Original research

A cross-sectional survey of the models in Bihar and Tamil Nadu, India for pooled procurement of medicines

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ABSTRACT

Background: In India, access to medicine in the public sector is significantly affected by the efficiency of the drug procurement system and allied processes and policies. This study was conducted in two socioeconomically different states: Bihar and Tamil Nadu. Both have a pooled procurement system for drugs but follow different models. In Bihar, the volumes of medicines required are pooled at the state level and rate contracted (an open tender process invites bidders to quote for the lowest rate for the list of medicines), while actual invoicing and payment are done at district level. In Tamil Nadu, medicine quantities are also pooled at state level but payments are also processed at state level upon receipt of laboratory quality-assurance reports on the medicines.

Methods: In this cross-sectional survey, a range of financial and non-financial data related to procurement and distribution of medicine, such as budget documents, annual reports, tender documents, details of orders issued, passbook details and policy and guidelines for procurement were analysed. In addition, a so-called ABC analysis of the procurement data was done to to identify high-value medicines.

Results: It was observed that Tamil Nadu had suppliers for 100% of the drugs on their procurement list at the end of the procurement processes in 2006, 2007 and 2008, whereas Bihar's procurement agency was only able to get suppliers for 56%, 59% and 38% of drugs during the same period. Further, it was observed that Bihar's system was fuelling irrational procurement; for example, fluconazole (antifungal) alone was consuming 23.4% of the state's drug budget and was being procured by around 34% of the districts during 2008–2009. Also, the ratios of procurement prices for Bihar compared with Tamil Nadu were in the range of 1.01 to 22.50. For 50% of the analysed drugs, the price ratio was more than 2, that is, Bihar's procurement system was procuring the same medicines at more than twice the prices paid by Tamil Nadu.

Conclusion: Centralized, automated pooled procurement models like that of Tamil Nadu are key to achieving the best procurement prices and highest possible access to medicines.

Key words: Access to medicines, medicine availability, medicine prices, pooled procurement

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INTRODUCTION

The *World Health Report 2000* defines three intrinsic goals of the health system – to improve health, to be responsive to the legitimate demands of the population, and to ensure that no one is at risk of serious financial losses because of ill health.[1] Inequities in access to medicines reflect failures in health systems and medicines policy. Around 90% of the global burden of disease is in low- and middle-income countries,[2] whereas their global share in health-care expenditure is only 10%.[3] Furthermore, the pattern of expenditure on pharmaceuticals is skewed towards high-income countries; they account for 78.5% of global pharmaceutical expenditure, whereas low- and middle-income countries account for only 11.3%. In 2011,

the per capita pharmaceutical expenditure in high-income countries was US$ 431.6 compared with US$ 7.61 in low- and middle-income countries. Pharmaceutical expenditure has been reported to be positively correlated with health-care utilization.[5–7]

One of the key barriers to access to medicines is price, which is an outcome of competition in the pharmaceutical industry, innovation and brand loyalty.[8–10] Other factors include the disease profile of the country, the systems of delivery of health-care services, and consumer-related factors.[11] In addition, an inefficient procurement system and suboptimal processes and policies, such as lack of a standard bidding document, delays in awarding contracts, irregularity in supplier selection, procurement at higher rates, delay in supply, non-utilization of products, poor quality of products and underutilization of funds,[12] also lead to poor access to medicines. India ranks third globally in terms of production of medicines, and 38% of the global population with no access to medicine lives in India.[4]

In India, procurement of medicines and medical supplies in the health system takes place at various levels, namely the national/federal level, state level, local government level and by autonomous bodies. In addition, medicines for national disease-control programmes, such as the Revised National Tuberculosis Control Programme, National AIDS Control Programme and others, are procured through a national procurement agency. Indian states procure medicines for their health systems through their own procurement agencies, although they may also receive funding from the national government. States such as Tamil Nadu, Kerala and now Rajasthan follow a so-called centralized procurement and decentralized distribution system, whereas several other states follow a decentralized procurement and distribution process, with an annual so-called rate contract, where bidders are invited to quote for the lowest rate for the list of medicines, through an open tender process. In some states, a central medical stores department procures medicines for the health system through an annual rate contract. The Chief Medical Officers or Medical Superintendents at the district level are empowered to place orders for required medicines with the rate-contracted supplier, for health facilities in their jurisdiction. They are also empowered to make payments through the general treasury within the limit of their budget, which is mostly on a pro rata basis. These models that have been adopted by the national and state governments are based on their requirements and administrative convenience.

