RESEARCH ARTICLE

A preliminary assessment of availability and pricing of children’s medicines in government hospitals and private retail pharmacies in a district of West Bengal in India

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ABSTRACT

Background: A lack of availability of suitable pediatric formulation and high price are often the major hindrance to the better access of the essential treatment to the children. In the backdrop of paucity of literature addressing this problem in India and in particular West Bengal, the present work was planned. Aim and Objectives: This study has been a maiden approach to generate data regarding this issue in small scale and in an inexpensive way after conducting a survey in different government and private facilities in a district of West Bengal, India. Materials and Methods: This cross-sectional study used “WHO Children’s Medicines Survey Form” to make a rapid assessment of availability and pricing of 20 core children’s medicine formulations among ten government hospitals and nine private retail pharmacies in the district of Burdwan in West Bengal during September-October 2009. In retail pharmacies, the actual price to the patient of the cheapest brand was documented. In public health facilities, procurement prices for medicines were obtained from state government’s Central Medical Stores (CMS) listing. Results: Overall, the availability was sub-optimal in all levels of public health facilities-30% in medical college pharmacy, 33% in the district reserve stores, 33.75% in sub-divisional hospitals, 32.25% in primary health centers, and in retail pharmacies was only 45%. Out of the 20 formulations, only two (ORS, paracetamol) were available in all the public and private retail pharmacies. Availability of anti-infectives was better than other medicines in both types of facilities. The variation of prices among different brands was wide. The cost of even the cheapest brand was much higher than corresponding government procurement price. Conclusion: This maiden effort reveals sub-optimal availability of core essential medicines for children in both public facilities and private retail pharmacies. However, medicines available in private pharmacies were much costlier compared to CMS procurement price. This is a matter of concern. A larger nation-wide study is the need of the hour with a greater focus on affordability and prescribing behavior.

KEY WORDS: Survey; Availability; Affordability; Children’s Medicines; Pricing; Access

INTRODUCTION

Around 5 million children of under five age group died in the world in 2020, translating into 13800 under five children’s death per day which was fairly high and large number of those deaths were preventable. Globally, under five mortality rate declined by; 61% from 93 deaths per 1000 live births in 1990...
to 37 in 2020. Similarly, infant mortality rate reduced in India from 47.3 per 1000 live births in 2009 to 28.3 in 2019. Despite this considerable progress, improving child survival remains a matter of urgent concern. Diarrhea, acute respiratory tract infection, malnutrition, anemia, measles have been the major causes of childhood mortality in India. With 32 infant deaths per 1,000 live births in rural areas, India is placed in between the countries with the highest and the lowest infant mortality rate. The decrease exemplifies an increase in medical care and hygiene, as well as a decrease in female infanticide; still rural areas have relatively less access to medical care, medicines and hygiene than the cities.

The message of hope in this challenging scenario is that a vast majority of children can be saved through a combination of good care, nutrition, improved basic sanitation and medical treatment. However, access to pediatric medicine in suitable pediatric dosage form and formulation is a matter of global concern today. Even when a medicine is available, the cost to the patients or their families may make it unaffordable, as the pediatric formulations are costlier than the adult equivalents in some occasions (e.g. antiretroviral drugs, metered dose inhaler). Very often the adult sized medicine is divided into parts to serve a pediatric patient. This practice seems to be irrational and unscientific because the children are not the miniature adults. The detailed information about the prices of medicines should be in hand to recommend appropriate policy and intervention to improve access and availability. Recognizing access to suitable pediatric medicine a major health issue, in May 2007 the World Health Assembly passed resolution WHA 60.20 identifying it as a key step for ensuring better health. However, very few initiatives have been taken till date to generate adequate data regarding the availability and pricing of children medicine in India including an earlier published study by the same author group and others. This study has been a maiden approach to generate data regarding this issue in small scale and in an inexpensive way after conducting a survey in different government and private facilities in a district of West Bengal, India.

MATERIALS AND METHODS

As no patient data were used in this study and as it was only a survey on medicines availability and price, no ethical dilemma was there but, written permission was obtained from local health authority (from Chief Medical Officer of Health of the district) before conducting the survey.

