

Research Article

Understanding the Success of TNMSC, An ICT Enabled Structure that Revolutionized The Indian Rural Healthcare System: A Comparative Analysis With KDLWS

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ABSTRACT

India is a developing nation with an agrarian economy, with a majority of rural population. The Indian Healthcare System is the largest service sector and around five decades old. It is still confronting an unprecedented pressure because of its poor reach in providing quality healthcare services to all. The total healthcare expenditure in the country is at 4.0 percent of the GDP¹ when compared to other nations. The out-of-pocket expenditure comprises about 61 percent², out of which only 26 percent of the entire population is covered under health insurance³. The major concern is the underlying procurement bottlenecks like access to funds, clearer visibility of the functionalities, corruption, blockage of funds, complex structures and quality of goods. This results in inequality for access and affordability of health care for all. There is critical need for a strategic tactic to leverage the growth trajectory of health care to its utmost advantage.

Since health care is a state affair, every state has their own evolving story of its public health care services. Among various public health care systems, Tamil Nadu public health care system is the top-notch. Their system is known for providing universal health coverage by introducing an effective drug procurement and distribution system since the year 1994. The Information Communication Technology (ICT) enabled drug supply chain management system assures rational utilization of drugs, better accessibility, visibility and tracking facility to prevent mismanagement and usage of substandard drugs and hence ensures quality control to eliminate counterfeit drugs. The Tamil Nadu health care model illustrates that key to the success of public health governance system is an E-healthcare structured on a robust IT foundation. This model proves that the combination of political commitment to health, participation of political strengths and community involvement, a sensible investment in the primary health care centers with regard to education and technology can help in achieving good health all in low income households.

This study highlights the objectives and success factors of the Tamil Nadu Medical Services Corporation Ltd (TNMSC) and how Karnataka State Drugs Logistics and Warehousing Society (KDLWS) is still struggling to meet the challenges and needs of the population, even though it was launched on the same lines with TNMSC.

The words "medicine" and "drug" are used interchangeably in this report.

INTRODUCTION

DRUG SUPPLY MANAGEMENT IN INDIA

The Healthcare system in India is highly inequitable and the current situation is very disappointing. About 65% of Indians lack accessibility to essential medicines and medical care. 82% of health expenditure in India is remunerated by the people themselves out of which 60% is splurged on medicines (Dr MC Gupta, 2006). The Health care system is a state affair where the State

¹ The World Bank Global Health Expenditure Database 2013

² WHO World Health Statistics 2012

³ Employees State Insurance Corporation; RSBY website.

government sanctions annual budgets for health expenditure. The graphical representation in Fig.1⁴ and Fig.2⁵ correlates the state-wise per capita health expenditure and the number of public health services beds that are available per 10, 00,000 persons in the year 2008-09 (Ministry of Health and Family Welfare, 2009).

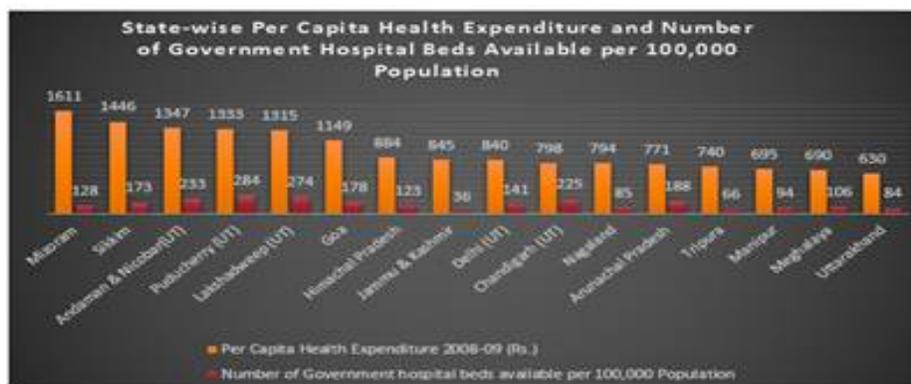


Fig. 1: Health expenditure of states which are above National Average of Per Capita Health Exp. 2008-09