However, these procurement agencies differ in many ways, such as in their governance structure, financial management, tender guidelines, distribution of drugs, preference for manufacturers. Also, there is limited evidence on the efficiency of pooled procurement at national level,[13] especially in terms of the impact of the procurement model on procurement prices and medicine availability at the facility level. In this context, this study was undertaken to measure the impact of two different procurement models on procurement prices and medicine availability at the facility level, and competition among the medicine suppliers.

METHODS

The selection of states in this study was purposively determined, based on need to capture the availability of essential medicines in different models of procurement as well as geographical, socioeconomic and cultural diversity. The study was conducted in two socioeconomically diverse states: Bihar and Tamil Nadu. Both states have a pooled procurement system but follow different models. Bihar uses a so-called cash and carry model, where the volumes of medicines required are pooled at the state level and rate-contracted, while actual invoicing and payment is done at the district level. In Tamil Nadu, medicine quantities are pooled at the state level, as in Bihar, but payments are processed at state level upon receipt of laboratory quality-assurance reports on the medicines. The drug distribution is then carried out through a value-based passbook issued to each health facility. A comparative assessment was conducted between the models in Tamil Nadu and Bihar.

To capture the diversity at the district level, 17 districts from Bihar and 18 districts from Tamil Nadu were selected. Districts were selected using a combination of economic and geographical criteria. Data from the *Economic Survey 2008– 2009*[14] and the Department of Economics and Statistics, 2006– 2007,[15] for Bihar and Tamil Nadu, respectively, were used for ranking the districts as economically rich, moderate or poor. This selection was also adjusted to geographical criteria by mapping the districts on a political map to capture the specific geographical representation from each state.

Thirty health facilities were selected from the study districts of each state for primary data collection. In Bihar, the 30 health facilities were located in 17 of the 38 districts; in Tamil Nadu, the facilities were in 18 of the 32 districts. The selected health facilities are first-level referral units (called referral hospitals in Bihar and upgraded primary health care [PHC] facilites in Tamil Nadu) that are essentially 30-bed hospitals catering for a population of about 100 000. First-level referral units were chosen for the survey since a substantial volume of drugs is dispensed from these facilities. Furthermore, the selection of health facilities in each district was based on the size of the district and distance from district headquarters; at least one health facility located closest to the district headquarters was selected from each district and more than one facility was selected from larger districts. The proportion of selected facilities across Tamil Nadu and Bihar was 14% and 43%, respectively. The significantly higher number of upgraded PHCs in Tamil Nadu than in Bihar resulted in selection of a lower proportion of facilities in Tamil Nadu.

In addition, a range of financial and non-financial data related to procurement and distribution of medicine were obtained from state government authorities, in the form of budget documents, annual reports, tender documents, orders, issue details, passbook details, policy and guidelines for procurement. Another set of data used for the purpose of financial analysis is state-level budget documents providing details on financial allocation for medicine. In addition, published literature on the

official website of the medicine procurement department of the respective state governments was downloaded, to collect information relating to tender documents, prices, procurement policy and guidelines.

