Research Article

Availability of essential medicines for obstetric care at selected primary health facilities in Central Java Province, Indonesia

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ABSTRACT

This study aims to assess the availability of essential medicines for obstetric care in terms of percentage of drugs available within one month, number of drugs with out of stock, volume and nominal value of expired drugs, and to determine factors affecting its availability. Records and stock cards of 32 essential medicines in 2017 were reviewed from 28 primary health centers in Central Java Province, Indonesia. The data were collected using checklist form as main tool and presented descriptively. Our study highlighted that the availability of essential drugs for obstetric care was 75.56%, 73.56%, and 96.95% for antibiotics, live saving, and supplement classes respectively. Overall, the percentage out-of stock was 22.35%. About 46.87% of total item was out of stock for more than 30 days. Volume of expired drugs was as amount as 15 items, with nominal value of expired drugs was worth as 970 USD in one year. Factors affecting drug availability were inadequate staffs, inconsistency of e-procurement systems and lack of training. The availability of essential medicines seemed to be lower than international standard as suggested by WHO. It is recommended to improve procurement system integratively and provide adequate training for staffs, in order to enhance provision of availability of essential medicines in public health facilities.

1. INTRODUCTION

It is predicted that almost 90% of all maternity deaths occur in low middle income countries[1]. Most of these deaths could be avoided by providing access to qualified maternal health services including quality emergency obstetric care treatment. The availability of obstetric care with good quality has been evidenced as a cost-effective initiative for reducing maternal mortality[2].

Along with the importance of quality of obstetric care, the shortage of drugs is the most problems in health systems affecting the provision maternal health services. The limited number of drugs for maternal health is a major problem especially in less developed countries[3,4]. Previous studies reporting drug availability in low middle income countries have studied majority focus on tropical diseases medicine such as malaria, HIV and tuberculosis[5-8], yet very small studies have explored the effects of drug availability on maternal health care[4,9].

As a result of decentralization in health care management which implemented in Indonesia in early 2000s, the provincial and district government became responsible for drug supply and financial resourcing in public health centers in the area[10]. Provincial health

department is liable for supporting financial budget for medicines and other related supplies. In addition, source of provincial financial support for drugs and ranges of treatment is a fund collected from national health insurance scheme from the society members known as capitation payment system. The list of drugs needed in each primary health centers was sent to district health department annually, while requesting of medicines and supplies is done every four months using a system called as e-catalogue. Using the e-catalogue, drugs and medical supplies can be ordered accordingly to facility's needs, then directly delivered to the primary health centers using logistic car. In 2011 Indonesian Ministry of Health introduced Basic Emergency Obstetric Neonatal (BEON) Program[11] in order to ensure the provision of obstetric care in Indonesia. Central government pushes all health centers to be ready for BEON program which aimed to provide maternal care for all citizens.

WHO has regulate a target of 80% supply of affordable priority medicines, including generics, to treat major diseases, in the public and private health services of countries by 2025[3,12]. Therefore, there is a need for increased accessibility to maternal health essential drugs, and obstacles that affect drug availability have to be addressed.

This study aims to assess the availability of essential drugs in primary health centers for obstetric care, in terms of percentage of drugs available within one months, number of drugs with out of stock, volume and nominal value of expired drugs, and to explain possible factors related to the availability of drugs, aimed to give more comprehension of the problem and identify potential issues for evaluation.

2. MATERIALS AND METHODS

A cross-sectional research with quantitative method of data collection was done between December 2017 and January 2018. The study was approved by the Gadjah Mada Health Sciences Ethical Committee with approval number 001162/KKEP/FKG-UGM/EC/2017. Twenty eight primary health centers in Semarang and Brebes Districts, Central Java Province, covering 36.26 million people, were chosen using a stratified sampling, so as to include all health care status of accreditation. All the 28 primary health centers had equipped with proper facilities, physicians, trained midwives, pharmacists, laboratory analysts, and administration staffs.

Total of 52 healthcare staffs working at the logistic were purposively selected and asked to fill questionnaire aimed to identify factors affecting drug availability and factors influencing drug availability. Structure of questionnaire consisted of two parts, including data avaliability indicators and factors influencing drug availability using 4-point likert scale. For section one, we collect the data of mean availability, items of drugs with out of stock, value of drugs with out of stock, and number of expired drugs. Section two, asking about factors associated with drug availability was conducted using self administed questionnaire and filled by the respondent pharmaciss. All data collection process was conducted by trained surveyor in order to maintain reliability and consistency.