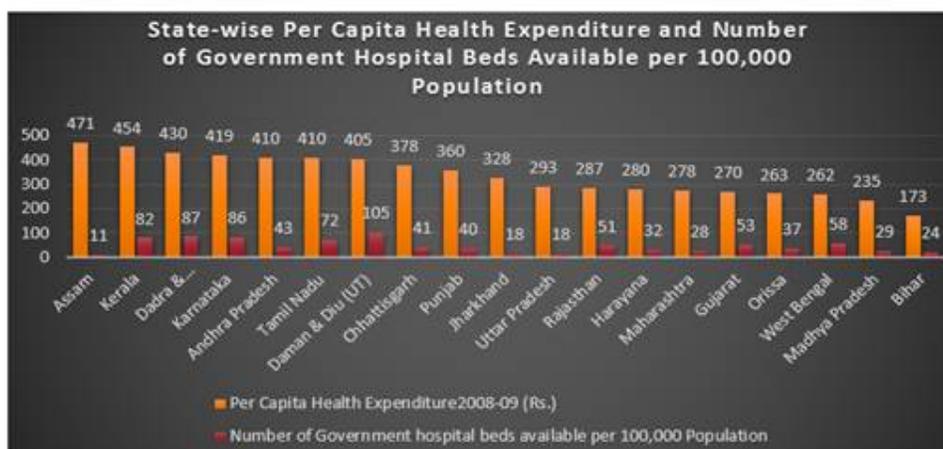


Fig. 2: Health expenditure of states which are below National Average of Per Capita Health Exp. 2008-09

Medicines are the basic and vital commodity for the right to good health. Provision of these essential medicines is one of the main aims of the government in order to achieve health for all (Hans V Hogerzeil, 2006). It was estimated by the World Health Organization (WHO) that out of 1.3 to 2.1 billion population in the world, the majority of them belonging to developing countries, lack accessibility to essential medicines and other basic medications (World Health Organization, 2004). Pricing and availability of medicines for public as well as private sectors are the main indicators of access to health care. Studies have showcased that poor availability of medicines, especially in the public sector, is the key obstruction to access to health (Alexandra Cameron, 2011). Considering all problems associated with the provision of medicines, the most difficult ones to solve are those related to inefficient procurement and distribution system and the ever escalating associated cost. Most of the short case studies conducted across the world have cited that the procurement process itself is the

⁴State-Wise per-capita expenditure on health. Press Information Bureau, Government of India.

⁵State-Wise per-capita expenditure on health. Press Information Bureau, Government of India.

main source for various bottlenecks. Lengthy and complex processes itself adds on to long lead times, inefficient utilization of valuable and limited resources and lacks visibility. Processes that are outsourced from external agencies to carry out specific tasks, or the vendors of health and service products are also an influence on the efficiency of the procurement structure (United States Agency for International Development (USAID), 2013).

Amongst the public health expenditure, the costs correlated with medicines stands at second highest, after personnel. In developing countries, it consumes about 25% to 65% of the total spending on health (Sakthivel Selvaraj, 2007). Establishment of a reliable, efficient and self-sustaining procurement system provides an avenue for cost-saving and improved procurement procedures for enhanced medicine affordability and accessibility (D Rainhorn, 1994).

In the present global scenario, India has risen as a leading supplier of generic medicines. By volume, it's the third largest manufacturer of medicine and stands around 14th in terms of value; In spite of which the present population's demand is at an outburst and it is not able to meet the plea due to lack of accessibility to the essential medicine (World Health Organization, 2004). More than meticulous follow up of all the principles of Good Manufacturing Practice (GMP) throughout the manufacturing and production of medicines, it is essential that the produced medicines are aptly stored and distributed to respective destinations for their utilization in a professional and scientific manner. The proficiency of a purchasing agency, outlines the development of an efficient and optimized procurement system. It ensures purchasing of the right item from the correct source at the right time possessing the accurate quality at a reasonable cost and in the right quantity. This requires possessing of both pharmaceutical know-how and managerial skills to effectively streamline the processes of purchasing and distribution.