This was a cross-sectional study conducted in the month of September-October 2009 in the district of Burdwan in West Bengal. Data collection form was “WHO Children’s Medicines Survey Form” after a little modification. Duration of study was 2 months. The form was collected from WHO South-East Asia regional Office, New Delhi. There were 20 core children’s medicines in the list. The availability and pricing of 20 core children’s medicines were assessed in the survey. All of these 20 core medicines were in WHO Model List of Essential Medicines for Children, Oct 2007 and 15 of them were included in National Essential Medicine List of India 2003. For data collection in this survey, the WHO/ HAI methodology was followed after due modification. Altogether ten public facilities were selected for convenience of sampling. At the same time, the data were collected from total nine private retail pharmacies nearest to the respective public facilities. Three medically qualified persons acted as data collectors in this survey. They collected data from a tertiary care hospital, district reserve store (DRS), four sub divisional hospitals, four block primary health centers (BPHC) or primary health centers, (PHC) and nine private retail pharmacies. The medicines which were present in the facilities on the day of survey were documented as “available.” The medicines presented in alternate pediatric dosage form or formulations were also regarded as “available.” In public facilities, the procurement prices of government were collected from State Government’s Central Medical Store listing. In private retail pharmacies, the actual price to the patient of cheapest brands available was documented.

Study Parameters

The data were analyzed to derive the following parameters

1. Availability of medicines in public and private facilities
2. Comparison of availability among different levels of govt. and private facilities
3. Availability of medicines included in National Essential Medicine List of India 2003
4. Availability of treatment of some common pediatric illness (with the drugs included in the list)
5. Comparison between procurement price of Govt. and cheapest brand in private retail pharmacies
6. Comparison of pricing in different private facilities.

Statistical Analysis

Statistical analysis was descriptive only. Data were expressed in percentage or ratio while depicting the study parameters. Simple mathematical calculations were performed using calculator.

RESULTS

Availability of Medicines in Public and Private Facilities

The data regarding the availability of medicines are summarized in Table 1. It only reflects the picture of availability at the day of data collection. Anti-tubercular medicines (rifampicin+isoniazid) were being supplied free to the patients in public facilities through a special national program in India. These medicines were not stored in general pharmacies of the public facilities and thus considered as NA (not applicable) as were not available in the general medicine store on the day of survey. Vitamin A, zinc were not available
in the mentioned formulations in any of the retail pharmacies. Instead combination formulation containing vitamin A along with other vitamins and micronutrients were found and thus were not considered as “available”. In case of nonavailability of the mentioned formulations, other alternate pediatric formulations if found, were considered “available.”

### Comparison of Availability among Different Levels of Govt. and Private Facilities

The data regarding the availability of medicines among different levels of government and private facilities are depicted in Figure 1. Percentage had been calculated between the number of survey-medicines available divided by total number of survey medicines (present in the form) and then multiplied by 100. The availability pattern of medicines in different levels of public facilities is more or less same. As high as ten formulations, that is, 50% of the basket of medicines was not available in any of the ten public facilities surveyed, while six out of the 20 core medicines, that is, 30% were not available in any private pharmacy.

### Availability of Medicines Included in National Essential Medicine List of India 2003

There are fifteen such medicines in the list that were included in Essential Medicine List of India 2003. The availability of such medicines is separately displayed in Table 2.

### Availability of Treatment of Some Common Pediatric Illness (with the Drugs Included in the List)

An exercise was done to find out the availability of the enlisted drugs for the treatment of some common pediatric illness. In acute respiratory infection availability of any of the three antibacterial medicines (amoxicillin, ceftriaxone, and cotrimoxazole) was considered. In bacterial meningitis, availability of ceftriaxone was considered which was not available in 20% of public facilities. The drugs meant for the treatment of acute respiratory tract infection and diarrhea were available in all public and private facilities but drugs enlisted for the treatment of chronic childhood bronchial asthma were not available in any public facility. Drug for the treatment of iron deficiency anemia was available in 11.11% of private facilities and in 60% of public facilities [Figure 2].