Furthermore, a so-called ABC analysis was undertaken to identify high-value medicines in the procurement systems. ABC analysis reveals which drug items account for the greatest proportion of the budget. The monetary value of consumption is calculated by multiplying the unit cost by the number of units consumed for all drugs, from which the percentage of total consumption for each medicine is calculated. This is compared with the cumulative percentage value of the total value for each medicine. Medicines are then categorized as A: the few medicines that account for 75–80% of the total value; B: the medicines that account for the next 15–20% of value; and C: the bulk of medicines that only account for the remaining 5–10% of value.[16] The common medicines were further analysed for prices and competitiveness of the procurement model. Price comparison was also done between the prices of the medical service corporations and the lowest and highest market prices for individual drugs, using the 2008 *Monthly Index of Medical Specialities*.[17] The same data set was also used to estimate the number of bidders in medical service corporations, as compared to private retail market suppliers.

The primary survey across health facilities in Tamil Nadu and Bihar was conducted between August 2009 and March 2010. The study protocol was approved by the ethics committee of the Public Health Foundation of India.

RESULTS

India's health system is characterized by significant diversity, as states within the country are constitutionally provided with the mandate of delivering health-care services. However, there are wide variations between the states and its health systems, as seen from Table 1, which compares Tamil Nadu and Bihar, the two states in this study.

In terms of health indicators and health outcomes, Tamil Nadu is one of the best-performing states in India, largely due to a well-developed health system, whereas Bihar's performance has been relatively poor. The Human Development Index (HDI) is a composite indicator of literacy, life expectancy and per capita income; the Government of India's *National Human Development Report* of 2002 reported that HDI had increased for Bihar, as for the rest of India, but at 0.367 was still lower than the Indian average of 0.472.[20] By contrast, Tamil Nadu was among the top few states in terms of the HDI, with 0.531 points in 2001.[20] The stark contrasts between these two states are visible in every available indicator. In 2007, institutional deliveries in Bihar were low at 22% compared to 90% for Tamil Nadu.[21] Similarly, immunization rates in Tamil Nadu were around 80%, against Bihar's 33%.[21] The other health outcome indicators, namely infant and maternal mortality, point to similar trends.[21]

Table 1: Health systems in the states of Bihar and Tamil Nadu		
Demographic indicators[18]	**Bihar**	**Tamil Nadu**
Total population (Census 2001), millions	828.8	624.1
Maternal mortality rate per 100 000 live births	312	111
Infant mortality rate per 1000 live births	56	31
Crude birth rate per 1000 population	28.9	16.0
Crude death rate per 1000 population	8.8	7.4
Health infrastructure[19]		
Subcentres	8858	8706
Primary health centres	1641	1215
Community health centres	70	206
Doctors at primary health centres	1565	2260
Pharmacists	439	1349

Landscaping of procurement models

The pooled procurement models of both Tamil Nadu and Bihar follow a two-bid system (technical bid and commercial bid) for tendering once a year, but their governance and organizational structures are significantly different. The Tamil Nadu procurement agency is known as the Tamil Nadu Medical Services Corporation (TNMSC), which is an autonomous agency that functions through the Tamil Nadu Transparency in Tenders Act, 1998.[22] The Act and associated rules provide details on the methods of tendering, the publicity requirements, technical specifications (information on the product quality, packaging and manufacturing practices), commercial conditions (information on product prices, inclusive of taxes, logistics and material cost), evaluation criteria, place and time for receipt of tenders, minimum time for submission of bids, time/place of opening of bids, time to be taken for evaluation and extension of tender validity, determination of the lowest evaluated price, and preparation of the evaluation report and award of tenders.

In Bihar, the State Health Society, a state-level agency guided by the principles of the centrally-funded National Rural Health Mission (NRHM), functions as the procurement agency. Under the State Health Society, the Directorate of Health Services oversees the entire procurement process and follows procedures laid down in the Bihar Finance (Amendment) Rules 2005.[23] These rules clearly define the entire procurement process. However, the tender lacks information on criteria for technical and commercial bids, especially on the quantity to be supplied, transportation cost, order period and schedule.