To estimate drug availability indicators, monthly stock recording cards were evaluated for period of one year in 2017; this is the period during which e-procurement system in universal health coverage was in operation. National list of 32 essential drugs adopted from National Formulary for primary health centers by Indonesian ministry of health was used as a standard list. Information on availability, number of drugs available within one month, number of expired drugs and its' value in each primary health center were gathered using standard checklist form. The formula to estimate drug availability is as follow:

$$Mean\ of\ availability: \frac{Total\ stock\ for\ one\ month}{30}$$

The data on 32 drugs were analyzed using Microsoft Excel and were presented using descriptive way, e.g., mean with standard deviation, median, and minimum and maximum range values. Criteria of drug availability following WHO standard on drug availability, using cut of point 80%. Drugs availability below 80% is categorized as low availability, where 80% and more is categorized as adequate[3]. Percentage of availability, percentage and mean days out of stock drug items, and percentage and value of drug with expired/damaged was calculated.

3. RESULTS

The essential medicines for obstetric care was available at 75.56%, 73.56%, and 96.95% for antibiotics, live saving, and supplement classes respectively (Table 1). The

Table 1. Profile of items of essential medicines with stock in within one month.

Items	Average of availability (Mean, SD)
Antibiotics	
Chloramphenicol inj	84.38 (18.12)
Ampicillin inj	78.13 (20.22)
Gentamycin inj	75.00 (21.78)
Penicillin procain inj	68.75 (24.29)
Mean (SD)	76.56 (25.17)
Live saving	
Nifedipine tab	85.80 (14.25)
Adrenalin inj	84.38 (12.86)
Oxytocin inj	80.75 (19.18)
Calcium gluconate inj	80.70 (17.18)
Methylergometrine	80.34 (17.84)
Lidocaine inj	76.65 (21.13)
Magnesium sulfate 20%	74.65 (16.57)
Magnesium sulfate 40%	74.65 (14.23)
Atropine sulfate inj	71.88 (24.18)
Diphenhydramine inj	70.56 (30.12)
Phenobarbital inj	67.60 (18.79)
Diazepam inj	65.67 (26.23)
Dexamethasone inj	50.32 (32.17)
Mean (SD)	73.56 (23.53)
Adjuvant and supplement	
Vitamin A 200,000 IU	108 (8.90)
Vitamin A 100,000 IU	106 (9.47)
RL 500 ml	105 (19.20)
Pirantel pamoat	103 (6.49)
Ferro sulphate tab	102 (10.90)
Calcium lactate	100
NaCl 500 ml	100
Gentian violet	97 (6.28)
Paracetamol 500 mg	90.45 (12.56)
Paracetamol syrup 125 mg	90.45 (19.21)
Sodium bicarbonate 4,8 %	89.78 (20.21)
Dextrose 5%	84.34 (11.89)
Dextrose 40%	84.34 (17.45)
Mean (SD)	96.95 (18.23)

drugs with shortage was indicated to be antibiotics (chloramphenicol injection) (36.21%) during one year. Penicillin and sodium bicarbonate had low stocking (30.23% and 25.12%). The number of days with out of stock for priority drugs was 97 days. In addition, the average percentage drugs with out of stock were 22.35%. In addition, number of health centers with out of stock drugs was 19 (67.86%) for sodium bicarbonate (Table 2). About 46.87% of

Table 2. List of essential medicines in obstetric care (OC) with out of stock.

Item	Days out of stock	% out of stock in one year	N (%) of PHC out of stock
Chloramphenicol injection	135	36.21	17 (60.07)
Penicillin procaine injection	135	30.23	15 (53.57)
Sodium bicarbonate 4.8%	135	25.12	19 (67.86)
Atropine sulphate injection	120	25.09	16 (57.14)
Dextrose 40% 500 ml	120	25.03	13 (46.43)
Diazepam injection	120	24.98	12 (42.86)
Gentamycin injection	120	21.36	12 (42.86)
Dextrose 5%	90	19.18	6 (21.43)
Ampicillin injection	90	14.28	10 (35.71)
Vitamin A 200,000 IU	90	13.23	2 (7.14)
Methyl dopa 250 mg	90	11.12	2 (7.14)

total item was out of stock for >30 days. Volume of expired drugs as amount as 15 items, while amount worth of expired drugs was 970 USD (Table 3).

Table 3. Drug availability indicators.

Drug availability indicators	
Median days out of stock for drugs	97 days
% out of stock per total supply	22.35
% no. of drugs out-of-stock	46.87
% no. of drugs out-of-stock for > 30 days	46.87
Amount worth of expired drugs in US dollars	970
Number of expired drugs	15

The possible reasons explaining the low availability of essential medicines felt by respondents were about lack of adequate staffs in managing drug supply. They felt that burden in monthly reporting procedure affecting their performance in the drug procurement. Change in drug procurement policies was also perceived as the challenge faced by the health staffs. In addition, informants felt that they were incapable to manage drug supply due to lack of training in this area.