India is the second largest populated country, it is an established truth that the availability of drugs in the Indian Public Healthcare sector has always been a rising problem. There are various factors like shortage or blockage of funds, inefficient indenting procedures, disorganized inventory and material handling management, irrational usage of resources and so on which adds up to the problem. By identifying the root cause for shortage of drugs in the public healthcare providers, many Indian state governments have introduced their own establishment for purchasing and distribution of drugs and other medical supplies required for them. Fig.3 highlights the various kinds of pharmaceutical procurement processes followed by the department of Health and Family Welfare Services in India.

In the initial stages, procurement of drugs was initiated through centralized pooled methods. This type of procurement commenced in the 1990s (R Veena, 2010).



Fig. 3: Procurement processes followed by the Department of Health and Family Welfare Services in India

In March 1994, Drug policy for Delhi was initiated by the Delhi Government. In the same year, the Tamil Nadu government came up with Tamil Nadu Medical Services Corporation Limited (TNMSC) and the revised Central Purchase Committee (CPC) was established in Kerala known as Kerala Medical Services Corporation Limited (KMSCL). These were the trend setters in the country, affirming scientific and organized pooled procurement of drugs. Over a period of time, the other state governments like Karnataka, Maharashtra, Punjab, Orissa, Rajasthan and others have started centralizing drug procurement systems (Prabal Vikram Singh, 2012). For our study, an in-depth exploration was conducted to study the effectiveness of TNMSC in comparison with KDLWS which is still at its nascent stage.

TAMIL NADU MEDICAL SERVICES CORPORATION LTD. (TNMSC)

With the insight and strong involvement of Government leaders in the state of Tamil Nadu, there has been a significant impact on the health gains of the state. Despite the ever changing political government, the approach of improvising the public health system has always been the primary consistent priority, ever since the early 1980s. The funds allocated by the government and the policies emphasized on improvising the primary health care services, especially targeting the rural poor and deprived population.

During the beginning of 1990s, the Tamil Nadu health service sector was plagued with a plethora of problems related to shortage of drugs and inaccessibility to essential medicines. This issue alarmed the Tamil Nadu government to take charge and initiate new strategies over the old non-productive model. Under the leadership of R. Poornalingam, Health Secretary to Government of Tamil Nadu, a team of technocrats and bureaucrats made tremendous changes in the existing system and paved a way for setting up a robust structure for purchase, storage and distribution of drugs, called "Tamil Nadu Medical Services Corporation (TNMSC). The system was integrated under the Companies Act 1956 with the main intention of undertaking and monitoring all the activities associated with the procurement and distribution of drugs for entire government hospitals and also to the public health setups around the state. The system was initiated in the year 1994 1st July and started functioning at full scale by the year 1995 January (K G Revikumar, 2013).

Tamil Nadu trail blazed in providing universal health coverage by introducing an effective drug procurement and distribution mechanism. The model is endorsed to other states by various organizations like the World Bank, the Department for International development and the World Health Organization. The system was also constituted to the Universal Health Care by the High Level Expert Group (HLEG) (High Level Expert Group, 2011). The entire system is built on an IT foundation that enables better visibility and tracking of medicines assuring the delivery of the same to the needy patients. The system drastically helps in eliminating the usage of counterfeit drugs (Dr. Rumki Basu, 2013). TNMSC has adopted a well-planned scientific streamlined process of drug procurement and distribution, assuring availability of drugs throughout the year. The bold and drastic decision was made by the system to deviate from the traditional procedures and functionality. The model incorporates centralized tendering and procurement to improve accessibility to drugs and decrease the financial burden on the state government and the individuals. A decentralized distribution system is followed, where the drugs are delivered to 25 district drug warehouses located across the state (as shown in Fig.4) by the suppliers in stipulated quantities. The TNMSC is an autonomous body, where all vital decisions regarding tendering and procurement are taken care by the board without any involvement of the ministry or the department of health. The ministry is responsible for structuring the procurement policies and administration of the functionality of the entire system. The Health Department and the Ministry decides the list of essential drugs and supplies (Dr T.Sundaraman, 2011).