Both Tamil Nadu and Bihar follow a two-bid system – technical tenders and commercial tenders are separate. However, the processes followed for bid opening and supplier finalization differ. In Tamil Nadu, the committee of state representatives first opens the technical bid; if the technical bid is successful, the commercial bid is then opened, but the rest are not considered. The entire process is transparent, as all the successful bidders are invited to participate in the tender-opening process, to share their price information and to identify the lowest bidder (L1). The L1 rates are announced on the day of bid opening, physically as well as electronically. In Bihar, on the other hand, there is a special committee called the Project Appraisal Committee, which includes a representative from each pharmaceutical company with a successful technical bid and undertakes a process similar to Tamil Nadu for supplier finalization, but L1 rates are not announced on the same day. In the event of the lowest bidder being unable to provide an adequate supply of medicines for some reason, in Tamil Nadu, price negotiation takes place with the second-lowest supplier to supply at L1 rates, whereas in Bihar, price negotiations are conducted to secure a better price for tendered drugs.

The financing and distribution systems are also quite different for each state. In Tamil Nadu, TNMSC operates in an integrated manner, where the funds for drug procurement are deposited into a public account of TNMSC by each health facility. The health facility receives a passbook in return for the amount deposited, which is generally 90% of the facility drug budget. This allows the facility to pick up the drugs from the district warehouses every quarter without any financial transaction. Further, automation of the processes is a key attribute of TNMSC. For example, in automation of financial management, once the reports on receipt of a consignment and approved quality are received by TNMSC, electronic transfer of funds to the suppliers takes place by default. In addition, in Tamil Nadu, all financial transactions take place at the state level, including payment to the suppliers, whereas in Bihar, the drug-distribution system functions through a so-called push and pull mechanism. The pull mechanism is based on an innovative so-called cash and carry approach, where an

advance payment is made to the winning bidders for procuring drugs and they are required to to establish depots/warehouses in the state capital city, Patna, and other district headquarters for ensuring supplies across the state. The District Health Society, which receives funds from the State Health Society, makes advance payments for the medicine procurement. However, the payments have to be approved by the district magistrate and medical officer, resulting in delays that lead to shortages at facilities level. In addition, it was noticed that, in Bihar, there were multiple mechanisms for drug procurement at the district level, apart from cash and carry, which include buying drugs without quotations, instruction from the State Health Society for drug procurement, three quotations and open tender within thresholds defined by the Bihar Finance (Amendment) Rules, 2005,[23] or through order passed by the District Collector.

Efficiency of the centralized procurement model

As shown in Table 2, in terms of competitiveness, the TNMSC model is quite successful and is able to attract more suppliers than the Bihar model. The competitiveness is defined as the number of supplier's applications, successful tenders and products supplied to the facilities. The numbers of firms submitting bids in Bihar was low at 29, 25 and 31 tender applications for 89, 91 and 369 medicines during 2006, 2007 and 2008 respectively. However, during the same period in Tamil Nadu, the numbers of bidders were 135, 124 and 100 for 270, 271 and 252 drugs respectively, although it should be noted that in both states the numbers of bidders reduced for each year but the number of drugs per bidder increased.

It should also be noted that in Bihar, the number of products for which tender was invited increased between 2006 and 2008, from 89 to 369, an increase of over 300%. Similarly, the percentage of successful technical bids for year 2007–2008 in Bihar was 87%, compared with 65% in Tamil Nadu, but the percentage of successful commercial bids was only 70%, as compared to 100% for Tamil Nadu. Hence, in terms

Table 2: Competitiveness in the procurement system, Bihar and Tamil Nadu models						
Variable	**Bihar**			**Tamil Nadu**		
	2005–2006	**2006–2007**	**2007–2008**	**2005–2006**	**2006–2007**	**2007–2008**
Number of drugs tendered	89	91	369	270	271	252
Number of drugs with no bidder	39	37	NA	0	0	0
Number of firms submitting bids	29	25	31	135	124	100
Number of drugs per bidder	3.0	3.6	12	2	2.1	2.5
Number of successful technical bids	14	19	27	76	77	65
% of successful technical bids	48.2	76.0	87.1	56.3	62.1	65.0
Number of successful commercial bids	9	13	22	76	77	65
% of successful commercial bids	31.0	52.0	70.0	100[a]	100[a]	100[a]
Number of products selected	50	54	141	270	271	252
% of products selected	56.1	59.3	38.2	100[a]	100[a]	100[a]