### Comparison between Procurement Price of Government and Price of the Cheapest Brand

A wide variability of price was seen among different brands of medicines in private retail pharmacies. The cost of the cheapest brand available in the retail pharmacies and the procurement price of government for the same medicine had been compared [Table 3]. The price comparison of medicines was done only for those items that those available in all or most of the government and private facilities. Among the eight medicines in the table, in all cases the procurement price of government was much lower than lowest price in retail pharmacies. The price in retail

### Table 1: Availability of medicines in public and private facilities

<table>
<thead>
<tr>
<th>Medicines</th>
<th>Availability in public facilities (n=10)</th>
<th>Availability in private facilities (n=9) (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Aciclovir suspension 200 mg/5 ml (125 ml)</td>
<td>nil</td>
<td>44.44</td>
</tr>
<tr>
<td>2. Amoxicillin suspension 125 mg/5 ml (100 ml)</td>
<td>80%</td>
<td>100</td>
</tr>
<tr>
<td>3. Amoxicillin/clavulanic acid suspension 125 mg + 31.25 mg/5 ml (100 ml)</td>
<td>nil</td>
<td>100</td>
</tr>
<tr>
<td>4. Artemether+Lumefantrine tablet 20 mg + 120 mg (16 tablets)</td>
<td>nil</td>
<td>nil</td>
</tr>
<tr>
<td>5. Beclomethasone inhaler 50 mcg/dose (200 doses)</td>
<td>nil</td>
<td>44.44</td>
</tr>
<tr>
<td>6. Carbamazepine suspension 100 mg/5 ml (100 ml)</td>
<td>nil</td>
<td>55.55</td>
</tr>
<tr>
<td>7. Ceftriaxone injection 1 gram (vial)</td>
<td>80%</td>
<td>100</td>
</tr>
<tr>
<td>8. Cotrimoxazole suspension 200 mg + 40 mg/5 ml (100 ml)</td>
<td>100%</td>
<td>88.88</td>
</tr>
<tr>
<td>9. Ferrous salt suspension 30 mg/ml (250 ml)</td>
<td>60%</td>
<td>11.11</td>
</tr>
<tr>
<td>10. Isoniazid tablet 50 mg (1000 tablets)</td>
<td>NA</td>
<td>11.11</td>
</tr>
<tr>
<td>11. Mebendazole tablet 100 mg (6 tablets)</td>
<td>40%</td>
<td>22.22</td>
</tr>
<tr>
<td>12. Mebendazole syrup</td>
<td>nil</td>
<td>44.44</td>
</tr>
<tr>
<td>13. Nevirapine syrup 50 mg/5 ml (100 ml)</td>
<td>nil</td>
<td>nil</td>
</tr>
<tr>
<td>14. Nystatin drop 100,000 IU/ml (30 ml)</td>
<td>nil</td>
<td>nil</td>
</tr>
<tr>
<td>15. ORS packet Packet to make 500 ml or 1 litre of solution</td>
<td>100%</td>
<td>100</td>
</tr>
<tr>
<td>16. Paracetamol syrup 120 mg/5 ml (100 ml)</td>
<td>100%</td>
<td>100</td>
</tr>
<tr>
<td>17. Rifampin+Isoniazid tablet 60 mg + 30 mg (1000 tablets)</td>
<td>NA</td>
<td>nil</td>
</tr>
<tr>
<td>18. Salbutamol inhaler (100mcg/dos) 200 doses</td>
<td>nil</td>
<td>88.88</td>
</tr>
<tr>
<td>19. Vitamin A capsules 100,000 IU (30 mg) (1000 caps)</td>
<td>60%</td>
<td>nil</td>
</tr>
<tr>
<td>20. Zinc dispersible tablet 20 mg dispersible (100 tablets)</td>
<td>40%</td>
<td>nil</td>
</tr>
</tbody>
</table>

Percentage has been taken on total number of public and private facilities included. NA-Not applicable
pharmacies were more than 7 times higher than government procurement price in case of acyclovir dispersible tablets and mebendazole chewable tablets and over 4 times higher in case of ORS packet and ferrous salt suspension [Table 3].

