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Stock Out of Essential Medicines among Patients on Health Insurance: Implications for Quality of Care

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Abstract

Background: The constant availability of essential medicines to patients on health insurance coverage is one of the many objectives of sustainable development goals. Health insurance coverage was implemented to improve access to medicines at costs that affordable to contributors of the scheme. Medicine stock outs remain an endemic symptom of poor availability of medicines in health facilities, a challenge that national health insurance scheme (NHIS) is intended to address. There are questions as to whether medicine stock outs has significantly declined with health insurance coverage. This study therefore aim to evaluate the prevalence of medicine stock outs among patients on NHIS and identify drugs frequently affected.

Methods: A retrospective review of 2560 prescriptions randomly selected prescription records from NHIS pharmacy between January and December 2021. Medicines

approved on the health insurance list that were not dispensed due to non-availability were identified and recorded accordingly. Data was entered into SPSS version 21 and analyzed using descriptive statistics.

Results: Stock out of medicines was widespread affecting all drugs therapeutic classes with prevalence of between 1.4 to 75.5% within the study period. The most frequently class of drugs were cardiovascular drugs (75.5%), antibiotics (49.4%), antidiabetics (33.9%), antilipidaemics (22.6%) and narcotic analgesics (20.9%). The resulting out of pocket medicine expenditure could worsen clinical, humanistic and economic outcomes of therapy.

Conclusion: The high level of medicine stock out threatens the achievement of easy and affordable access to life saving medicines among patients whose primary reason for enrollment is healthcare cost savings.

Keywords: Essential Medicines, Health Insurance, Stock Out, Therapy Outcome, Quality of Healthcare

Introduction

The availability of essential medicines at health facilities is one of the many objectives of sustainable development goals, however a third of the world population still do not have regular access to quality assured medicines [1]. Medicine stock out in health facilities which is common feature of low availability is not a phenomenon, recent reports have indicated that it has been rising in globally over the last few decades [2]. Literature evidence has shown a clear pattern of stock outs affecting multiple drugs in both high income countries [3, 4, 5, 6, 7] and in low and middle income countries [LMIC] [8, 9, 10, 11].

While the definition of medicine stock out and shortage appear to be largely similar even though minor differences have been observed in literature, the conclusion is that medicines that are not available at the time patient need them for therapy is considered to be out of stock [12, 13]. The stock out of medicines have been widely reported to affect all classes of drugs used in treatment of both communicable and non-communicable diseases [14, 15, 16, 17]. In many LMICs stock out of medicines is particularly a challenge in both public and private health facilities [18, 19]. The prevalence has been reported to be 17 – 53% in both HICs and LMICs [20, 21, 22].

Literature evidence clearly showed that prescription medicines constitute a significant proportion of healthcare expenditure with figures of up to 70% been frequently reported [23]. In response to high cost of medicines and to reduce financial burden of medical care on households, many developing countries have undertaken health sector reforms to mitigate the impact of rising costs of healthcare, reduce out of pocket expenditure and improve affordability of essential medicines [24, 25]. Some of these reforms involved universal health insurance schemes, direct funding of healthcare facilities and strengthening of public private partnerships [26]. In addition to improving affordability to life saving medications, these reforms were also aimed at promoting

public health by improving access and utilization of health care services through reduced cost offered by health insurance [27].

The provision of medicines in public health facilities in Nigeria has traditionally been through budgetary allocation which became increasingly inadequate to meet the growing needs of the population.

In 1988, the government relying on WHO recommendations introduced the drug revolving fund aimed at improving availability of low-cost generic medicines in public health facilities. This policy like the Bamako initiative before it failed to address the lingering low medicine availability and stock outs/shortages [28]. So, in 2005, the national health insurance scheme [NHIS] was introduced initially for public sector employees and was later expanded to include informal sector workers. In this scheme a subscriber is expected to pay only 10% of the cost of medicines and other services as co-payment, while the remainder is covered by health insurance companies [29]. Since the inception of this scheme, many initiatives have been introduced to expand coverage and improve access to medicines at all levels of healthcare, however "medicine stock out" remain endemic at all levels of the healthcare system [30, 31, 32].