[a] All payments are processed on receipt of a laboratory quality-assurance report, thus the figure is 100%.
NA – Not available

of competitiveness, this cannot be attributed as healthy competition because many products/drugs found no supplier in Bihar by the end of the procurement process. In the context of efficiency, TNMSC is very successful, as 100% of drugs on their procurement list had a supplier at the end of procurement process, while in Bihar only 56%, 59% and 38% of drugs on their list had a supplier by the end of procurement process in 2006, 2007 and 2008 respectively *(see Table 2)*.

Inefficiencies of the decentralized cash and carry procurement model

As shown in Table 3, decentralization of financial autonomy might fuel inefficiency in the procurement system. An ABC analysis[16] was performed and it was observed that 17 drugs accounted for 71% of state drug expenditure. Of these 17 drugs, nine were antibiotics, two were cough syrups and two were multivitamins. In 2008–2009, an antifungal drug fluconazole consumed 23.4% of the state drug expenditure and was procured by approximately 34% (13/38) of the districts. Similarly, the antibiotic azithromycin accounted for 5.6% of state drug expenditure and was procured by only two districts, norfloxacin consumed 1.4% of expenditure and was procured by four districts. In addition, around 57% of Bihar's drug

budget was spent on the procurement of non-rate-contracted drugs, which were not on the state's Essential Drug List.[24] These inefficiencies can be largely attributed to the decentralized procurement and distribution system followed in Bihar. It was not possible to perform similar district-wise analysis for Tamil Nadu, as the pooled procurement takes place at state level. However, ABC analysis of Tamil Nadu pooled-procurement data for 2007 highlighted that, of 20 drugs that accounted for around 80% of the state drug expenditure, 11 were antibiotics.

In terms of prices, both procurement systems, TNMSC and Bihar, were able to procure medicines at prices that were significantly lower that the retail market prices, with some exceptions. However, the prices at which TNMSC procured were significantly lower than the Bihar procurement prices. The prices of 15 medicines with comparable formula, pack size and strength across Tamil Nadu and Bihar were selected from a so-called basket of drugs list containing 22 drugs. It was observed that the ratio of prices in Bihar compared with Tamil Nadu was in range of 1.01 to 22.50. For example, the unit price of paracetamol syrup (60 mL bottle) was almost same for Bihar and Tamil Nadu *(see Table 4)*. However, chlorpheniramine tablets (4 mg) had the highest price ratio of 22.50 per unit purchase for Bihar (₹ 0.45), as compared to Tamil Nadu (₹ 0.02). For seven out of 14 medicines, the price ratio was more

Table 3: Drug expenditure on various medicines, Bihar, 2008–2009

Serial number	Name	Specification	Therapeutic category	Quantity	% of the overall procurement budget	Number of districts purchasing (*n* = 38)
1	Fluconazole	Tablet 150 mg	Antifungal	741 000	23.44	13
2	Anti-rabies vaccine	Vial 0.5 mL	Vaccine	465 342	14.95	38
3	Azithromycin	Tablet 250 mg	Antibiotic	706 000	5.57	2
4	Cough expectorant	100 mL pack	Respiratory system	2 835 606	4.38	36
5	Vitamin B complex	Syrup[a]	Vitamins	1 529 129	4.00	34
6	Ciprofloxacin (E) – tablet	Tablet 500 mg	Antibiotic	18 711 999	3.78	31
7	B complex	Tablet[a]	Vitamins	33 155 490	1.88	38
8	Ciprofloxacin + tinidazole	Tablet 500 mg + 600 mg	Antibiotic	6 401 935	1.86	22
9	Ciprofloxacin	Tablet 250 mg	Antibiotic	12 238 590	1.62	27
10	Norfloxacin	Tablet 800 mg	Antibiotic	240 000	1.41	4
11	Amoxicillin	Capsule 250 mg	Antibiotic	5 029 796	1.35	26
12	Cough sedative	Syrup 100 mL	Respiratory system	761 602	1.27	17
13	Oral rehydration salt (ORS)	20.5 g	Alimentary system	3 282 900	1.15	26
14	Erythromycin	Tablet 500 mg	Antibiotic	3 186 700	1.14	19
15	Pantoprazole	Tablet 40 mg	Antiemetic	177 387	1.10	3
16	Ampicillin	Capsule 500 mg	Antibiotic	2 141 700	1.08	6
17	Metronidazole	Tablet 400 mg	Antibiotic	17 093 320	1.06	37