Fig. 4: 25 Drug warehouses located in various Districts of the State

STRUCTURE OF THE ORGANIZATION⁶

Fig. 5: Administrative Structure of TNMSC

SIGNIFICANT FEATURES OF THE TNMSC

The TNMSC model is known for its accountability, reliability and responsibility. Some of the significant features that makes the system superior are as follows (Dr T.Sundaraman, 2011; TNMSC.Ltd, 2009) -

1. TNMSC covers almost 12000 medical and healthcare facilities; ranging from sub-centers to medical colleges
2. TNMSC also supplies 114 Veterinary drugs to government owned veterinary institutions under the governance of Directorate of Animal Husbandry
3. Engaged in the distribution of 268 drugs, 84 suture items and 63 surgical items as per the essential drug list (WHO standards) with an annual turnover not less that Rs. 20.00 crores for the past three years
4. The Distribution Management cost is as low as ~ 5% per year.
5. TNMSC manages 25 district warehouses located across the state
6. Inculcates the practice of blister packing with a special logo to avoid misuse and usage of counterfeit drugs.
7. Efficient Quality Control systems to eradicate sub- standard products
8. Overall stock control and stock maintenance through online computer networking
9. Real-time, accurate Management Information System (MIS) for monitoring, controlling and decision-making support
10. Support services for maintenance of non-medical and medical instruments and equipment in various medical facilities in the state.

CRITICAL SUCCESS PARAMETERS OF TNMSC MODEL FOR DRUG PROCUREMENT AND DISTRIBUTION

1. **Strong political backing and effective leadership** – Even though TNMSC is an autonomous body, it comprises of government deputed Indian Administrative Service officers along with contractual staffs who are technically qualified. This is done mainly to avoid lumbering bureaucratic procedures and improve the efficiency of the system from the level of tendering to payment.
2. **For the political buy-in, there is a multi-stakeholder participation-** The TNMSC model also comprises of personnel from different fields to form a multi-stakeholder structure for better political support and perform the functionality with ease.

