI	1608
NARAYANA HRUDAYALAYA PRIVATE LIMITED	925	MCGANN TEACHING DISTRICT HOSPITAL, SHIMOGA	910

Table 2 Top 5 public and private hospitals in service delivery under cardiology services

The top 5 hospitals under government and private contribute to 21264 pre-authorisations and 5623 pre-authorisations respectively.

The top 5 hospitals under government contribute to the maximum pre-authorisations volume translating to nearly 96.5% pre-authorisations and private contributes to 24.5% of overall pre-authorisations.

NEUROLOGY SERVICES:

<u>GOVERNMENT FACILITIES UNDER NEUROLOGY</u>	<u>NUMBER OF PRE- AUTHORISATIONS</u>	<u>PRIVATE FACILITIES UNDER NEUROLOGY</u>	<u>NUMBER OF PRE- AUTHORISATIONS</u>
NIMHANS HOSPITAL, BANGALORE_	2267	NARAYANA HRUDAYALAYA SURGICAL HOSPITAL PVT LTD	554
KARNATAKA INSTITUTE OF MEDICAL SCIENCES, HUBLI	920	YENEPOYA MEDICAL COLLEGE HOSPITAL	497
VIJAYANAGARA INSTITUTE OF MEDICAL SCIENCES, BALLARI	655	SAHYADRI NARAYANA HRUDAYALAYA	461
BMCRI SSH PMSSY, BANGALORE_	373	KULLOLLI HOSPITAL SANGLI	387
SANJAY GANDHI INSTITUTE OF TRAUMA AND ORTHOPAEDICS, BANGALORE	371	KLES DR PRABHAKAR KORE HOSPITAL AND MRC	383

Table 3 Top 5 government and private hospitals in service delivery under neurology services

The top 5 facilities under private and government accounts to 2282 pre-authorisations and 4586 pre-authorisations respectively. The top 5 government hospitals contribute to nearly 80% of pre-authorisations and top 5 private contribute to nearly 23% of overall pre-authorisations under private facilities.

ONCOLOGY SERVICES:

<u>GOVERNMENT FACILITIES UNDER ONCOLOGY</u>	<u>NUMBER OF PRE- AUTHORISATIONS</u>	<u>PRIVATE FACILITIES UNDER ONCOLOGY</u>	<u>NUMBER OF PRE- AUTHORISATIONS</u>
KIDWAI MEMORIAL INSTITUTE OF ONCOLOGY, BANGALORE_	16592	KERUDI HEALTHCARE PRIVATE LIMITED	1708
KRISHNARAJENDRA HOSPITAL, MYSURU	1657	BHARATH HOSPITAL INSTITUTE OF ONCOLOGY	1518
VTSM PERIPHERAL CANCER CENTER, KALABURGI_	1515	MANGALORE INSTITUTE OF ONCOLOGY	1360
KARNATAKA INSTITUTE OF MEDICAL SCIENCES, HUBLI	1107	MALNAD HOSPITAL AND INSTITUTE OF ONCOLOGY	1320
VIJAYANAGARA INSTITUTE OF MEDICAL SCIENCES, BALLARI	325	HCG CANCER CENTRE GULBARGA	1202

Table 4 Top government and private hospitals in service delivery under oncology services

The top 5 government and private hospitals have raised a pre-authorisations of 21196 and 7108 pre-authorisations respectively.

The top 5 government facilities contribute to nearly 98% of pre-authorisations and the top private facilities contribute to around 30% of overall private pre-authorisations.

UROLOGY SERVICES:

<u>GOVERNMENT FACILITIES UNDER UROLOGY</u>	<u>NUMBER OF PRE- AUTHORISATIONS</u>	<u>PRIVATE FACILITIES UNDER UROLOGY</u>	<u>NUMBER OF PRE- AUTHORISATIONS</u>
INSTITUTE OF NEPHRO UROLOGY, BANGALORE	2275	SIGMA HOSPITAL	1476
KARNATAKA INSTITUTE OF MEDICAL SCIENCES, HUBLI	1326	V L PATIL SUPER SPECIALITY HOSPITAL	1317
KRISHNARAJENDRA HOSPITAL, MYSURU	657	ASHRAYA HOSPITAL	686
WENLOCK DISTRICT HOSPITAL, DAKSHIN KANNADA	614	SUKSHEMA HOSPITAL PVT LTD	638
SHREE CHAMARAJENDRA HOSPITAL/ HIMS, HASSAN	604	SAPTHAGIRI SUPER SPECIALITY HOSPITAL	546

Table 5 Top 5 government and private hospitals for service delivery under urology services.

The top 5 government and private facilities raise a total pre-authorisation of 5496 and 4663 respectively.

The top 5 government facilities contribute to 61.5% and top 5 private contribute to nearly 27% of overall pre-authorisations under private facilities.

VIII. AGE WISE UTILIZATION OF ALL SUPER SPECIALTY SERVICES BASED ON PRE-AUTHORISATIONS GENERATED:

ALL SUPER SPECIALTIES:

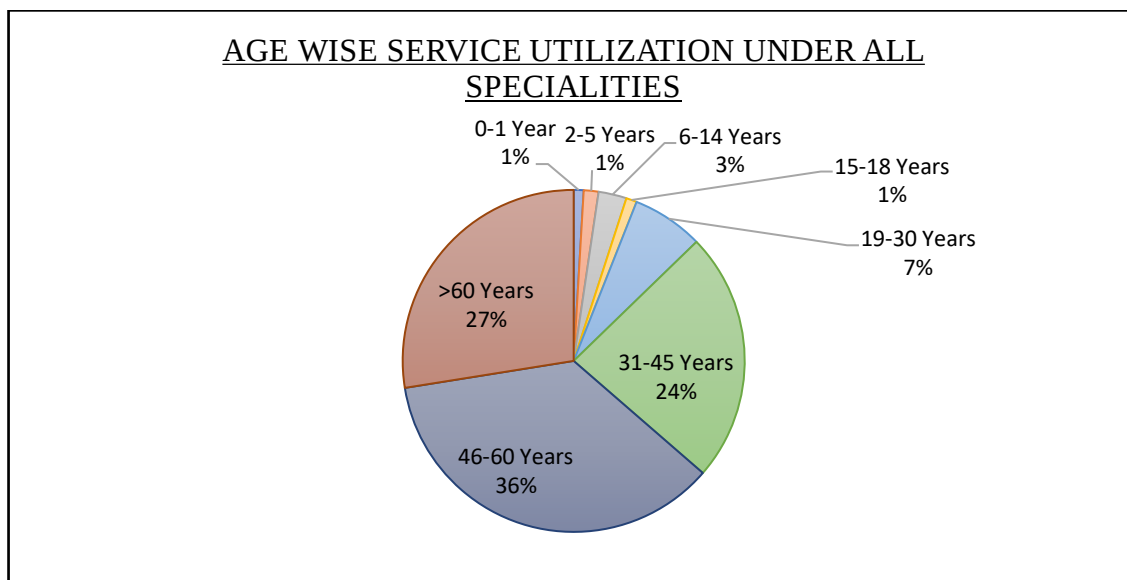


Figure 17 Age wise service utilization under all super specialty departments

This age wise distribution graphs clearly shows that maximum pre-authorisations is raised by the age group of 46-60 years under all the superspecialties. 36.1% of overall pre-authorisations is contributed by 46-60 years group. This is followed by the age group 60+ which contributes to nearly 28% of overall pre-authorisations raised. 30-45 years age group category contributes to around 24% of the overall pre-authorisations followed by 18-30 years which nearly takes 7% of pre-authorisations, followed by 5614 years (nearly 3%), 2-5 years (nearly 1.5%), least percentage is occupied by 14-18 years and 0-1 year which raise about 1% of overall pre-authorisations under all super specialties.

CARDIOLOGY SERVICES:

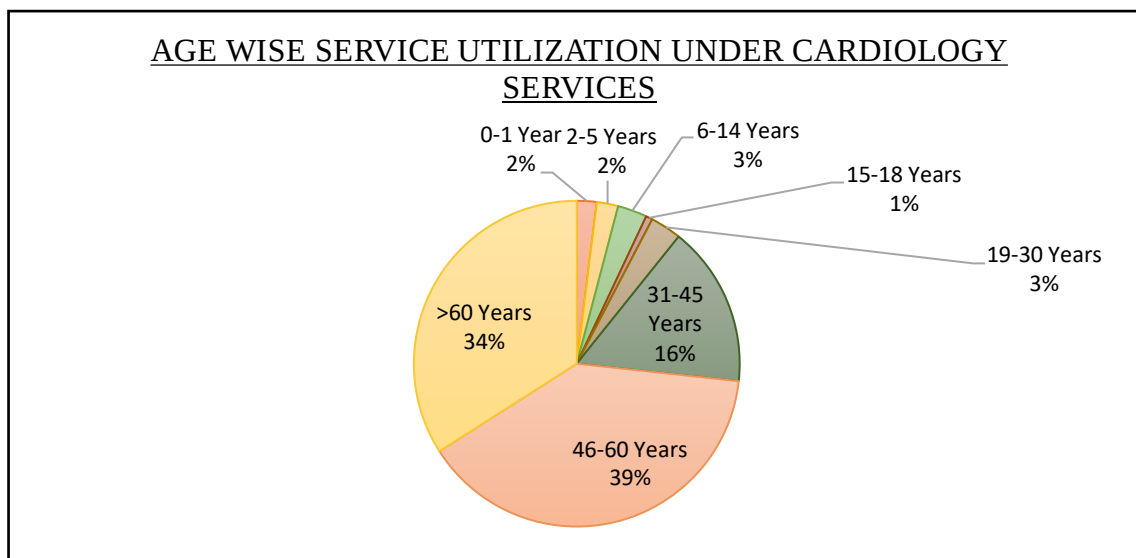


Figure 18 Age wise service utilization under cardiology services

Under cardiology services, age distribution in service utilization shows that 46-60 years age group beneficiaries utilize these services the most, it forms around 40% of overall cardiac pre-authorisations volume. This is followed by 60+ years with 37% pre-authorisations, 31-45 years with 16%. 19-30 years and 6-14 years age group both contribute around 2% pre-authorisations each, followed by 0-1 and 2-5 years contributing 1%, least is contributed by 15-18 years with nearly 0.5% of pre-authorisations raised.