Many developing countries that introduced universal health insurance schemes have not only achieved improved availability to quality assured medicines [33], but also better therapy outcomes. The consequence of medicine stock outs is that insured patients are forced to them from the private sector at much higher costs.

The out-of-pocket expenditure on medicines has the potential to reverse economic benefits that come from insurance cover and may discourage further enrolment and participation in the scheme. There is scanty report of medicine stock outs among patients on full health insurance cover [NHIS] in Nigeria, so the aim of this study is to evaluate medicine stock out and implications for quality of care.

Methods

Setting:

The pharmacy department of the hospital have several units that service medical wards of which NHIS pharmacy is one of them. This study was carried out at NHIS pharmacy department which is responsible for dispensing and pharmaceutical care services for patients enrolled on the scheme.

Study Design:

A retrospective review of prescriptions given to patients on health insurance and dispensed by pharmacists and medicines that were marked as not available were regarded as stock outs. Prescriptions issued between January and December 2021 were included in the study.

Sample Size/Sampling:

The sample size was determined using Raosoft calculator to be 377, however 2560 prescription records dispensed in NHIS pharmacy within the study period were selected by simple random sampling method.

Data Collection:

The selected prescription records were reviewed for stock out using out of stock sign [O/S] and /or not available [NA]. Any drug for which any of these signs was attached was considered to have experienced stock out on the day prescription was filled.

Data Analysis:

Data was entered into Statistical Package for Social Sciences version 21 (SPSS Inc. Chicago) for Windows® and Microsoft® 2010 excel package using descriptive statistics.

Ethical Issue:

Ethical approval was obtained from the health research ethics committee of the hospital before commencement of the study.

Results

The demographic data showed that females constituted just above half of all patients [54%]. The mean age was 44.3 ± 14.8 years and majority of them were prescribed 4-6 drugs per prescription [64.9%]. The number of medicines per prescription that experienced stock out ranged from 1 – 7 with a mean of 2.7 ± 1.3 [Table 1].

Table 1: Demographic data [n=2560]

Demographic variable	Number [%]
Gender	
Male	1178 [46]
Female	1382 [54]
Age	
≤ 20	371 [14.5]
21 – 30	340 [13.3]
31 – 40	440 [17.2]
41 – 50	658 [25.7]
51 – 60	591 [23.1]
61 – 70	113 [4.4]
≥ 71	47 [1.8]
Mean age [SD]	44.3 ± 14.8 [yrs.]
Number of drugs/prescription	
1 – 3	325 [12.7]
4 – 6	1661 [64.9]
7 – 9	515 [20.1]
≥ 10	59 [2.3]
Mean [SD]	5.4 ± 1.7
Stock outs/Prescription	
1	625 [24.4]
2	735 [28.7]
3	643 [25.1]
4	343 [13.4]
5	133 [5.2]
6	61 [2.4]
7	20 [0.8]
Mean [SD]	2.7 ± 1.3

Stock out of medicines was observed in all therapeutic classes and range from 1.4 – 75.5% of prescriptions. The most frequently encountered class of drugs with stock outs included cardiovascular drugs [75.5%], antibiotics [49.4%], antidiabetics [33.9%], antilipidemics [22.6%] and narcotic analgesics [20.9%] [Fig 1].