[a]Data not provided on pack size/dose.

Table 4: Price per unit of drug procurement in Tamil Nadu, Bihar and retail market, 2008–2009				
Name of drug	Bihar (₹)	Tamil Nadu (₹)	Ratio	Retail market prices range17 (₹)
Albendazole tablet (400 mg)	0.94	0.49	1.91	0.75–1.48
Amoxicillin capsule (250 mg)	1.59	0.71	2.24	3.1–4.5
Chlorpheniramine maleate tablet (4 mg)	0.45	0.02	22.50	NAa
Ciprofloxacin tablet (500 mg)	1.20	0.97	1.24	3.9–9.5
Cough syrup (50 mL bottle)	9.16	3.36	2.73	NAa
Diclofenac sodium tablet (500 mg)	0.21	0.12	1.75	1–2.3
Gentamicin eye/ear drops (5 mL)	4.02	0.02	1.61	NAa
Metronidazole tablet (400 mg)b	0.19	0.14	1.36	0.35–3.6
Paracetamol syrup 125 mg/5 mL (60 mL bottle)	4.65	4.59	1.01	NAa
Ranitidine tablet (150 mg)	0.37	0.18	2.06	0.42–0.57
Salbutamol tablet (4 mg)	0.18	0.04	4.50	0.16–0.28
Erythromycin stearate tablet (250 mg)	1.09	0.66	1.65	2.3–3.5
Co-trimoxazole tablet (80 mg trimethoprim + 400 mg sulfamethoxazole)	0.80	0.18	4.44	0.59–0.89
Calcium lactate tablet (300 mg)	0.40	0.06	6.67	NAa

[a]NA reflects non-availability of similar formulation in the retail market.
[b]200 mg tab in Tamil Nadu.

than 2, that is, the Bihar procurement system was purchasing the same medicines at twice the prices paid by TNMSC. Also, in some instances, Bihar procured medicines at a price that was higher than the lowest retail price. For example, albendazole tablets and salbutamol tablets were procured at higher prices than the lowest retail prices that is, (₹ 0.94 and ₹ 0.18 per unit procurement prices compared with a retail price of ₹ 0.75 and ₹ 0.16 for albendazole and salbutamol, respectively).

DISCUSSION

It is pertinent to point out that the efficiency of any procurement system depends on how well the individual functions of financing, regulation, tendering and stakeholder involvement are performed. This study observed that the TNMSC model is a good example of how clear rules and regulations, along with clearly outlined processes for implementation, can help in attainment of a high level of transparency and accountability.[25,26] In terms of governance, TNMSC has been established as an autonomous agency, through the *Tamil Nadu Transparency in Tenders Act, 1998*,[22] which has resulted in seamless implementation of policy guidance and trust between the state and the procurement agency. However, the Bihar procurement agency follows the guiding principles laid down by the federal government, as it receives funding from the federal government to procure medicines through its flagship programme, National Rural Health Mission (NRHM). The implementation of NRHM is largely decentralized through the State and District Health Societies, which sometimes results in inefficiencies in procurement, resulting from an absence of economies of scale and lack of regulatory control.

In addition, it was observed that the TNMSC tender documents were explicit and detailed, running into hundreds of pages itemizing each step of the procurement processes, which has resulted in efficient implementation and has significant bearing on attracting bidders. Further, this positive effect of attracting a high number of bidders has positive effects in terms of enhancing competition and efficiency. It was further observed that the integrated nature of the procurement and financing function in TNMSC has also contributed to lower prices. Since the suppliers are aware of the entire process, responsibilities and expected timelines, including supply costs and payment schedules, there is a high number of bidders, with the benefit that lower prices are quoted.