NEUROLOGY SERVICES:

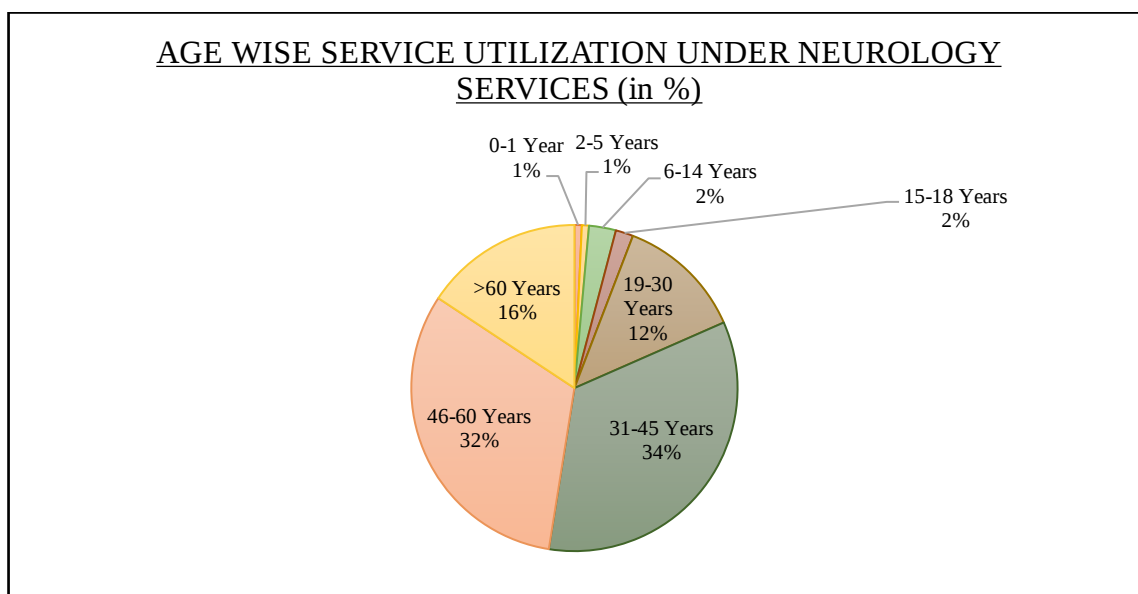


Figure 19 Age wise service utilization under neurology services

Under neurology services, the maximum pre-authorisations is raised by the age group of 31-45 years contributing nearly 34% of the overall neurology pre-authorisations, this is followed by 46-60 years age group which contribute to nearly 32% of pre-authorisations, 60+ category contributes to nearly 16% of all pre-authorisations and 19-30 years age group contributes to around 12%. 0-1 years, 2-5 years, 6-14 years and 15-18 years contribute very minimum to overall pre-authorisations individually, together they contribute to around 6% of overall pre-authorisations.

ONCOLOGY SERVICES:

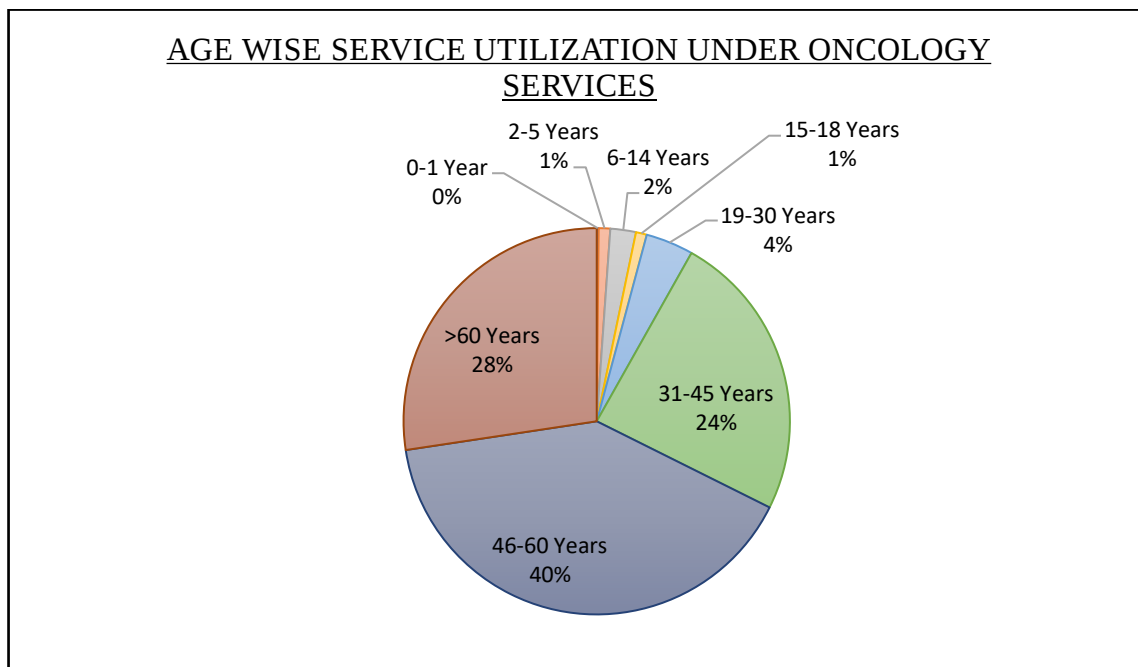


Figure 20 Age wise service utilization under oncology services

Under oncology services, maximum contribution is made by 46-60 years age group which makes around 40% of overall pre-authorisations, 60+years category contribute to around 27% of pre-authorisations, followed by 31-45 years which contribute to nearly 24%. From 0-1 years till 19-30 years together they contribute around less than 10% of overall oncology pre-authorisations

UROLOGY SERVICES:

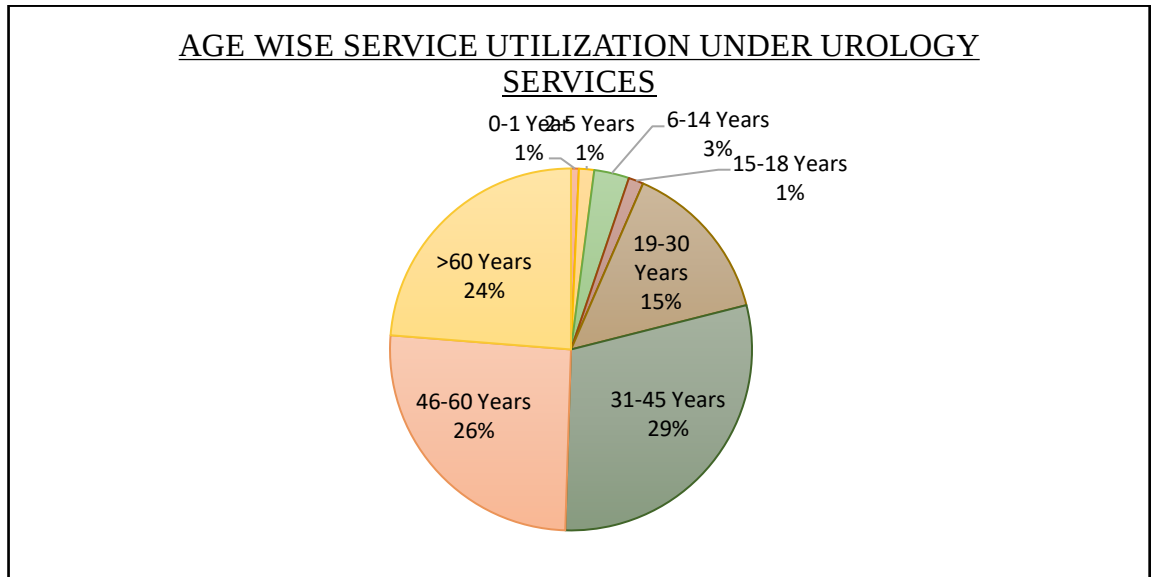


Figure 21 Age wise utilization under urology services

Under urology services, nearly 30% of pre-authorisations are raised by 31-45 years age group, this is followed by 46-60 years age group contributing to 26%, 60+ age group contributes to nearly $\frac{1}{4}$ th of Oncology pre-authorisations which is around 25%, 19-30 years contribute to around 15% of pre-authorisations followed by 0 to 18 years which collectively contribute around 6% of overall pre-authorisations.

IX. GENDER WISE DISTRIBUTION IN SERVICE UTILIZATION UNDER EACH SUPER SPECIALTY:

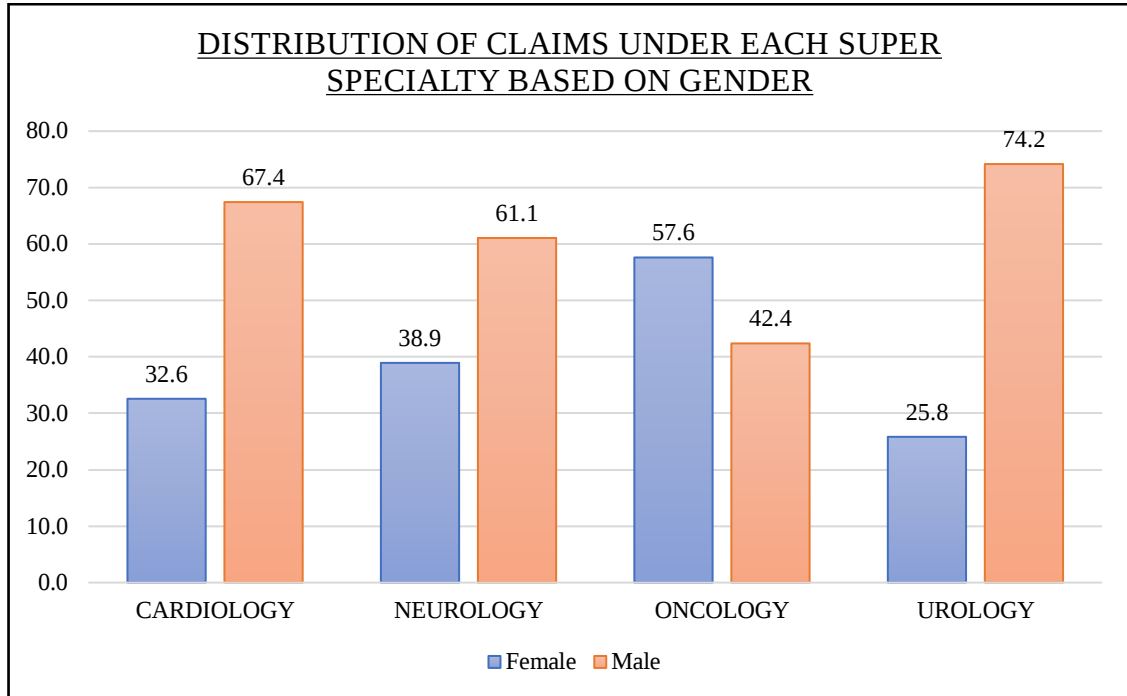


Figure 22 Gender wise distribution in service utilization under each super specialty

The above graph presents the gender distribution of service utilization based on the number pre-authorisations raised. It can be seen that under all the super specialties except oncology there is a male predominance in service utilization. This male dominance in availing services could be attributed to lack of awareness and less accessible services among females. It is observed that males contribute to nearly 68% of overall pre-authorisations under cardiology , 62% under neurology and 74% under urology when compared to 33% of overall pre-authorisations by females under cardiology, 39% under neurology and 26% under urology services. There is a greater utilization of services by females contributing to around 58% when compared to 42% by males under oncology services. It is seen that higher Oncology care is required by females when compared to males.