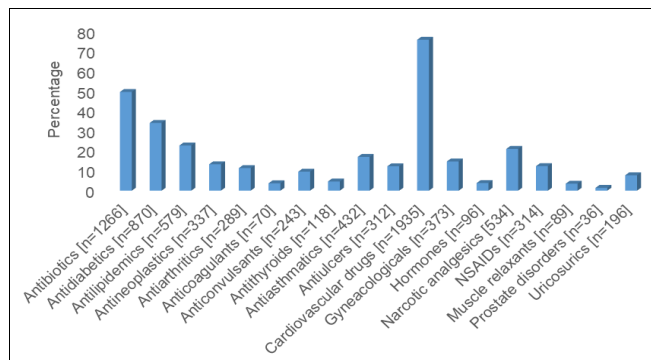


Fig 1: Class of drug and frequency of stock out [n=6590]

The most common antidiabetic drug stock outs involved Glimperide [35.4%], Insulin [22.9%], Vildagliptin [13.9%] and combination of Metformin/Vildagliptin [12.8%]. Among the antilipidemics Simvastatin [67.7%] was the most affected by stock out, while Warfarin [59.1%] and Enoxaparin [31.8%] experienced most stock out among anticoagulants. All prescriptions of erythropoietin [100%] were unavailable during the period of study [Fig 2].

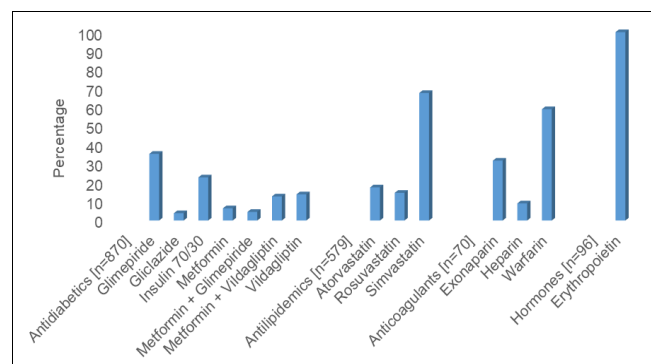


Fig 2: Stock out of drugs for metabolic disorders

The stock out of antibiotics was commonly found with Amoxicillin + Clavulanic acid [23.5%], Ceftriaxime [10.1%], Metronidazole IV [9.6%] and Clarithromycin [9.4%]. Other antibiotics had stock out prevalence of between 1.5 – 6.1% [Fig 3].

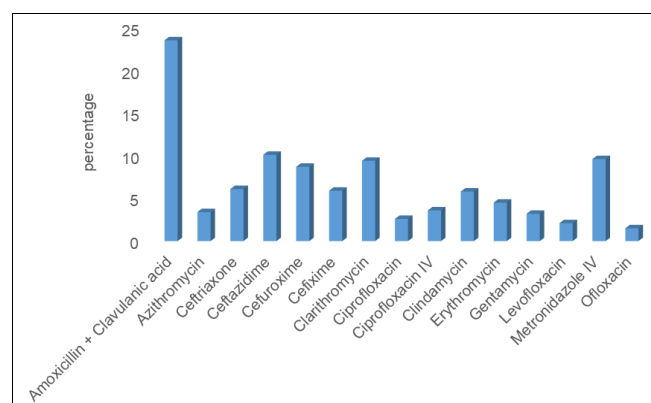


Fig 3: Stock out of antibiotics [n=1266]

The major cardiovascular drugs that were observed with stock outs included Losartan [36.4%], Amlodipine [17.9%] and Carvedilol [9.8%]. Other drugs in this class had stock out prevalence of between 1.2 – 7.8% [Fig 4].

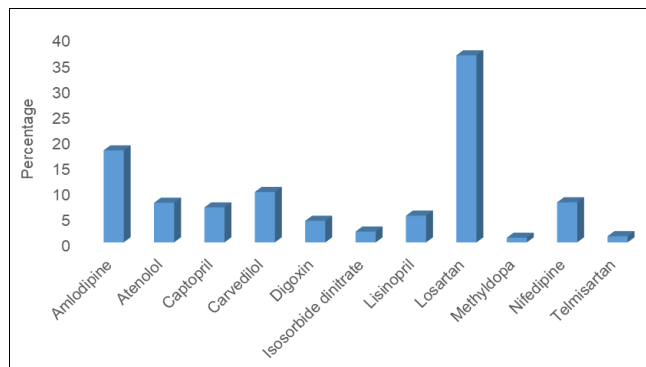


Fig 4: Stock out of cardiovascular drugs [n=1935]