Comparison of Pricing in Different Private Facilities

The price of the cheapest as well as costliest brands of an enlisted medicine was documented in all private retail pharmacies. The highest and lowest price of the brands available was tabulated and a comparison was made [Table 4]. The price of the medicines which were available in at least one private retail pharmacies was considered. The variation of price was wide. The ratio between highest and lowest price was more than two in case of oral suspensions of amoxicillin, amoxicillin plus clavulanic acid and injection ceftriaxone.

Availability of Antibacterial in Different Public and Private Facilities and Inter-sect oral Comparison

Amoxicillin and clavulanic acid combination, amoxicillin, ceftriaxone and cotrimoxazole were widely available (100%) in private retail pharmacies. Although amoxicillin and ceftriaxone were available in 80% of public facilities and cotrimoxazole in 90% of public facilities, amoxicillin and clavulanic acid combination was not available in any public facility [Table 1].

DISCUSSION

The key finding of this study reflected poor availability of the selected children’s medicines in both public and private facilities in the study district of West Bengal. Moreover, most of the medicines were included in National List of Essential Medicines (NLEM), the average percentage availability of medicines in both of public and private facilities were below 50%. Only two medicines ORS and paracetamol were available in all public and private facilities. Although iron deficiency anemia had been a highly prevalent disease
in India, availability of pediatric tablet or suspension containing ferrous salt was very poor in public facilities and was not absolute in private facilities too. In public facilities, availability of vitamin A and zinc were suboptimal and in private facilities those were available in highly priced combination preparations. Moreover, the availability of the enlisted medicines in private retail pharmacies was also suboptimal. This remained a matter of major concern. Among the 12 anti-infectives surveyed, four medicines, that is, 33.33% (nystatin drops and nevirapine syrup, combination tablet of artemether–lumefantrine, and rifampicin–isoniazid) were neither available in public facilities nor in any private retail pharmacies. Rifampicin–isoniazid was supplied through dedicated national program but falciparum malaria being a serious life threatening disease in children, the nonavailability of artemether–lumefantrine was a serious concern, though another alternative of this drug combination were in supply through a separate national program. Among the public facilities, amoxicillin suspension, injection ceftriaxone and mebendazole tablets were found to be available in DRS, but their availability in public health facilities (other than DRS) were accordingly 77.77%, 77.77% and 33.33% respectively. This finding represents a gap in supply chain between DRS and other health facilities or lack of appropriate use of those medicines by the health facilities culminating to less demand, thus resulted in supply demand imbalance and mismanagement. It was also been noticed that in sub divisional hospitals the availability was slightly better than DRS. This was probably because some drugs (such as vitamin A, iron salts, etc.) were distributed through health facilities by different parallel health programs bypassing DRS. Nevirapine syrup, an antiviral agent generally used in HIV infections in children was unavailable in all public and private facilities. During survey, in few health facilities, data collectors noted that a particular medicine not available on that day was expected to be available within 24 h or shortly. This reflected the irregular supply of medicines which might be due to poor inventory management. However, ORS was available in 100% facilities surveyed; this highlighted the existence of an efficient system of drug supply chain in the state. This system could be utilized and deployed efficiently to supply other essential medicines for the beneficiaries. Metered dose inhaler medications were not available in any public facility. Although we did not collect data on availability of spacer devices, it is an important mode of administration of inhaled medicines in children. Moreover, in many public facilities,
oral salbutamol tablets were used to treat bronchial asthma in children after adjusting the dose according to the body weight. These practices are not recommended because of limited efficacy and potential adverse effects and appropriate inhalational device with antiasthmatic medications should be available in all facilities.\[12\] Further work is needed to understand local treatment practices and preferences and to identify barriers to the more widespread use of metered-dose inhalers in children.