⁶ Source: TNMSC, <http://www.tnmsc.com/tnmsc/new/html/aboutus.php>

3. **An adequate allocated budget that is satisfactory to face the drug demand and covers the administration costs-** For the financial year 2010, a budget of US\$ 39.8 million was allocated to the state of Tamil Nadu, this budget includes the cash generated through the management fees which the autonomous procurement agencies charge. With this budget, they were able to make capital investments in the state and also administer 25 district warehouses which function with the scientific standards of inventory management (Prabal Vikram Singh, 2013).
4. **Facilities like Information Technology service, Quality Control, Supply Chain Management are outsourced-** Extensive utilization of IT infrastructure has helped in achieving proficient, efficient and optimized use of resources by providing a robust structure with a better transparency. Introduction of streamlined processes through outsourcing with well trained personnel has helped in maneuvering the current system to a better infrastructure. There by building a better management information system that enables scientific utilization and forecasting of the required quantity of drugs of good quality and delivering the same to the population that is actually in need of it.
5. **Generation of well- defined essential drug list based on local consumption and requirement.**
6. **Demand estimation and forecasting for the required drug supplies are done in a scientific manner-** Periodic revisions are conducted to check if the essential drug list, drug formulary is on par with the standard treatment guidelines. Prescription audits are done to promote rational use of drugs among the medical professionals.
7. **Scientific techniques are followed in maintaining the drug warehouses and inventory management** – The objective of maintaining the warehouse is to ensure the availability of products throughout the year of consumption. Clear criteria are set to indicate no stock outs in the warehouse and the system followed is very dynamic and responds to changing needs.
8. **Compulsory external quality testing of the drugs supplied in order to avoid usage of sub-standard drugs** -For every batch of drugs that are supplied, a set of two samples are tested in two different laboratories confidentially. Payment to the suppliers is done only on passing the quality check. If the samples fail the check, replacement of the entire batch is required. The pharmaceutical firm is black listed if the firm repeats supply of sub-standard quality products thrice. Audits of the manufacturing firms are done on regular basis before a quality check.
9. **A procurement system with better visibility and transparency** - The phenomena of transparency are very vital in the process of procurement; this provides better visibility in the system. The procurement process followed by the TNMSC model is calendar based and is over before the month of February. The tendering process is planned in such a way that it does not extend more than a month. For every transaction in the procurement process requires standardized documents to avoid mismanagement and ambiguity. The bidding process is web based and the winning bid is informed to all. The Management Information System, helps in monitoring stock inventory, quality control, prompts required payment and maintains a list of blacklisted pharmaceutical suppliers (Dr T.Sundaraman, 2011).
10. **Well maintained Distribution System-** the TNMSC model is facilitated with dedicated vehicles only for warehouse- facility transportation. The district warehouses are located in distant districts to provide better connectivity to more remote rural regions. The model manages up to 25 district drug warehouses. Every transaction is made cashless with only passbook entries. The system is built to ensure availability of goods at all time, no stock outs and the system must be responsive to the ever changing needs and demands.

The Tamil Nadu model showcases that the key to success is an E-Health care infrastructure with a robust Information Technology foundation. This resilient model assures accountability and better visibility associated with effectual supply and inventory management, promising better accessibility to free essential medication that can change the quality of the present scenario.

KARNATAKA STATE DRUGS LOGISTICS AND WAREHOUSING SOCIETY (KDLWS).

Initially the drugs and other supplies required for utilization of public health services in the state of Karnataka were procured from Government Medical Stores. Only in the year 2002, a society was established with the main aim of establishing a cost effective, efficient and decentralized drug logistics and warehousing structure in the state. It was called the Karnataka State Drugs Logistics and Warehousing society (KDLWS) which was initiated with the assistance of the European Union and was registered in 2003 under the Karnataka Registration Act 2003. The system was initiated to

adhere to the modern warehousing techniques to stringent quality control and also to provide information technology empowered functionalities to service the patients free of cost. Drugs, chemicals and other sundry items are procured through the society for the usage in government owned hospitals and other healthcare services. Unlike the previous system, KDLWS does not supply drugs to government medical college hospitals, which is under the Ministry of Medical Education. The procurement in the state is done under the State Sector, District Sector and the Directorate of Medical Education. The society also takes care of the drug requirements of various other programs like National Rural Health Mission (NRHM), Karnataka State Aid Prevention Society (KSAPS) and Akshara Dasoha of Education Department (Comptroller and Auditor General of India, Supreme Audit Institution of India, 2013).

The KDLWS operates from its headquarters in Bengaluru, which comprises of 6 departments covering administration, procurement, logistics, quality control, accounts and finance and Information Technology. It was established on similar lines with the TNMSC. Even though they function under similar objectives, there are significant variances between the two organizations. The KSDLWS is not an autonomous body, it is a complete government system where the Chairman of KSDLWS is the state health minister and the Additional Director is a member of the Karnataka State Administrative Department (Sudha Bhat, 2011).