X. ECONOMIC STATUS WISE DISTRIBUTION OF SERVICE UTILIZATION
UNDER EACH SUPER SPECIALTY

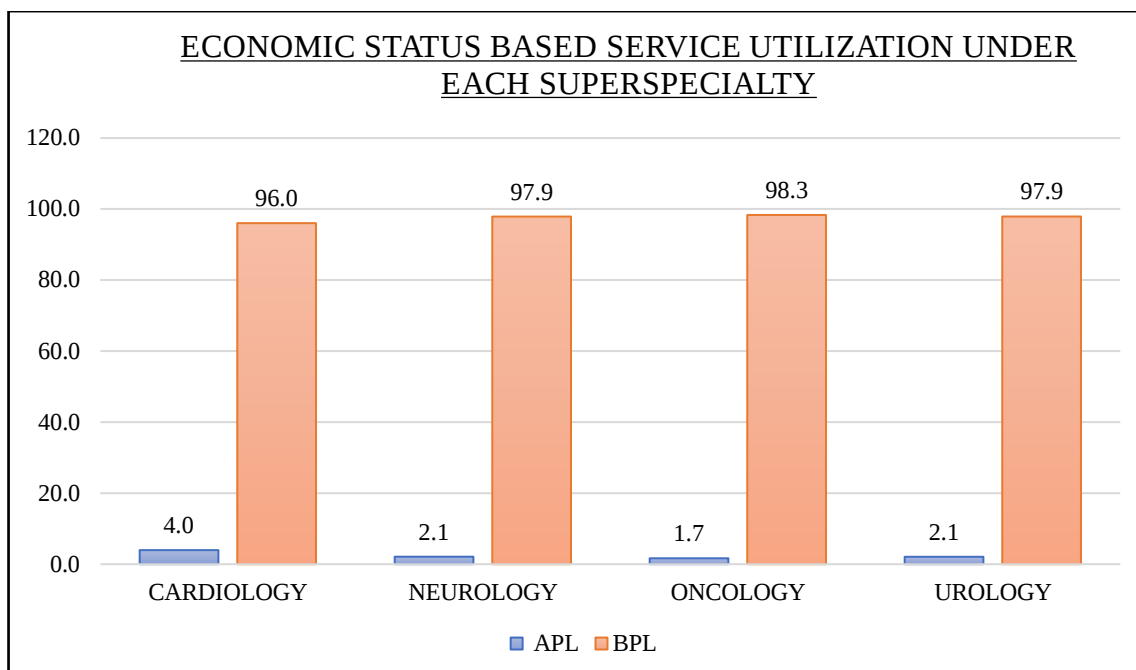


Figure 23 Economic status-based service utilization under each super specialty

AB-PMJAY scheme has set the eligibility criteria as BPL beneficiaries to avail the facilities. Karnataka government under co-branded scheme of Ayushman Bharat-Arogya Karnataka allows even the APL to avail the facilities under this scheme with a reduced coverage of 1.5 lakhs on a family floater basis. The above graph shows that under all super specialties considered for this study, maximum pre-authorisations are raised by BPL beneficiaries. This helps us to understand that there is good penetration of the scheme amongst the BPL category and the objective of the program is being achieved. There is also a need to create awareness and popularise this scheme amongst APL population.

XI. INTRA-STATE PORTABILITY ANALYSIS UNDER EACH SUPER SPECIALTY:

CARDIOLOGY SERVICES:

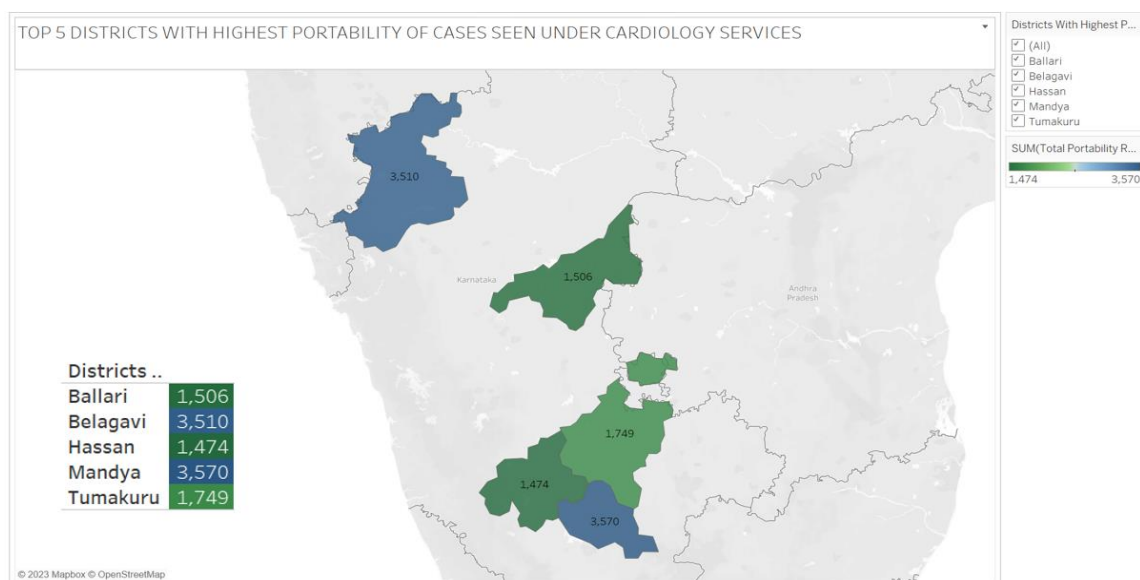


Figure 24 Intra state portability analysis under cardiology services

<u>CARDIOLOGY</u>	<u>PORTABILITY ANALYSIS</u>
<u>DISTRICTS WITH MAXIMUM PORTABILITY</u>	<u>DISTRICTS WHICH HOST MAXIMUM PORTABLE CASES UNDER CARDIOLOGY</u>
BELLARY	BENGALURU URBAN
BELGAVI	OTHER STATES,DHARWAD
HASSAN	MYSURU,BENGALURU URBAN
MANDYA	MYSURU
TUMAKURU	BENGALURU URBAN

Table 6 Portability analysis under cardiology services

PORTABILITY ANALYSIS	CARDIOLOGY	CARDIOTHORACIC SURGERY	CARDIOVASCULAR SURGERY	TOTAL
TOTAL PORTABLE PRE-AUTHORISATIONS UNDER CARDIOLOGY	18775	6133	737	25645
TOTAL PRE-AUTHORISATIONS UNDER CARDIOLOGY	34751	8964	1180	44895
% OF PORTABILITY	54.0	68.4	62.5	57.1

Table 7 intra state portability analysis under each cardiology procedure

Under cardiology services, 25645 portable pre-authorisations were recorded in the given study period. This amounts to 57% of total pre-authorisations raised under cardiology. It has been noted that Bellary, Belagavi, Hassan, Mandya, Tumakuru show the maximum patient movement to avail cardiac services under this scheme. The districts preferred by the patients usually correspond to two factors: availability of the needed service and accessibility from their place of residence. Bengaluru Urban, Dharwad, Mysuru are the most common districts visited by patients from the highest portable cases to seek services. It has been noted consistently that people of Belagavi usually travel to adjacent states and Dharwad to seek their services, this could be attributed to the above-mentioned factors. Under cardiology, it has been noted that 54% portable cases are recorded under cardiology procedures, around 69% portability under cardio-thoracic surgery and around 63% under cardiovascular surgery.

NEUROLOGY SERVICES:

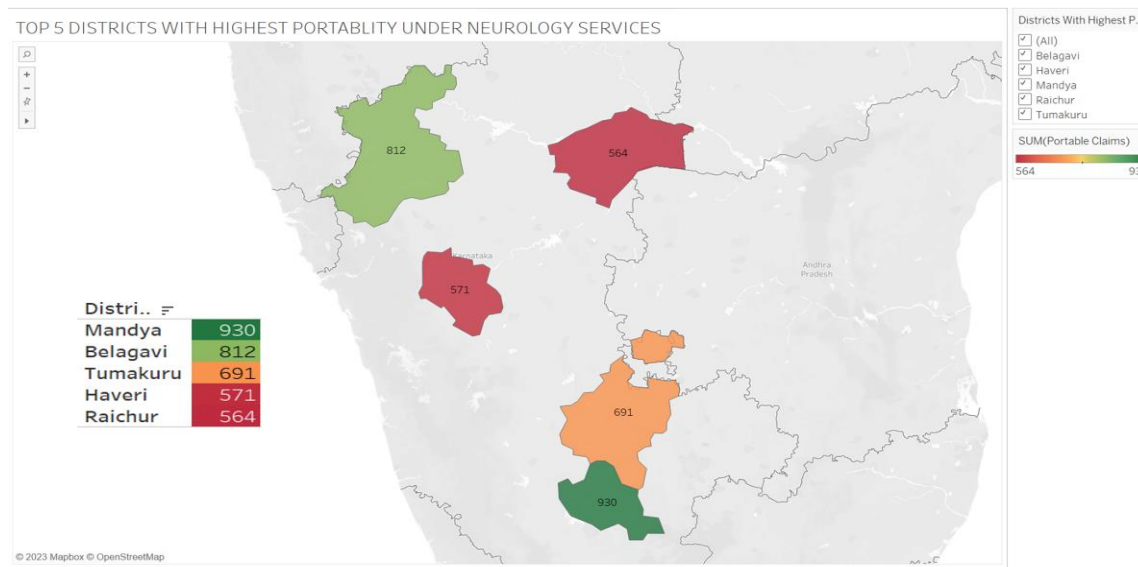


Figure 25 Intra state portability analysis under neurology services

NEUROLOGY	PORTABILITY ANALYSIS
DISTRICTS WITH MAXIMUM PORTABILITY	DISTRICTS WHICH HOST MAXIMUM PORTABLE CASES UNDER NEUROLOGY
MANDYA	BENGALURU URBAN,MYSURU
BELAGAVI	BENGALURU URBAN,OTHER STATES
TUMKURU	BENGALURU URBAN
HAVERI	BENGALURU URBAN,DHARWAD
RAICHUR	BENGALURU URBAN

Table 8 intra state portability analysis under neurology services

PORTABILITY ANALYSIS	INTERVENTIONAL NEURORADIOLOGY	NEUROSURGERY	TOTAL
TOTAL PORTABLE PRE-AUTHORISATIONS UNDER NEUROLOGY	140	10541	10681
TOTAL PRE-AUTHORISATIONS UNDER NEUROLOGY	198	15614	15812
% OF PORTABILITY	70.7	67.5	67.5

Table 9 Intra state portability analysis under procedures in neurology

Under neurology services, 10681 portable pre-authorisations have been recorded. This translates to nearly 68% of the overall pre-authorisations under neurology services. The districts of Mandya, Belagavi, Tumakuru, Haveri, Raichur show the maximum patient movement to avail neurology services by the patients. These patients usually prefer Bengaluru Urban, Mysuru, Dharwad and other state to seek services under neurology. It has been noted that under neurology services, neurosurgery shows 68% portability and interventional neuroradiology shows nearly 71% portability to seek services.