The commonly prescribed antineoplastic drugs observed with stock outs included Cyclophosphamide [24.3%], Hydroxyurea [24.3%], Tamoxifen [16.8%] and Vincristine [10.6%]. The other drugs prescribed in this class had stock out rates of between 3 – 7.5% [Fig 5].

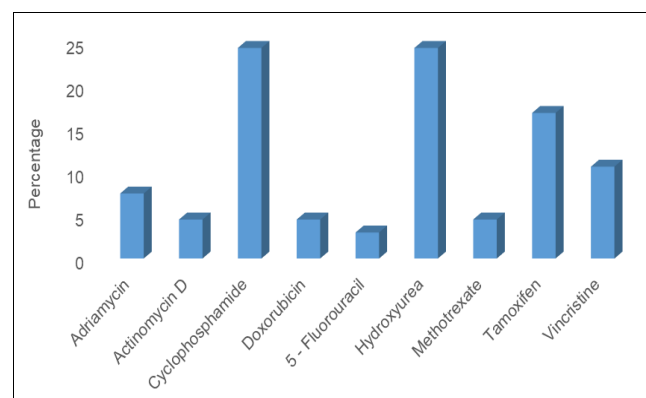


Fig 5: Stock out of antineoplastics (n=337)

A breakdown of narcotic analgesics stock outs showed that Codeine + Paracetamol [56.5%], Pentazocine [26.7%] and Dihydrocodeine [11.9%] accounted for the highest proportion. Among NSAIDs Diclofenac [45.2%] and Ketoprofen [43.2%] were the most frequently encountered [Fig 6]

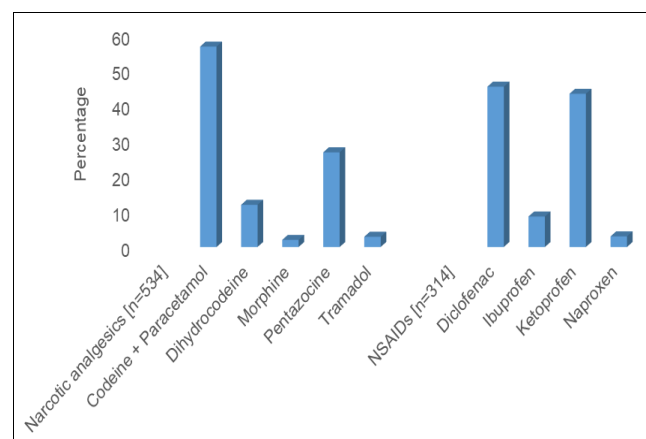


Fig 6: Stock out of analgesics

The distribution of stock outs of anticonvulsants showed Pregabalin [37.4%], Gabapentin [23.6%], and Biopentin [20.2%] to the most commonly encountered [Fig 7].

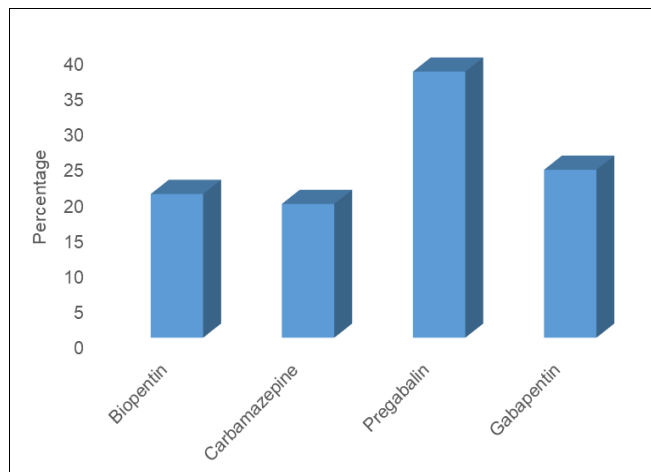


Fig 7: Stock out of anticonvulsants [n=243]

