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Regulation of mark-up on medicine prices in Zimbabwe: a pilot survey from 92 community pharmacies in the metropolitan area of Harare

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Abstract

Background Medicine pricing in the community pharmacy sector in Zimbabwe significantly influences accessibility to health care. In this pilot survey, we investigated how community pharmacies in Zimbabwe apply various mark-up strategies to essential and non-essential medicines, and gathered community pharmacists' perspectives on mark-up regulation.

Methods Using an adapted methodology endorsed by the World Health Organization and Health Action International for studying medicine prices and availability, we conducted a quantitative cross-sectional pilot survey for 46 medicines (31 essential and 15 non-essential) identified using the Zimbabwe Essential Medicines List and classified according to the Vital, Essential, and Non-essential (VEN) tool. We conducted the pilot survey in 92 community pharmacies in the metropolitan area of Harare, Zimbabwe.

Results We gathered a total of 92 responses from 167 distributed questionnaires. The most prevalent mark-up strategy was the cost-plus fixed percentage.The median mark-up for all medicines in the community pharmacies was 60% (interquartile range 50- 82%). We found a statistically significant difference in the median mark-up by essentiality of medicines ($p < 0.001$), essential medicines had a median mark-up price of 62% while non-essential medicines had a mark-up of 56%. Antipsychotics had the highest mark-up at 82%, while anti-neoplastic medicine had the lowest at 36%. Overall, 55% of the community pharmacists did not support mark-up regulation.

Conclusion Mark-up strategies varied across community pharmacies in the metropolitan area of Harare. Without mark-up regulation, essential medicines remain significantly expensive in Zimbabwe. We recommend mark-up regulation in Zimbabwe's community pharmacy sector and emphasize the effective use of multiple pricing strategies to reduce medicine prices. .

Keywords Mark-up, Essential medicine, Pricing regulation, Affordability

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Introduction

Pharmaceutical expenditures are a significant driver of rising health care costs [1, 2]. Mark-ups and taxes charged along supply chains contribute to high medicine prices, as wholesalers and community pharmacies seek to cover operating costs [3]. In Zimbabwe, the lack of regulation in medicine pricing drives inflated prices in the community pharmacy sector[4, 5]. Unregulated medicine pricing threatens medicine affordability, particularly in low-and-middle income countries (LMICs)[5].

Affordability of essential medicines is a critical determinant of medicine accessibility at the population level. The World Health Organization (WHO) defines and classifies essential medicines as those that satisfy the health care needs of the population [6]. The WHO published the first Model List of Essential Medicines in 1977, which highlighted medicines considered the most effective, safe, and important for priority public health needs [7]. Most countries, including Zimbabwe additionally have their own National Essential Medicines list (NEML). Establishing NEMLs enables governments to prioritize evidence-based interventions and to ensure medicine accessibility at the population level [8].

The Zimbabwe National Medicines Policy [9], which is the national medicine use policy guideline, emphasizes the availability and accessibility of safe, efficacious, cost-effective and affordable medicines of good quality through competitive practices. However, the medicine policy does not address price regulation. Community pharmacies are an essential player in the provision of health care in Zimbabwe. Different pricing and mark-up strategies are used in the community pharmacy sector in Zimbabwe, including: (i) cost plus fixed percentage, (ii) cost plus declining percentage, (iii) cost plus fixed dispensing fee and (iv) maximum allowable price.

When the cost-plus fixed percentage mark-up strategy is applied to medicine prices, all medicines receive the same mark-up as a percentage of the cost price. For cost-plus declining percentage, costly medicines attract lower percentage mark-ups. Cost-plus fixed dispensing fee involves charging the wholesale price plus an additional fixed or flat fee. For the maximum allowable price mark-up strategy, the sale price or reimbursement level is fixed for the generic equivalents of certain drugs or for therapeutic categories.

Out-of-pocket expenditure is the most common method of buying medicines in community pharmacies in Zimbabwe. This is due to the limited availability of most medicines in the public sector. Public hospitals often provide prescriptions for relatives of hospitalized patients to buy medicines from community pharmacies. Regulating medicine pricing in community pharmacies is therefore crucial, as they fill the gap left by persistent stock-outs in the public health sector [10, 11]. The lack of price regulation has led to exorbitant medicine prices in Zimbabwe, with local newspapers reporting on pricing practices as "milking the public" [12, 13].