Currently, the society manages about 14 district drug warehouses (approx. one warehouse for every two districts) as depicted in Fig.6 and the state government is taking an initiative to set up drug warehouses for every district. The warehouse is staffed by 1 in-charge, 1 chief pharmacist, 2 junior pharmacists, 1 data operator and 2 attendees. An electronic based Drug Management Information System operates in the headquarters and at the district drug warehouses, but does not extend up to the level of healthcare facilities. With the advent of NRHM programs that were implemented in 2005 and e-procurement and electronic drug management information access to essential medicines at the public health facilities have improved drastically, although there are reports of stock outs and increased out of pocket expenditure from the patient side. Hence, the electronic based drug supply chain system in Karnataka is still in its nascent stage, where major functionalities and transactions are manually done with cumbersome paper based proceedings (National Rural Health Mission, 2011).

KDLWS supplies medicines that are listed in the Essential Drug List (EDL). The Annual turnover for the year 2012 was around 120 crore rupees and escalated up to 140 crore rupees in 2013. Drugs are dispensed free of cost in all public health facilities.



Fig. 6: 14 Drug warehouses located in various Districts of the State

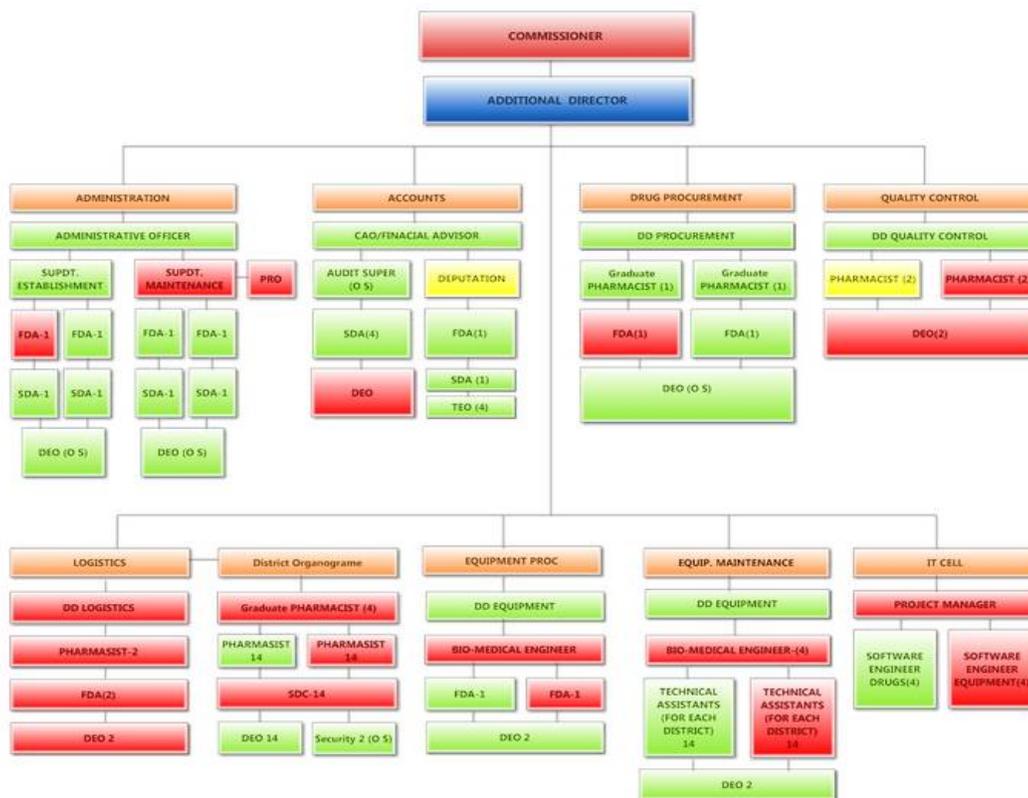
STRUCTURE OF THE ORGANIZATION⁷

Fig. 7: Administrative Structure of KDLWS

OBJECTIVES OF KARNATAKA STATE DRUGS LOGISTICS AND WAREHOUSING SOCIETY (KDLWS)

KDLWS was formed akin to TNMSC model and their main objectives are as stated below(KarHFW) –