ONCOLOGY SERVICES:

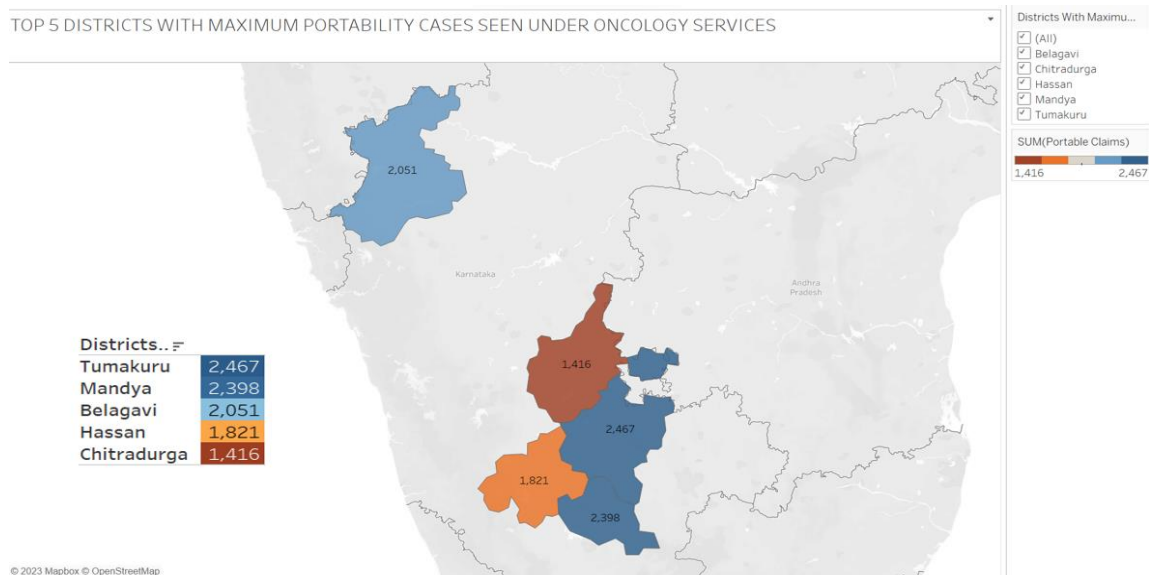


Figure 26 intra state portability analysis under oncology services

ONCOLOGY	PORTABILITY ANALYSIS
DISTRICTS WITH MAXIMUM PORTABILITY	DISTRICTS WHICH HOST MAXIMUM PORTABLE CASES UNDER ONCOLOGY
TUMAKURU	BENAGLURU URBAN
MANDYA	BENAGLURU URBAN
BELAGAVI	OTHER STATE
HASSAN	BENAGLURU URBAN
CHITRADURGA	BENAGLURU URBAN

Table 10 Intra state portability analysis under oncology

PORTABILITY ANALYSIS	MEDICAL ONCOLOGY	RADIATION ONCOLOGY	SURGICAL ONCOLOGY	TOTAL
TOTAL PORTABLE PRE-AUTHORISATIONS UNDER ONCOLOGY	16005	9346	6383	31734
TOTAL PRE-AUTHORISATIONS UNDER ONCOLOGY	23923	13945	9629	47497
% OF PORTABILITY	66.9	67.0	66.3	66.8

Table 11 Intra state portability analysis of Oncology procedures

Under oncology services, there were a total 31734 portable pre-authorisations which forms around 66.8% of overall pre-authorisations raised under oncology services. This means that there are a lot of people who needs to travel within the state to avail the services for oncology which makes it necessary to improve district wise service delivery. It has been noted that based on portable pre-authorisations: Tumakuru, Mandya, Belagavi, Hassan and Chitradurga districts shows the highest patient movement to avail services. Majority of patients from these districts move to a nearby district which provides them with necessary services. It has been observed that Bengaluru Urban is the most chosen place to avail services under all three categories of oncology. This could be because of well-established infrastructure, available human resource and expertise. People from Belagavi though choose to travel to surrounding states for availing services. This could be because Belagavi shares close border with the state of Maharashtra and Goa. Under oncology services, nearly 67% of all pre-authorisations show portability/ movement to access appropriate care.

UROLOGY SERVICES:

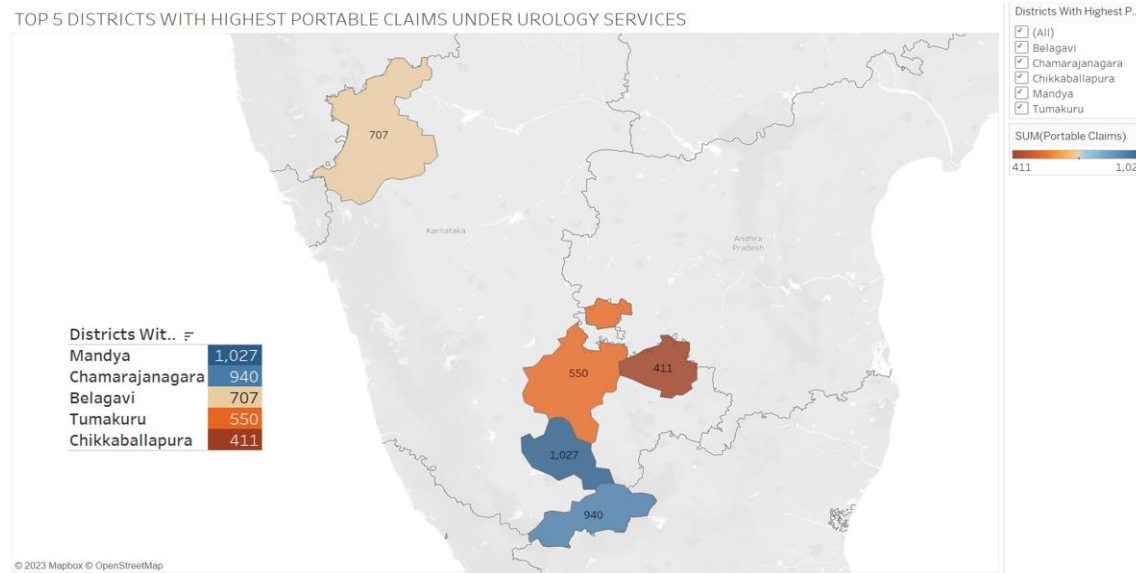


Figure 27 Intra state portability analysis of Urology services

UROLOGY	PORTABILITY ANALYSIS
DISTRICTS WITH MAXIMUM PORTABILITY	DISTRICTS WHICH HOST MAXIMUM PORTABLE CASES UNDER UROLOGY
MANDYA	MYSURU
CHAMARAJNAGAR	MYSURU
BELAGAVI	OTHER STATE
TUMAKURU	BENGALURU URBAN
CHIKKABALLAPURA	BENGALURU URBAN

Table 12 Intra state portability analysis of Urology services

PORTABILITY ANALYSIS	UROLOGY
TOTAL PORTABLE PRE-AUTHORISATIONS UNDER UROLOGY	12545
TOTAL PRE-AUTHORISATIONS UNDER UROLOGY	26120
% OF PORTABILITY	48.0

Table 13 Intra state portability analysis in terms of pre-authorisations raised.

Under urology services, total portable pre-authorisations recorded is 12545 during the given study period. This translates to 48% of overall Urology pre-authorisations raised. Major districts that show maximum patient movement is Mandya, Chamarajanagar, Belagavi, Tumakuru, Chikkaballapura. These districts show a maximum movement to Mysuru, Bengaluru Urban and other state for seeking treatment.

XII. REFERRALS RAISED UNDER EACH SUPER SPECIALTY IN THE FY2022-2023.

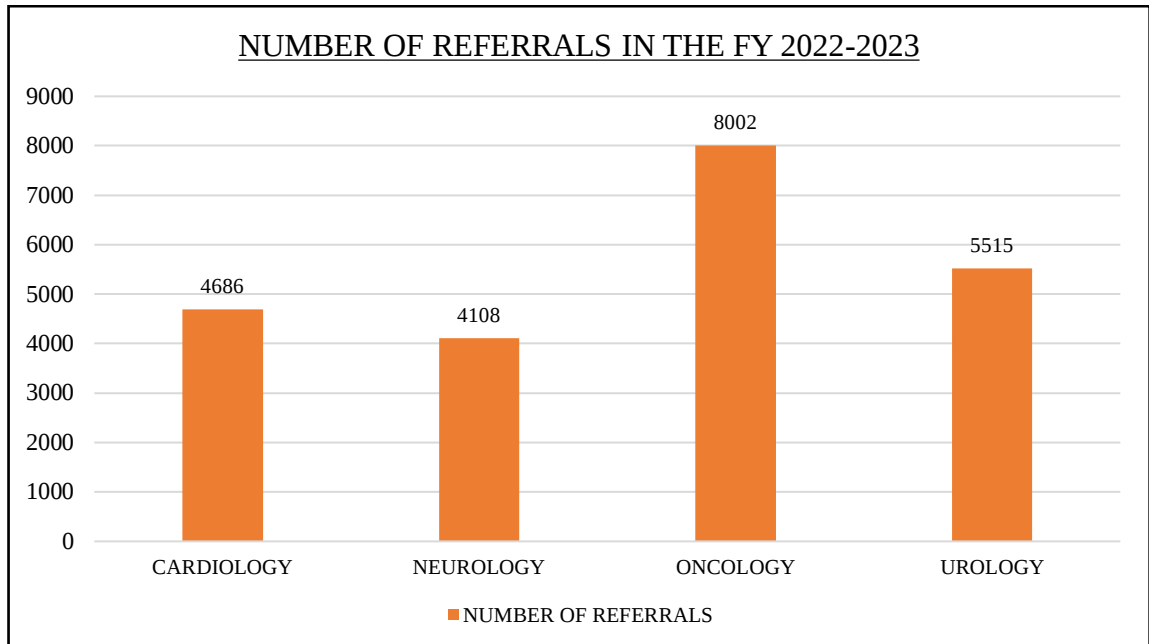


Figure 28 Number of referrals under each super specialty in the FY2022-2023

The above graph depicts the number of referrals seen under each super specialty in the financial year 2022-2023 which is the given study period. It can be noted that oncology services shows maximum referrals of 8002 when compared to other super specialties, this could be because the facility might not be equipped to deliver the needed services. Following this, urology shows the next highest referrals of 5515, cardiology shows 4686 referrals and neurology 4108 referrals in the given time period.