Table 4. Factors affecting the availability of drugs.

Factors affecting drug availability (N=52)	Mean (SD)*
Low number of staffs	3.89 (1.56)
Abrupt changes in drug procurement policies	3.78 (0.98)
Lack of training	3.67 (1.34)
Unavailability of requested drugs in e-procurement system	3.56 (1.67)
Unpredictable lead time	3.27 (2.45)
Transportation problem	2.69 (1.45)

Range score 1-4

4. DISCUSSION

This is a first attempt to assess the availability of essential medicines for obstetric care in Indonesian health care setting toward efforts to improve national drug management system. This study found that level of drug available was about 75%, still under level of recommended drug availability. According to WHO, at least 80% of essential medicines should be available in the public health facility[3,12]. Our study also highlighted that majority of essential medicines in obstetric care stocked out up to a period of three months. The availability of key medicines in our study was lower than previous study conducted in several countries, Malaysia[13], Kenya[14], Uganda[15], and Tanzania[16]. The shortage duration was also substantially higher as opposed to that of the previous studies.

The possible factors related to drug availability problem in our study were inadequate staffs, changes in national drug procurement policy, and lack of training in estimating the needs of drugs. Of Indonesia's 33 provinces, 29 do not have the WHO recommended ratio of 1 pharmacist per 1,000 population[17]. The shortage of pharmacists in hospitals and health centers is noticeable despite the large number of graduates. The government had addressed this problem by issuing the health worker contract policy in 2014 to improve the distribution of health workers including pharmacists. It offered a shorter contract and higher monetary benefits for rural and remote area.

The change in drug procurement system during universal health coverage era was the second factor affecting availability of essential medicines. The requested drugs that are unlisted in e-catalogue in the procurement system was lead to stock outs of essential medicines in 28 public health centers. This problem seems a common problem experienced by drug procurement staffs in all setting nationally since Indonesia just started the e–catalogue in 2014 and implemented the new e-procurement system in 2015. These data are parallel with other studies conducted elsewhere that found identical factors to be contributed to weak healthcare management system[18,19]. Lack of strong national e-procurement system was also cited to be adversely affecting the supply of essential medicines[18,20].

Inadequacy of appropriate training in medicines selection and estimating drug consumption was mentioned as the third factor affecting drug availability. This is presumably because heath workers were not capable to estimate the number of medicines were precisely needed which might have direct to drug shortages[19,21]. This finding is similar to a study undertaken in Tanzania where inadequate of training was the most probably related to low medicines

supply[16]. Prediction of drug requested was commonly based on previous needs and infrequently on epidemiological morbidity data. Non-availability of priority medicines for unpredictable duration raises awareness about emergency care in obstetrics. Drugs that may be prominent for live saving such as atropine sulphate were zero stock for long duration. This matter would possibly have adversely affected the quality of care provided to the patients.

We highlighted that the volume and nominal value of expired drugs was considerable high. Currently all primary health centers under the universal health coverage system could ordering for drugs needed using capitation fund provided and this was likely they request drugs in a number of quantities higher than they actually needed which would implies on drug expiries. The health centers might have evaluated their drug procurement method over time in any case of the technique used in acquiring medicines.

Uniquely, in our study, low budget for drugs was not quoted as a barrier to access to essential medicines. However, in some countries, low of budgeting of funding was also mentioned frequently. If the budget for key drugs is limited, there may prone to shortages of essential medicines. Insufficiency of funding has been mentioned as a dominant factor for shortage of drugs in another study[18]. Other studies have suggested that sustainable financial support and implementation of supply chain management both are important requirements to ascertain easiness access to essential pharmaceutical products for the benefit of public health[4,22]. Results from our study highlight that availability of essential medicines needs to be ameliorated from the current status. Also, determinant for drug supply need to be attend to.

Our study had several limitations. The finding was restricted in not being able to oppose e-procurement system with previous system since all health providers currently using the new system. It was thus probable that changes overtimes may have brought about some of the observed differences. However, the enhanced drug availability and reduced drug expiry is likely to be due to the system.

5. CONCLUSIONS

It was concluded that for the key drugs for obstetric care, the levels of supply are still need to be improved. Some essential drugs were out of stock in most of primary health centers and had also been out of stock for extensive term during the consecutive year. There is need sustainable training of pharmacy personnel in drug supply management, providing support and provision of reliable procurement system to maintain the drug supply.

6. ACKNOWLEDGEMENT

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