1. Implementation of logistic drug and warehouse management system with IT infrastructure to assure availability of ensured quality of drugs at all levels of healthcare services with rational usage with due monitoring.
2. Implementation of a concrete centralized system for procurement and distribution of drugs in the department of health and family welfare.
3. Execution of a stakeholder friendly system to assess qualitative and quantitative requirements of the end users to avoid scarcity and loss.
4. Optimized economic expenditure on drugs, chemical another miscellaneous items through pooled procurement set up.
5. Accountability optimization at all levels of public health care services.
6. Provision of training of functionaries in computer skills, scientific warehouse and logistics management and through regular periodicals for human resource development.
7. Establishing district warehouses in every district and facilitating them with required infrastructure for scientific management of inventories.
8. Introduction of e-governance and management through complete computerization.
9. Initiate various studies, research and other necessary incidental studies.
10. Provision of Quality ensured an environment for material management and operations in the system until the end users.

⁷Source: KSDLWS, http://www.kdlws.kar.nic.in/organisation_struc.html.

11. Periodical monitoring of drug and therapy related statistics with necessary follow up action.
12. Maintenance of all accounts, expenditure and transactions within the project to sustain transparency and accountability.
13. Formulation, promotion, implementation, development, maintenance, operation, construction, erection, building, remodeling, execution, improvisation, administration, control and management of drug warehouses, offices of the Drug logistic management center, accommodation for staffs, etc., up gradation, renovation of the existing structures and buildings from the funding received by State/ Central government or foreign funding agencies for effective and efficient implementation of drugs logistics and warehousing project.

DRAWBACKS IN THE CURRENT SYSTEM OF DRUG PROCUREMENT AND DISTRIBUTION IN THE STATE OF KARNATAKA

Even though the Karnataka's Department of Health and Family Welfare – Karnataka State Logistics and Warehousing Society has drifted the system from rate contract to e-procurement in order to ensure complete transparency and better visibility in the system management through electronic mode, there are a lot of shortcomings in its functionalities.

With the recurring shortage of drugs across various primary health centers in the state, the patients are enforced to purchase drugs from the private pharmacies. The medical professionals working in public health institutions censure the procedure for drug procurement, as it is a lengthy process resulting in shortage of drugs and other medical essentials. Most predominantly the shortage of drugs and other essentials are a huge crisis in primary health centers that function on 24-hours bases and paucity of medicines at the end of each year has been persisting over a long period of time in PHC that which are in remote locations further from the nearest drug warehouse. This problem is not much severe in urban cities like Bengaluru, Mysuru etc...as other government and private health institutions caters to the needs of patients. On a broad scale the drawbacks can be summarized as follows –

Inaccurate Supply Planning – Imprecise supply of requirements and complex budgeting and approval procedures where there is a mismatch between the budget cycle and the funding cycle. Because of which the timing does not match the resupply needs and there is a cut in the mid-term budget.

Slow-paced purchasing activity – Slow processing of documents like contract planning, procurement scheduling, bidding schedules, decision making etc. directly reduces the efficiency of the system. Uncertainty over dates and availability of funds, shortage of raw materials, distributor issues, shipping problems, delayed or failed post testing and inspection adds more misery to the existing system.

Fragmented approach – Conceptualization and planning of all the programs is centralized and the exclusive, real-time and specific needs are not taken into consideration.

Diminishing accessibility, acceptability and utilization of programs – Mainly due to the set of the infrastructure by the government is completely based on population norms and habitation is neglected.

Poor system of drug quantification – A push-pull system is followed in system where drugs are sent according to the previous year indent. There are evidence of stock-outs at both healthcare centers and drug warehouses. Quantification of drugs at the health centers are completely based on the previous year's consumption rate and estimates by the senior staffs and the pharmacists ignoring the practice of scientific methods and stock-out periods.

Timely access to resources – The current system is ignorant to timely delivery of drugs and other essentials as per the requirement.