XIII. REFERRAL PRE-AUTHORISATIONS RAISED BY A PUBLIC FACILITY PROVIDING SPECIALIZED SERVICES:

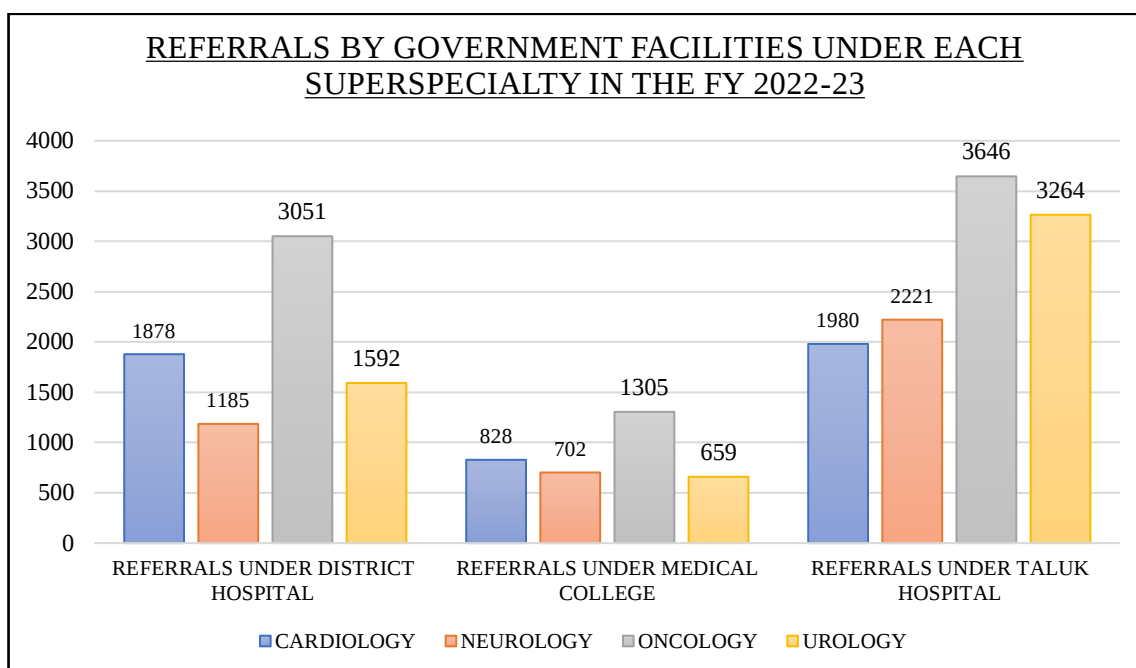


Figure 29 Referrals by a specialised public facility

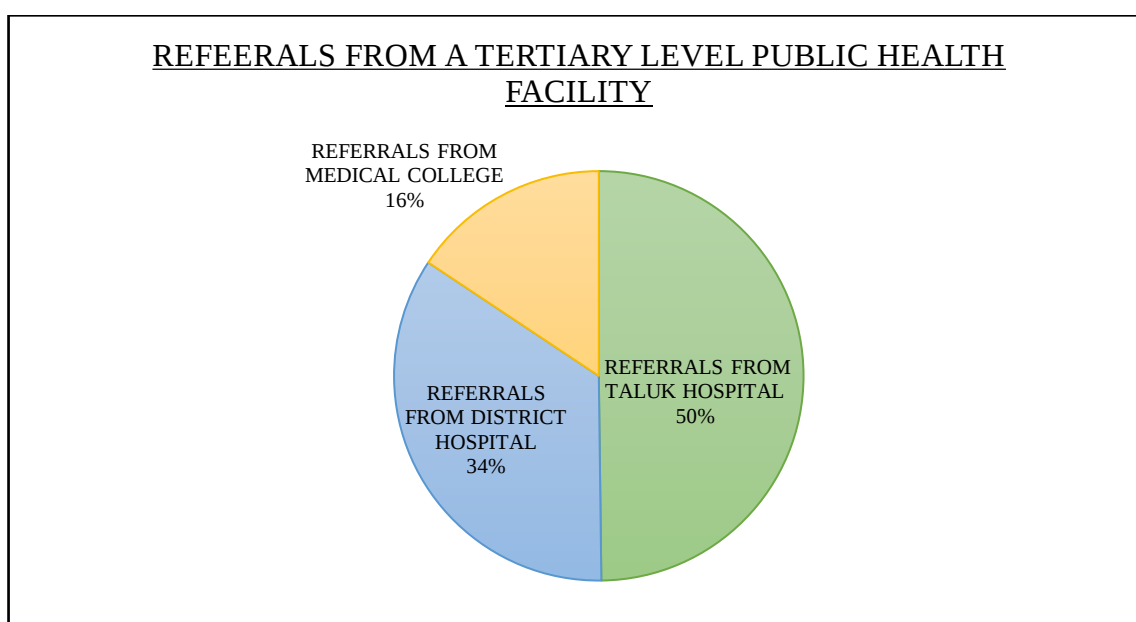


Figure 30 Referral percentage raised by public health facility

The above graph shows the referrals raised from a secondary government facility over the super specialities. The online referral system adopted by Karnataka state has automated the referral process in such a way that when a particular service is not available at a facility on a given day, then a referral form is generated with a list of 50 hospitals surrounding the given facility which has the availability of the service. The patient has

the autonomy to choose the facility from the referral form and avail the required service. In general, when a service is not available in a taluk hospital, the beneficiary is referred to the next higher facility which is the district hospital, if the service is unavailable in the district hospital, then the patient is referred to a medical college which is the highest public facility. From the above graph, it can be seen that taluk hospital shows the maximum referrals to the higher facility under all the super specialties followed by district hospital and medical college. Taluk hospitals form nearly 50% of referrals generated under all specialties, following which district hospitals form 34% of all referrals and the remaining 16% is by medical colleges. This shows that there is a need for taluk hospital strengthening as more people access it and this could reduce the patient load on higher facilities. Medical colleges show least referrals thus showing a strengthened system in providing super-specialty services.

XIV. TOP PACKAGES UTILIZED UNDER EACH SUPER SPECIALTY BASED ON PRE-AUTHORISATIONS RAISED

CARDIOLOGY SERVICES:

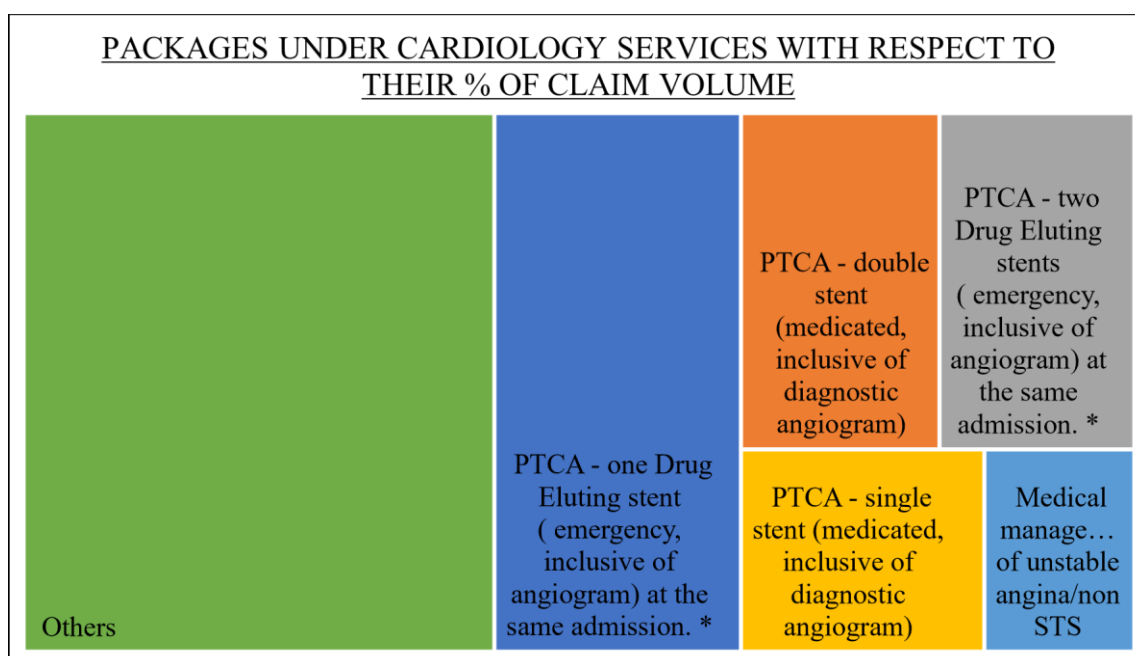


Figure 31 Top packages utilized under cardiology services with respect to their pre-authorisations volume

1. PTCA - one Drug Eluting stent (emergency, inclusive of angiogram) at the same admission forms 9970 pre-authorisations.
2. PTCA - double stent (medicated, inclusive of diagnostic angiogram) forms 5004 pre-authorisations.
3. PTCA - two Drug Eluting stents (emergency, inclusive of angiogram) at the same admission forms 4914 pre-authorisations.
4. PTCA - single stent (medicated, inclusive of diagnostic angiogram) forms 3690 pre-authorisations.
5. Medical management of unstable angina/non-STS forms 2263 pre-authorisations.

These packages attribute to the maximum pre-authorisations under cardiology super specialty. Out of total 44895 pre-authorisations under cardiology, 25841 pre-authorisations are raised for these services only which translates to nearly 58% of overall pre-authorisations.