The result showed that two drugs used in treatment of gout namely Allopurinol [77.5%] and Febuxostat [22.5%], and Colchicine [55.4%], Celebrex [24.8%] and Celecoxib 20.8%] used in arthritis experienced stock out during the study period [Fig 8].

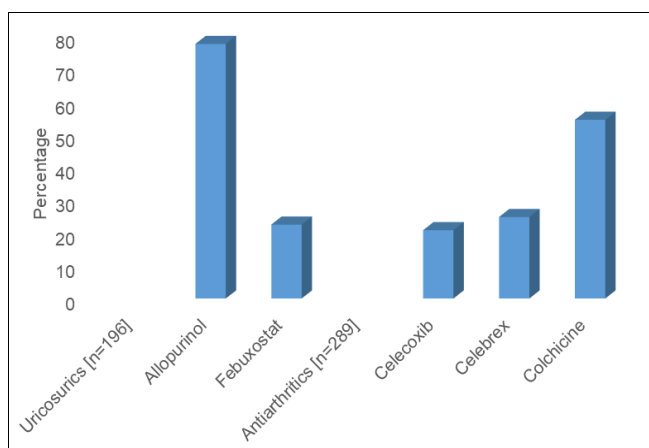


Fig 8: Stock out of drugs for gout/arthritis

The stock out prevalence of skeletal muscle relaxants involved Tizanidine [48.1%], Orphenadrine [33.3%] and Baclofen [18.6%] [Fig 9].

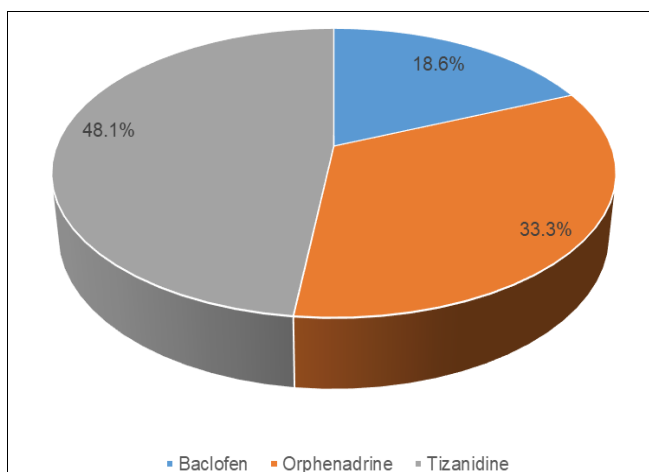


Fig 9: Stock out of skeletal muscle relaxants

Other commonly encountered drugs with stock outs included Tamulosin [100%], Carbimazole [100%],

Salmeterol + Flucotisone inhaler [63.7%], Misoprostol [56%] and Salbutamol inhaler [34.3%] [Fig 10].