This observation is also reinforced by the fact that multistakeholders' engagement in the TNMSC procurement system strengthens its implementation and builds confidence in the process. One of the key features of TNMSC is that the opening of the bids for rate finalization takes place in the presence of all the successful tender applicants. This has significantly increased the transparency of and confidence in the system. This confidence in the system, along with assured timeliness of payments, has positively influenced the behaviour of suppliers, which has resulted in regular supply of drugs at the facilities, hence increasing the availability of drugs to the end users. It also is evident from the analysis of tender documents *(see Table 2)* that transparency in the process results in high levels of competition and does have an effect on the prices and availability of drugs.[16] It is also reported that although the TNMSC system may not always provide a level playing field to all the suppliers, the competition among suppliers has brought down the procurement prices of the drugs.[8]

However, in Bihar's cash and carry model, because of decentralized payment structures and uncertainty in payment schedules, the bidders tend to quote higher prices for drugs on tender. Similar observations have emerged from analysis of private-sector drug prices, where assumed delays in payments have contributed to higher drug prices.[27] Further, as observed in the Bihar model, rate contracting and decentralized financing were fuelling inefficient procurement for certain classes of drugs in specific districts, leading to high expenditure *(see Table 3)*. Further, it is important to understand that the procurement models and processes may need some time to mature and generate desired results. As seen in the Bihar model, the procurement system and processes have refined significantly over the last few years. This has led to an increase in the number of supplier applications and increased proportions of successful tenders. However, the procurement records are still maintained manually, leading to inefficiency in forecasting, distribution and consumption of supplies.

Although there is limited evidence from this study of the direct effect of competition on drug prices in the public health system, it is evident that centralized pooled procurement enhances the opportunity for monitoring drug consumption, prescription practices and promotion of rational drug use. Some other examples of pooled procurement worth mentioning are global health initiatives such as the Global Fund for AIDS Tuberculosis and Malaria (GFATM),[28] Green Light Committee,[29] and the Clinton Health Access Initiative.[16] Many states of the United States of America also use pooled procurement, along with price negotiation, as part of their medicine-purchase strategy.[30,31] Even though there is lack of conclusive evidence of the effect of pooling on prices,[32] evidence suggests a positive effect of pooled procurement in fostering competition and ensuring better quality and compliance of supply. These eventually translate into reduced prices of drugs, which increase the efficiency of a health system, leading to increased access to medicine through the public health system.[32–34]

One of the limitations of this study is the lack of estimates of medicine procurement and consumption from tertiary care facilities such as district hospitals and medical college hospitals, which represent medical specialties such as cardiology, neurology, surgery, gynaecology, paediatrics, oncology and others. In both Tamil Nadu and Bihar, the procurement of specialty medicines is dealt with separately. In Bihar, medical colleges procure medicines independently of the district procurement system, and in Tamil Nadu, although the specialty medicines are procured by TNMSC, there is a separate budget for them. Also, although this study conducted an extensive survey of primary-level facilities, it was not possible to estimate facility-level medicine expenditure and consumption, owing to lack of facility-level financial data.

Conclusion

Based on findings of this study, it can be reasonably concluded that while adequate funds for drug procurement are essential, a concomitant reliable and efficient procurement and distribution system is essential for timely and uninterrupted medicine delivery at the facility level. Further, a centralized pooled procurement and decentralized distribution system such as TNMSC can ensure efficient utilization of the financial resources available for procurement, through ensuring a transparency and accountability in the procurement system. A procurement system like TNMSC also helps in achieving good value for money for the government. In addition, through multistakeholder engagement and a transparent process, it ensures trust and confidence in the system, which ultimately translates into an increased number of bidders, increased competition among suppliers and lower purchase prices for medicines for the government.

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