One study by the same author's group covering a district of Andhrapradesh during similar period also revealed poor availability of child size medicines in both public and private facilities, around 50% among the 20 core medicines surveyed were neither available in public or private facilities.\[8\] Another study from Odhisa also showed similar picture, where ORS (for 1 L) was widely available with 85% or more in all three (public, private and NGO) sectors with scarce availability (<5%) of dispersible zinc tablets and beclomethasone inhaler in all three sectors whereas availability of antibiotics was consistently less in more than 60% of outlets while salbutamol inhaler was found both in the public and private sectors (51.2% and 64.6%, respectively) but was not available in the NGO/mission sector without any antiepileptic preparation in public sector facilities (valproic acid oral syrup was most commonly available [42.7%] in private sectors).\[7\] The comparisons of costs between public and private sectors were limited because free medicines were provided by public sector facilities in West Bengal. Hence, a comparison of procurement price of government with price of cheapest brand in private facilities was performed. Moreover, in private facilities, data were only collected provided the particular medicine was available, and the price of the cheapest product available was then recorded. Therefore, data were only collected on a limited number of medicines available both in public and private facilities and did not distinguish between generic and branded products. Despite these limitations, considerable variations in prices were reported between public and private sectors, although the variability tended to be greater and the prices higher in the private sector [Tables 3 and 4]. In fact, government procurement was very efficient in terms of lower price of the medications in comparison to the retail pharmacies. Similar findings were also documented in the other publications as well. A publication from another state of Chhattisgarh showed similar trend of lesser availability (17% in both public and other sectors) of the children’s medications as well as price variability between public facilities and private sectors had been documented. The Chhattisgarh survey revealed that out of 50 child medicines surveyed for the state, 29 medicines were not available in any of the facilities.\[13\] Low availability of medicines in the present study was also corroborative with other studies from South East Asia Region.\[14-16\] This has definite implications on the affordability of medicines for children. While surveyed medicines were provided free of cost to the children in public sector facilities, in case of availability of a medicine only in private outlets, the higher cost might preclude the access to the medicine. Hence, the efficient procurement system of government facilities should be extended to a higher number of medications. The high price variability in the private retail pharmacies was likely the result of low market competition and the absence of proper price regulation. Maintaining uniform drug price is a real challenge as pointed out by different international studies.\[17-19\] Wide price variation of few medicines [Tables 3 and 4] suggested the common practice of retail pharmacies to stockpile medicines of their own choice to gain maximum financial benefit. Thus, government through regulatory authorities needed to impose more child-specific formulations with strict price regulation. The strategic policy is needed for the uninterrupted availability and price reduction toward better access and affordability of essential life-saving medicines for children in all medicine outlets.

This survey was only to follow the medications enlisted in the form and might be considered as a limitation of the study, but it is to be noted that majority of the medications were included in the NLEM, 2003. The small number of medicines surveyed might also be seen as a limitation of the study. However, our intention was to demonstrate the utility of a concise, easy-to-use data collection tool that is sufficiently flexible to be adapted to local circumstances. Study covering a limited number of facilities in a single district of West Bengal was a definite limitation that restricted the general conclusions drawn on the overall affordability of medicines. The study was conducted many years ago and might not be showcasing the current status of availability and price of the selected children’s medications in the study district and the state as a whole. However, the study result was first of this kind in the region and was comparable to few other published studies from other states of India conducted over the similar period.

Considering importance of the issues on availability, access and affordability of child size medicines, a follow-up study is the need of the hour to find out the changes in the situation (if any) involving a larger pool of facilities. Access to medicine is a complex construct because medicines not only have to be available; need to be affordable and acceptable to the patients too. Noteworthy, prescribing practices largely determine the availability of medicines in a particular area.\[20\] Thus, management failure or imperfection in purchasing and distribution mechanism cannot be inferred without studying the local prescribing behavior which can modify the local demand of medicines. Hence, a detailed study on the prescribing behavior is also required.

**CONCLUSION**

The availability of essential children’s medicines was poor in both public and private sectors as reflected in this study whereas price of the available cheapest medicines in retail pharmacies was higher than corresponding government
procurement price with a wide price variation among available brands in the retail pharmacies. There is a huge scope of work to determine the causes behind the poor availability and price disparity. Regarding the cost of medications, we should critically look into the list of price controlled medications and need to update and modify it regularly. Getting feedback from the prescribers with both ways communications toward formulating and updating the essential medicine list for the child size medicines is the need of the hour. A nationwide survey is an urgent need on availability with focus on affordability and prescribing behavior of the children’s medicines to protect our future generations in a better way.

REFERENCES


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