Others includes all the other packages available under cardiology.

NEUROLOGY SERVICES:

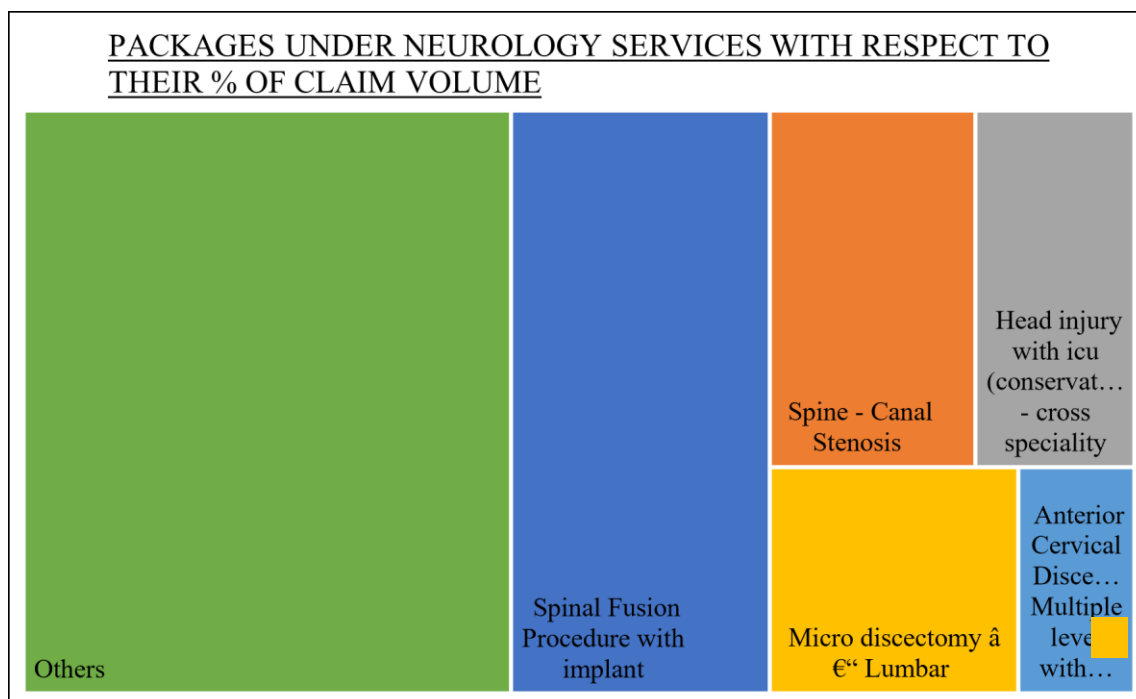


Figure 32 Top 5 packages utilized under neurology services based on their pre-authorisations volume

The top procedures utilized under neurology are:

1. Spinal Fusion Procedure with implant
2. Spine - Canal Stenosis
3. Head injury with ICU (conservative) - cross speciality
4. Micro discectomy Lumbar
5. Anterior Cervical Discectomy Multiple level with Implants.

These 5 procedures raise a pre-authorisation of 8867 out of 15812 overall neurology pre-authorisations. This translates to nearly 56% of all the procedures performed under neurology.

Others include all the other packages under the neurology.

ONCOLOGY SERVICES:

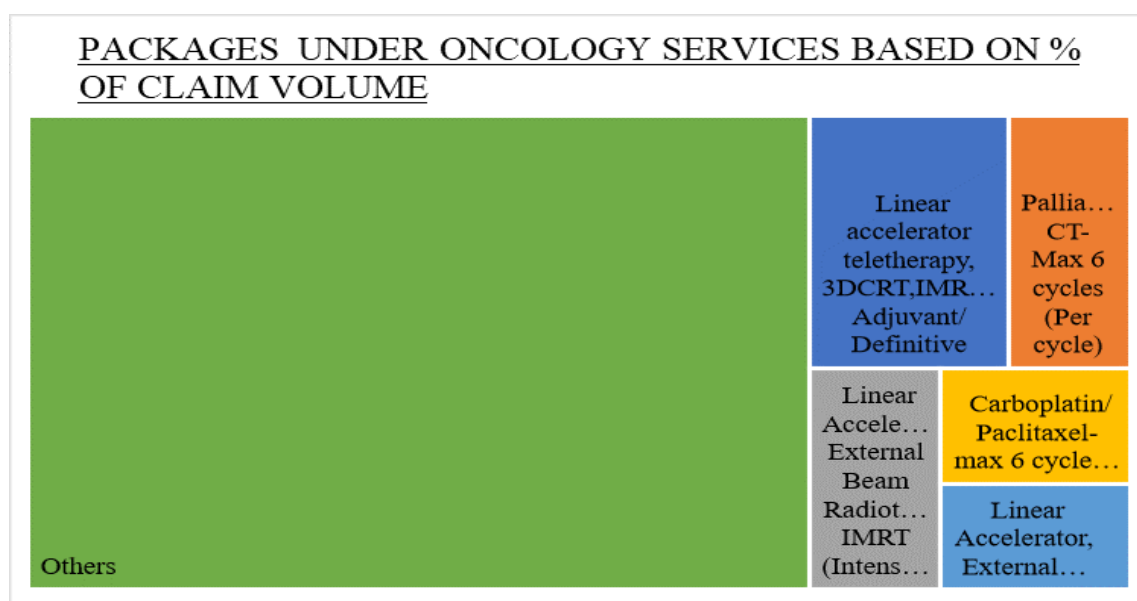


Figure 33 Top 5 packages available under oncology services

Under oncology services the following the most availed services:

1. Linear accelerator teletherapy, 3DCRT,IMRT,VMAT Adjuvant/Definitive
2. Palliative CT- Max 6 cycles (Per cycle)
3. Linear Accelerator, External Beam Radiotherapy IMRT (Intensity Modulated Radiotherapy) (Radical/Adjuvant/Neoadjuvant)
4. Carboplatin/Paclitaxel-max 6 cycles (Per cycle)
5. Linear Accelerator, External Beam Radiotherapy 3D CRT/2D Planning (Radical/Adjuvant/ Neoadjuvant)

The top 5 procedures under the oncology services translate to 13854 pre-authorisations which correspond to nearly 30% of overall pre-authorisations under oncology.

Others include all the services under Oncology.

UROLOGY SERVICES:

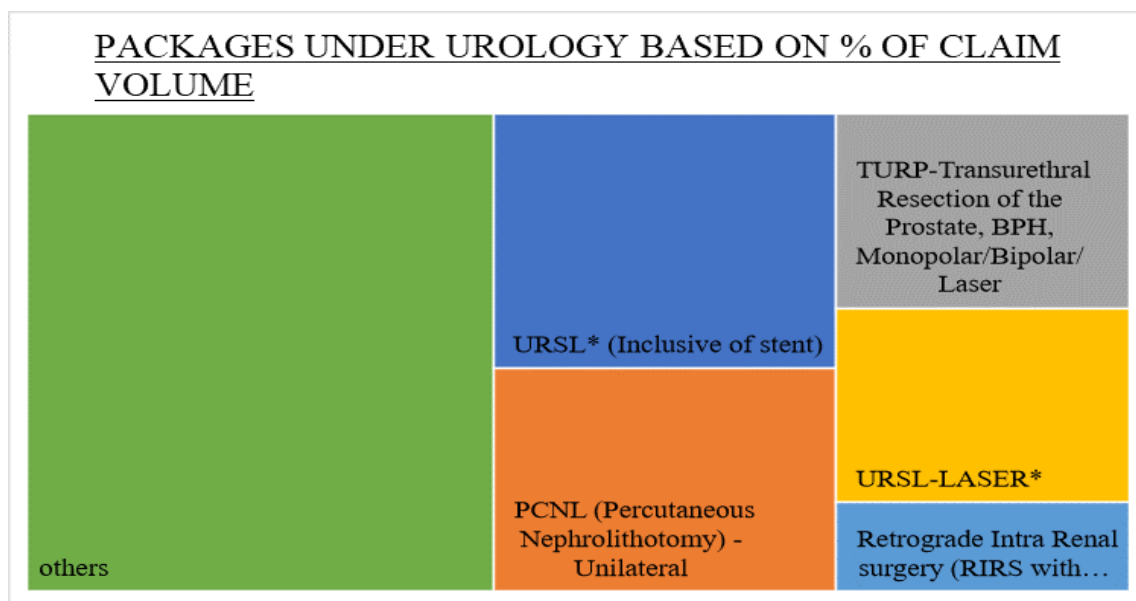


Figure 34 Top 5 packages under Urology services based on pre-authorisations utilization

Under urology services the top packages available are:

1. URSL (Inclusive of stent)
2. PCNL (Percutaneous Nephrolithotomy) - Unilateral
3. TURP-Transurethral Resection of the Prostate, BPH, Monopolar/Bipolar/Laser
4. URSL-LASER
5. Retrograde Intra Renal surgery (RIRS with laser) for renal and PUJ calculi

Overall, the top 5 packages under urology services raise 15067 pre-authorisations which translates to nearly 58% of overall urology pre-authorisations.

Others include all the other packages under Urology.

XV. AVERAGE PRE-AUTHORISATIONS SIZE OF EACH SUPER SPECIALTY:

SUPER SPECIALTY	PRE-AUTHORISATIONS VOLUME	PRE-AUTHORISATIONS VALUE (in Rs)	AVERAGE PRE-AUTHORISATIONS SIZE (in Rs)
CARDIOLOGY	44895	3,22,58,97,000	71,854
NEUROLOGY	15812	70,30,94,000	44,466
ONCOLOGY	47497	2,29,45,82,000	48,310
UROLOGY	26120	59,59,15,000	22,815

Figure 35 Average pre-authorisations size of each super specialty

Average pre-authorisations size of each super specialty is shown above. It is seen that of all the super specialties cardiology shows the highest average pre-authorisations value of Rs 71854. this indicates the higher average cardiac care cost. This is followed by oncology services with an average pre-authorisations value of Rs 48310, Neurology services with Rs 44466 and Urology with Rs 22815.

9. DISCUSSION:

SUPPLY SIDE OF CARE:

This study found that there are 121 hospitals providing cardiac care based on the pre-authorisations submitted in the FY2022-2023. A study by Pulkit Kumar Sehgal, Dr Sudha Chandrashekhar, and Parul Naib on Trends in Cardiac Care utilisation under Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (PM-JAY) from the date of roll out till 1st March 2020 showed Karnataka had 5% of country's cardiac care empanelled hospitals. This percentage corresponds to 80 hospitals.(Ref 5). It can be observed that there is an addition of nearly 43 more hospitals under cardiac care from 2020 till the year of this research study.