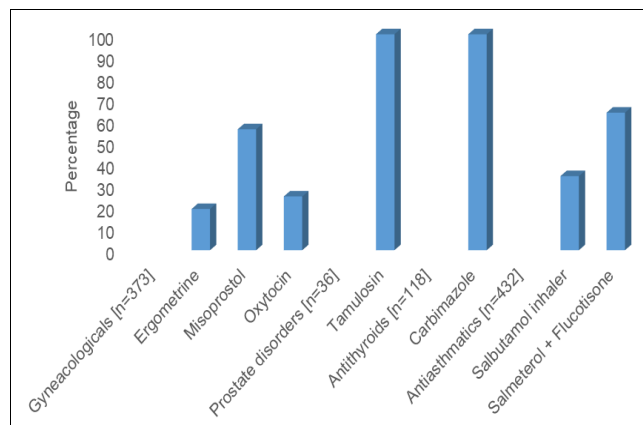


Fig 10: Stock out of other drugs

Discussion

In many countries that have introduced universal health insurance coverage, medicine stock out continue to persist [9, 34, 35] affecting all classes of drugs [11]. The burden of medicine stock out evaluation has been made rather difficult by limited data and the fact that many countries including Nigeria do not have reporting systems in place. The results of this study showed that medicine stock outs remain high and major challenge to quality of healthcare offered to patients on health insurance. Overall, majority of patients were unable to obtain and average of 20 – 40% of their prescribed medications from the hospital pharmacy.

The stock outs of antibiotics was comparable to a previous study [11], and involved commonly used ones like Ceftriaxone, Ciprofloxacin, Clindamycin similar to a previous study [36]. The scale of antibiotic stock out in LMIC is less reported, however anecdotal reports indicated that the problem is much worse [37, 38]. While stock out rates vary widely between studies, the result of this study indicate that this is an ongoing challenge even among patients who have health insurance coverage [37, 39, 40].

A similar pattern of stock outs was observed with drugs for metabolic disorders such as diabetes mellitus [41, 42], antineoplastics [43, 44, 45], narcotic analgesics [46, 47] and non-communicable diseases with contrasting prevalence compared to results of this study [19, 48]. Overall, a total of 77 drugs covering eighteen therapeutic classes experienced stock out within the study period which contrast with 6 – 31% in some studies [6, 48, 49]. The implications of medicine stock outs include avoidable out of pocket expenditure as patients purchase their drugs from profit oriented private sector drug outlets [4, 50]. There is also increased risk of fake and counterfeit medicines being obtained from non-professional personnel who often perform dispensing functions in many private drug outlets [2, 51]. A number of studies have also reported an association between medicine stock outs and increased incidence of adverse drug reactions resulting in increased hospitalization and mortality [16, 17]. Other commonly reported consequence of medicine stock outs include dissatisfaction with pharmaceutical services [9, 22], increased cost of travels between facilities to find prescribed drugs [52] and higher incidence of medication errors [53, 54].

While stock out of medicines is nothing new to Nigeria’s healthcare system, the high prevalence among patients on

health insurance represent a challenge for the expansion of the scheme and wider coverage of the population. It also represent a symptom of internal control systems of health insurance organizations to ensure that service providers give patients their needed medications for which health insurance scheme was initiated. While the root causes of medicine stock out is multidimensional and multifactorial and outside the scope of this study, there is need for the management of health facilities to improve the performance of their supply and logistics chain capacity, leverage on technology to improve stock management and improve communication between management and other critical stakeholders in the medicine supply system.

Conclusion

The high prevalence of stock outs among patients has serious implications for affordability and quality of care, dramatically increase the cost of medicines and cause disaffection among patients. There is need for health insurance companies to work with health facility managers to ensure medicine stock is reduced to the barest minimum.

Limitations

One of the challenges was that drugs marked as not available may have been dispensed from other pharmacy units of the hospital and may not be properly indicated. Furthermore, drugs that were not available at the time of dispensing may not have been properly indicated on the prescription by the attending pharmacist.

Recommendations

The widespread stock out of essential medicines require that hospital drug procurement unit be reorganized under pharmacist led team with the requisite authority and responsibility to quickly respond to supply challenges. There is the need to adopt appropriate technologies that can monitor medicine supply and utilization as well as track stock outs. This will enable allow decision makers to quickly respond demand and supply gaps and promptly arrange purchase orders so as to improve performance of medicine delivery schedules.

The ICT driven medicine tracking system will not only promote transparency within the system, but also facilitate procurement reforms, policy changes and administrative support for medicine supply management in the hospital.

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Conflict of Interest

The authors declare no conflict of interest.

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