Lack of Computerization-Poor MIS (Management Information System); Lack of coordination in terms of information sharing, data management, proper monitoring and evaluation of information record systems. Even though the existing system has an electronic drug distribution management system with features like indent, order, passbook, stock balance, stock use etc. the software updating is not done on a regular bases.

Ever drifting gap between the actual demand and the supply of resources – The supply of resources like drugs, medicines, human resources etc. are done without considering the actual local demands.

Uncertainty of quality – Even though there is an execution of infrastructure and various programs, but the quality of service is always compromised.

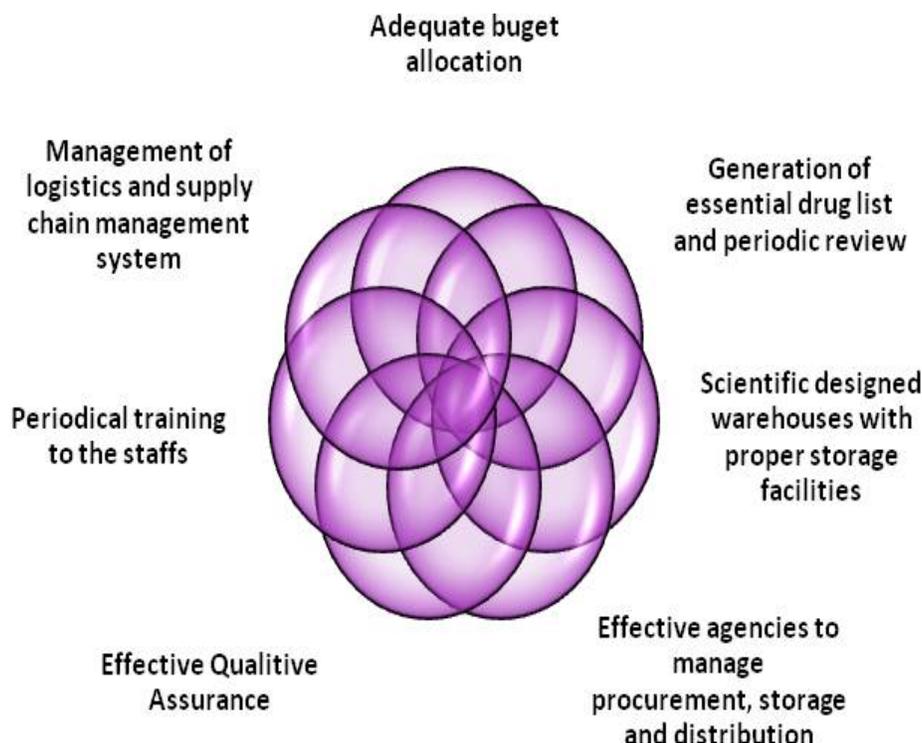
Lack of rational utilization of Drugs – The system is deficient in monitoring the rate of drug usage and inappropriate practices of medicine for example excessive use of injections, overuse of antibiotics etc.

Cumbersome Manual work – In spite of systematic approach in administration and maintenance, all jobs are manually done (paperwork). Absence of automation and computerization led to error prone situation and mismanagement; resulting in un-scientific utilization of resources.

CONCLUSION

This study gives an overview of various lacunae in the current system of drug procurement and the supply chain system in the state of Karnataka, which results in insufficient availability of drugs in the public health facilities. Major problems that are plaguing the system are lack of visibility and transparency, constant monitoring of various procurement activities, deficiency of computerization, under developed Management Information System (MIS) and faulty assessment of the real time need. In order to cater to these problems, there is a critical need for overhauling the existing system. Understanding the positive experience and development of TNMSC for their efficient procurement and supply chain management system, some of the key aspects need to be incorporated to achieve availability and affordability of drugs and judicious use of the limited resources.

Key Aspects for an Efficient, Robust and Self-sustaining Medicine supply chain system are –



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