A previous study published by NHA(National Health Authority) about the trends in oncology services showed that from the time period of September 2018 to July 2019 there were 56 hospitals empanelled under PMJAY which provided cancer care in the state of Karnataka. Our study shows that, there are 88 hospitals in the state which caters to Oncology services, this shows an increase in 22 hospitals from the year July 2019¹⁶ showing a progress in oncology service delivery in the state.

Our study showed that there are 138 hospitals providing Neurology services, 218 hospitals providing Urology services . There has been no study specifically about empanelled services under Urology and Neurology in Karnataka.

PRE-AUTHORISATIONS UTILIZATION IN TERMS OF PRE-AUTHORISATIONS VOLUME AND PRE-AUTHORISATIONS VALUE:

The study revealed that Oncology accounted for the largest share of pre-authorizations in terms of volume, with a contribution of 35%. In contrast, Neurology had the lowest contribution at 12%. Cardiology represented 33%, while Urology accounted for 20% of the pre-authorizations submitted. Under Cardiology, Karnataka recorded 44,895 pre-authorizations during our study period, this when compared to a previous study on trends in cardiac care utilization which spanned from 2018 until March 1, 2020, showed that 51890 claims were submitted under cardiology in the state of Karnataka. The duration of our study is 12 months and that of previous study is 15 months. We can understand that there has definitely been an improvement in terms of service utilization under cardiology when compared to the previous study showing better awareness and utilization of services with each passing year.(Ref 5)

Oncology contributes to 47497 pre-authorisations; urology contributes to 26120 pre-authorisations and Neurology for 15812 pre-authorisations. No study has been done specifically to study the pre-authorisations volume under these three specialties.

Cardiology contributes to the maximum pre-authorisations amount, followed by oncology, Neurology and urology. Cardiology pre-authorisations value raises to Rs.32258.97 lakhs in the study period. Previous study on cardiac trends and service utilization from 2018 till 1st March 2020 (15 months period) showed a cardiac pre-

¹⁶ [*early trends in utilization of oncology services.pdf](#)

authorisations value of Rs.36,446 lakhs rupees.(Ref.5). Neurology, Oncology, Urology raised Rs.7030.94 lakhs, Rs.22945.82 lakhs, Rs.5959.15 lakhs, respectively.

PRIVATE VS PUBLIC SERVICE UTILIZATION:

Under all the specialties it can be seen that private hospitals have submitted more pre-authorisations than government hospitals under all the super specialties considered under the study. If the hospital data is considered it can be seen that out of 318 empanelled hospitals which has submitted pre-authorisations under these super specialties, there are only 38 government hospitals, and the rest is private empanelled hospitals. 38 government hospitals have submitted 58363 pre-authorisations and the remaining 280 private hospitals has submitted 75961 pre-authorisations. **Average pre-authorisations submitted per government facility can be calculated as 58363 pre-authorisations/38 government hospitals which is nearly 1500 pre-authorisations per government facility. 280 Private empanelled hospitals has submitted 75961 pre-authorisations, this amounts to an average pre-authorisation of 300 submitted per private facility. It can be seen that in all the specialties the private and public utilization is nearly same. Under Neurology government pre authorizations submitted is nearly 50% less than private. There are 14 government hospitals and 127 private hospitals empanelled to provide neuro care. This amounts to an average of 405 pre-authorizations is handled by a single government facility and 80 pre-authorizations from a single private facility. It can be seen that government facilities handle 5 times more cases than a private facility.** Another study shows that Karnataka had 47% private empanelled hospitals in 2020 under all the specialties in the scheme. This study also finds that private hospitals predominate among super-specialties such as cardiology, cardiothoracic and vascular surgery (CTVS), neurosurgery, plastic surgery, and surgical oncology. For all these specialties, private hospitals account for at least two-thirds of hospitals empanelled to offer such care. Private hospitals are more likely to empanel as multi-specialty facilities than public hospitals (79 percent vs. 69 percent).¹⁷ This could be due to unavailability of infrastructure, HR and expertise in government facilities. This finding can be co-related with our study which shows higher private facility utilization by beneficiaries under super specialty services. Under Urology services private share is 79% (Ref 14). This study talks about the number of private hospitals and its empanelment at the country level. According to this study, in Karnataka under Urology, there is a greater service utilization from private facilities contributing to nearly 66% private share which is much lesser than the national average.

DISTRICT WISE SERVICE UTILIZATION:

This study has shown district wise top 5 and bottom 5 service utilization under each super specialty considered in this study based on pre-authorisations raised by each district has been found out.

Super specialty	Top 5 districts	Bottom 5 Districts
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¹⁷ [pmjay role of private hospitals.pdf](#)

Cardiology	Bengaluru Urban,Mysuru,Dharwad,Dakshin Kannada, Shivamogga	Chamarajanagar, Chikkaballapur, Haveri, Ramanagara, Uttara kannada.
Neurology	Bengaluru Urban,Mysuru,Dharwad,Dakshin Kannada	Chamarajanagar, Chikkaballapur,Chikkamagaluru, Ramanagara, Tumakuru
Oncology	Bengaluru Urban,Mysuru,Dharwad,Dakshin Kannada	Chamarajanagar, Chikkaballapur,Chikkamagaluru, Ramanagara, Raichur
Urology	Bengaluru Urban,Mysuru,Dharwad, Kalaburagi, Davanagere	Chamarajanagar, Chikkaballapur, Haveri, Ramanagara, Raichur.

There has been no prior study which has shown district wise service utilization in Karnataka. With this study we can conclude that in most of the specialties Bengaluru Urban, Mysuru, Dharwad, Dakshina kannada, Davanagere, Shivamogga and Kalaburagi are the districts with maximum utilization of the services.

Chikkaballapura,Chamarajanagar,Haveri,Ramanagara,Uttarakannada,Chikkamagaluru, Tumakuru and Raichur are the districts with least utilization of the services. This could be due to lack of availability of empanelled facilities, expertise and infrastructure.

SOCIO-ECONOMIC AND DEMOGRAPHIC INFLUENCE ON SERVICE UTILIZATION:

Age wise service utilization:

Under all the super specialties, on an average it is the age group of 46-60 years which utilize the services more. Of all the pre-authorisations raised 36.1% of the pre-authorisations accounts to this age group. This can be supported by the fact that according to 2019 Global burden of disease study data, the age group of 15-49 and 50-69 contain the highest incidence of non-communicable diseases in both males and females.¹⁸ The above data also supports the fact that the incidence of non-communicable diseases is most common in the age group of 45 to 60+ years which can be justified by the current study. Following this age group, 60+ age group were found to be the beneficiaries for utilization of services under these 4 super specialities. The above facts are supported by the PMJAY annual report published by the NHA.¹⁹

Gender wise service utilization:

The current study showed that under all the super specialties except oncology there was a male predominance in service utilization. PMJAY annual report released by the NHA , shows that overall, there is a male predominance in service utilization under PMJAY scheme in the country.(Ref.20). Under the cardiology service utilization, the current study showed that male utilization was nearly 68% and female utilization was 33% for the study period of FY2022-2023. A previous study on cardiac care utilization showed that in the

¹⁸ <https://vizhub.healthdata.org/gbd-compare/>

¹⁹ [PMJAY Annual Report 25 1f47b3cfa5.pdf](#)

span of 15 months from the date of implementation of the scheme till 1st March 2020, the % distribution of cardiac care utilization based on gender showed 68% male utilization and 32% female utilization which shows similar utilization patterns as compared to our study. This could be attributed to lesser accessibility of high-quality cardiac care near the place of residence for women, given that women may not be able to travel long distances for care as compared to men due to societal obligations. Identifying and addressing barriers for women to access necessary cardiac care will be important to effectively increase their percent share in utilization of cardiac care and improve women's health (Ref.5).

Under the oncology service utilization, Karnataka showed a female predominance with 58% female utilization when compared to 42% male utilization. A previous oncology service utilization in India study too supported this finding of female predominance in service utilization under Oncology in the country (Ref 10).

There has been no studies which co-related gender wise service utilization under Urology and Neurology services.

Economic status wise distribution of service utilization:

Karnataka in its Ayushman Bharat yojana has included even the APL beneficiaries unlike the PMJAY rolled out by centre with a coverage of 1.5 lakhs/year on a family floater basis. No study was found which co-related economic status and service utilization under PMJAY scheme.

It was found that in all the super specialties BPL pre-authorisations were significantly higher than that of APL. A higher BPL coverage shows that there is a good penetration of the scheme amongst the BPL category. Lower APL coverage could be due to lack of information and reduced awareness amongst the APL holders about the existence and coverage of the policy. It is imperative for creating awareness and popularising about the coverage of the policy as an important step in the achievement of Universal Health Coverage under the SDG goals.

MOVEMENT OF PATIENT TO ACCESS CARE – INTRA STATE PORTABILITY ANALYSIS:

It can be seen that amongst all the super specialties- Oncology and Neurology shows the highest movement of patients to access care. Oncology records nearly 67% and Neurology shows nearly 68% portability within the state. A previous study on cardiac care utilization showed that during the period from 2018-2020 there were 18000 portable pre-authorisations under all specialties which translated to 1.4% of overall pre-authorisations. Karnataka shows nearly 60% of intra state portability compared to overall pre-authorisations raised. The districts which shows highest portability under each super specialty is analysed from the pre-authorisations data in our study. Under cardiology services- Bellary, Belagavi, Hassan, Mandya and Tumakuru shows highest portability. Under Neurology- Mandya, Belagavi, Tumakuru, Haveri and Raichur. Under Oncology- Tumakuru, Mandya, Belagavi, Hassan and Chitradurga.

Under Urology-Mandya, Chamarajanagar, Belagavi, Tumakuru and Chikkaballapura. In a previous study for intra state portability under oncology services 99.6% oncology services showed intra state portability with 37% of cases moving to Bangalore Urban for availing services(Ref 16). It was seen that few cases under all the super specialties moved to other state to avail services this was especially true in district of Belagavi as it shares borders with both Maharashtra and Goa. In the same study there was an interstate portability of 0.6% to Wardha, Maharashtra for oncology treatment(Ref 16). The district to which maximum portable pre-authorisations went to avail services are- Bengaluru Urban, Mysore, Dharwad. This data suggests that higher strengthening of the facilities is needed in the districts with higher portability.

REFERRALS RAISED UNDER EACH SUPER SPECIALTY AND REFERRALS BY A PUBLIC FACILITY ANALYSIS:

One of the objectives of this study is to understand the referrals raised under the super specialties considered and also to analyse the possible reasons for higher number of referrals. It can be seen that maximum referrals was raised under oncology services in the state. Oncology services is followed by Urology, Neurology and cardiology under referrals . From this study it is seen that majority of referrals are raised by Taluk hospital which translates to 50% followed by district hospitals which form 34% and then medical college which forms 16% of referrals raised. Possible reason could be that a taluk hospital is allowed(desirable) to diagnose and refer but not treat as they are not equipped to do so. A district hospital based on state's manpower can provide oncology services under desirable services. If a District hospital is not equipped, then they are allowed to refer the case to a medical college which is the highest facility in public providing super specialty services. Lack of manpower and equipment could thus be the reason for higher number of referrals under these super specialties. Medical colleges show least referrals compared to other government facilities, this shows that medical colleges in Karnataka are well-equipped to handle majority of cases thus pointing a strengthened public system.

TOP PACKAGES UTILIZED UNDER EACH SUPER SPECIALTY:

Under cardiology services, PTCA related procedures are utilized more by the patients in Karnataka. previous study showed that across the country the highest utilized cardiac package was PTCA-single stent (medicated, inclusive of diagnostic angiogram)(Ref.11). This stands as 4th utilized package in the state of Karnataka. This shows that coronary angioplasty is one of the most performed procedures under cardiology in the state and the country. This shows that coronary artery disease is one of the most common cardiac issue prevailing. Under neurology services, Spinal fusion procedure with implant, spinal canal stenosis and head injury management in the ICU are utilized commonly. Fusion procedures with implants are most commonly done to treat spinal deformities due to injury or fractures to the bones of the spine, infections, tumors, spondylolisthesis, scoliosis, kyphosis. This is followed by treatment of spinal stenosis . Head injury management too forms a major facility availed which supports the fact that RTA cases are on the rise. Under oncology services, linear accelerator teletherapy, palliative CT are the most utilized. Linear accelerator teletherapy is a part of radiation oncology and palliative CT comes under medical oncology . Even at country level it can be seen that linear accelerator treatment forms the majority of services utilized (Ref 16). Under Urology

services, URSL, PCNL TURP forms the most utilized procedures. URSL (ureteroscopic lithotripsy), PCNL (percutaneous nephrolithotomy) are procedures for kidney stones treatment and TURP (transurethral resection of the prostate) is used for patients for prostate enlargement. From these top procedures used under each super specialty, we can also assess the condition for which these procedures are performed to be more prevalent than others amongst the beneficiaries.

AVERAGE PRE-AUTHORISATIONS SIZE:

From a previous study mentioned earlier on cardiac trend analysis, we can understand that national average of cardiac pre-authorisations value is Rs.69000 from 2018-2020. (Ref 11). This study showed an average pre-authorisations value under cardiology services to be Rs.71854. Karnataka's average pre-authorisations value is greater than the national average. A higher cardiac pre-authorisations value might indicate higher utilization of high-end packages like PTCA. Under Neurology average pre-authorisations value is Rs.44466. This forms the least when compared to other super specialties considered in our study. But Neurology forms the second lowest pre-authorisations value with lowest pre-authorisations volume compared to others. Yet the average pre-authorisations size is more which could be because of high end packages utilization. Under oncology the average pre-authorisations size is Rs. 48310 and under Urology services the average pre-authorisations size is Rs.22815. Urology has a pre-authorisations volume of 26120 and a pre-authorisations value of Rs.5959.15 in lakhs which is the lowest amongst other super specialties. It is important to note that the average pre-authorisations size is not the same as the cost of the service or treatment. It represents the average amount pre-authorisations by the patient or their insurer for a particular medical service or treatment. The actual cost of the service or treatment may be higher or lower than the average pre-authorisations size depending on various factors such as the type and complexity of the treatment, location, hospital or facility, and other related factors.

10. CONCLUSION:

Since the launch of ABPMJAY-ARK scheme in the state of Karnataka, there has been a steady increase in the utilisation of super specialty packages across all districts. Several areas of focus emerge from this study:

This study provides an overview of the service utilization (demand) and supply side of care under ABPMJAY-ArK scheme in Karnataka.

The study found that there are 121 hospitals providing cardiac care, 138 hospitals providing Neurology care, 218 hospitals under urology and 88 hospitals under oncology services. During the study period, (FY2022-2023) overall there are 280 private empanelled hospitals and 38 government hospitals under the scheme providing services under these 4 super specialties.

Under all the super specialties, private hospitals shows more pre-authorisations than government hospitals, this is a finding consistent with the pattern that is observed all over the country. It can also be seen that the **average number of pre-authorisations raised by a single private hospital is lesser than that of a government facility, government facility(average-1500 pre-authorisations) raises nearly 5 times more pre-authorisations than a private facility (average-300 pre-authorisations)in Karnataka.** Availability of private hospitals in terms of geographic reach is far better than availability of government hospitals which could also be the reason for this disparity. Accessing a private hospital is much easier compared to a government facility for a beneficiary. This remains a focus area for policy makers to pay attention to improve service uptake from at public facilities. Increase in the facilities providing super specialty care in districts where there is increased referral or portability is a much-needed step to achieve the objectives of this program. This will also help lessen the load on existing government facilities which attends to the referral and portable claims.

Coming to district wise service utilization, the top districts with maximum pre-authorisations raised under all super specialties considered in the study are Bengaluru Urban, Mysuru, Dharwad, Davanagere, Kalaburagi, Shivamogga, Dakshina Kannada. Districts with reduced service utilization based on pre-authorisations submitted are Chamarajanagar, Chikkaballapur, Haveri, Ramanagara, Tumakuru, Raichur, Chikkamagaluru. It can be seen that Tumakuru, Haveri, Chikkaballapura, Chamarajanagar, Raichur are also the districts with higher number of portable cases in the state of Karnataka which shows that these districts do record cases under these super specialties but lack the facility to provide services to the beneficiaries thus resulting in patient movement to other districts to access care. Along with these districts Belagavi, Mandya, Hassan, Chitradurga also show high portability which could be due to lack of availability of empanelled facility to do provide the needful care. Beneficiaries from Belagavi prefer to travel to adjacent states to avail facilities ,this could be because Belagavi shares its borders with Goa and Maharashtra. Maximum such portable cases are handled by Bengaluru urban, Mysuru, Dharwad under intra state service providing districts and fewer cases from Belagavi are handled by adjacent states.

Under socio-economic-demographic influence on service utilization, age gender and economic status factors are considered. 45-60 years of age shows the maximum utilization under all specialties with a male predominance except in oncology which shows a female predominance in service utilization in all the super specialties except oncology. This shows that there is a need to create more awareness and accessible services to improve their utilization . BPL users shows greater utilization of services than APL. It has to be mentioned that Karnataka is the only state which provides insurance cover also to APL beneficiaries. Out of a total 5.09 crore beneficiaries under this scheme, 1.83 crore beneficiaries belong to APL category.

Under the referrals, oncology shows maximum referrals compared to other super specialties and maximum referrals are raised by a taluk hospital. This can be attributed to the fact that taluk hospital and district hospital providing super specialty services considered under the study as “desirable” services based on resource availability.(As per IPHS guidelines published for Taluk hospitals and district hospitals)

Under all the specialties considered in the study, major packages utilized gives us an insight about the prevalence of the condition for which the treatment is being utilized by the beneficiaries. From the study we can understand that CAD, kidney stone problems, prostate hypertrophy, road traffic accidents, deformities,tumors are the most prevalent conditions for which facilities are utilized.

Average pre-authorisations size provides information about the average amount pre-authorisations submitted by the institution for a particular specialty. Under the scheme, average pre-authorisations size also provides information about the financial burden on the patients. In Karnataka, the average cardiac pre-authorisations is found to be higher than the national average suggesting higher cost of services. Following this is Oncology, Neurology and Urology.

11. WAY FORWARD: (RECOMMENDATIONS)

- Karnataka has a gate keeping mechanism which makes it necessary for the beneficiaries to first try to avail the treatments under government facility which when unavailable is referred to a private sector. When the number of pre-authorisations attended by a government facility is compared with that of private it can be seen that government nearly contributes to 5 times more pre-authorisations when compared to private, therefore this when analysed with gate keeping mechanism adopted in Karnataka there is a need for increase in the number of facilities to decrease the load on public hospitals.
- Across the country, there is an increased dependence of patients on private sector to avail treatments specially treatments covered under super specialties thus they are adding significant additional capacity for specialties and packages which are offered by government hospitals as well as extending supply into specialties and packages which are traditionally neglected by the public hospital network.(Ref 13).In terms of expanding the geographic reach of PM-JAY to underprivileged communities, private hospitals contribute less. Including private facilities in a PPP mode of service delivery to reach the less accessible areas is bound to help. ABPMJAY-ArK scheme thrives in the area that they include private hospitals under the policy , for better reach of marginalised communities PPP mode of service delivery is bound to help. It is important to hold private hospitals to be accountable for providing effective and high-quality care is the biggest hurdle which needs focus by regulating market prices, check on quality treatment provided, putting patient comfort as a priority.
- Chamarajanagar, Chikkaballapur, Chikkamagaluru, Haveri, Raichur, Tumakuru, Belagavi are the districts in Karnataka which requires more focus on adopting measures to improve the health system service delivery. There is a need for improving resources and strengthening the work force to provide satisfactory beneficiary experience. Further research is necessitated to find out the reasons behind the service gaps with these districts for better policymaking.
- There is a male predominance noted in terms of service utilization under these super specialities. This could be because females prefer to take treatment based on the accessibility of the facility in terms of distance to their place of residence due to familial obligations, to improve this scenario there is a need to create better awareness in the community regarding women's health, providing accessible services. In this regard, Karnataka has piloted in providing incentives to ASHAs to create awareness and provide special focus on women.
- There is a need to improve the facility delivered at the taluka level hospital to reduce the number of referrals made. Increase in referrals from taluk hospital could increase the patient load at district and medical college level which could lead to resource burden. Thus, strengthening the services at the taluka level and with better screening and early diagnosis performed at primary and secondary level facilities helps enhancing the performance and reduces the disease burden.

- There is a need to bring in alternative cost-effective treatments under cardiology specialty and streamlining of process to prevent wastage of resources to reduce the average pre-authorisations value under all super specialties.
- Improving tele-consultation procedures for better patient follow up.
- ABPMJAY-ArK scheme does not have a backward referral policy or patient tracking mechanism following the referral done. There is a need to include a follow up mechanism for better prognosis and service delivery.

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