This pilot survey sought to describe mark-up strategies for a basket of selected essential medicines in Zimbabwe's community pharmacy sector, analyze mark-up strategies employed by community pharmacists, compare median mark-ups across different mark-up strategies between essential and non-essential medicines and assess pharmacists' perceptions on mark-up regulations.

Methods

Study design

A cross-sectional survey was conducted in the metropolitan area of Harare, encompassing 167 community pharmacies. The survey adapted features of the methodology outlined by the World Health Organization and Health Action International (WHO/HAI). Pharmacies were selected using the Online Premises Registers obtained from the Zimbabwean Medicines Control Authority portal.

Medicine classification and description of the basket of medicines

Medicine selection was based on the WHO/HAI global core medicines list and the latest version of the Essential Drug List of Zimbabwe [9, 14]. The WHO/HAI core list was established based on availability, importance and relevance in addressing overall global disease burden. We conveniently sampled medicines that are commonly available, sold and bought from community pharmacies in Zimbabwe. Medicine availability refers to the degree to which a medicine is physically present at a distribution point (e.g., pharmacy) [15]. When multiple generics of the same drug were present, we grouped all generics together, without considering differences between manufacturers. Although selecting the same company's generics across pharmacies would have provided more consistent comparisons, this was not feasible due to variations in pharmacy suppliers; thus, we treated "generic" as a broad category. The classification of medicines was based on the VEN (vital, essential and non-essential) classification tool, an international certified classification tool and system which give priority to medicines based on economic consideration [16]. The VEN tool is used to assess expenditure or use of medicines according to the given definitions - vital medicines are lifesaving, and unavailability would cause serious harm, essential medicines (E class) get second priority and their unavailability would cause major harm and discomfort, and medicines that belong to the N class are of lower priority compared to the others [17].

Out of the 46 medicines, 31 were classified as essential, and 15 were non-essential, Table 1. All the medicines

Table 1 List of surveyed Medicines

Generic name, dosage form and strength	Medicine Class	Category	Percentage availability (%)	Frequency
Tenofovir/Emtricitabine 200/300 mg tabs	Antiretroviral	E	85	78
Tenofovir/Lamivudine/Efavirenz 300/300/600 mg tabs	Antiretroviral	E	75	69
Dolutegravir 50 mg tabs	Antiretroviral	E	80	73
Atazanavir 300 mg tabs	Antiretroviral	E	76	69
Artemether/Lumefantrin 20/120 mg tabs	Antimalarial	E	65	59
Miconazole oral gel 20 mg/g	Antifungal	E	70	64
Hydrochlorothiazide 25 mg tabs	Antihypertensive	E	99	91
Nifedipine 20 mg tabs	Antihypertensive	E	90	82
Verapamil 40 mg tabs	Antihypertensive	NE	30	27
Enalapril 10 mg tabs	Antihypertensive	E	80	73
Ramipril 2,5 mg tabs	Antihypertensive	NE	48	44
Losartan 50 mg tabs	Antihypertensive	E	80	73
Telmisartan 40 mg	Antihypertensive	NE	60	55
Codeine 30 mg tabs	Analgesic	E	60	55
Tramadol 50 mg caps	Analgesic	NE	60	55
Fluorometholone 0.1%/5 ml eye drops	Anti-inflammatory	NE	50	46
Maxitrol eye drops 3.5 mg/ml	Antibiotic/Anti-inflammatory	E	60	55
Carbamazepine 200 mg tabs	Anticonvulsant	E	80	73
Phenytoin 100 mg caps	Anticonvulsant	NE	20	18
Clarithromycin 500 mg tabs	Antibiotic	NE	15	13
Azithromycin 500 mg tabs	Antibiotic	E	95	87
Fluconazole 200 mg tabs	Antifungal	E	70	64
Itraconazole 200 mg caps	Antifungal	NE	35	32
Metronidazole 400 mg tabs	Antibiotic	E	84	77
Rituximab 500 mg injection	Antineoplastic	E	10	9
Herceptin 400 mg injection	Antineoplastic	E	12	11
Zoladex 10.8 mg injection	Antineoplastic	E	11	10
Doxorubicin 50 mg injection	Antineoplastic	E	60	55
Cisplatin 500 mg injection	Antineoplastic	E	40	36
Carbamazepine 200 mg tabs	Antipsychotic	E	80	73
Amitriptyline 25 mg tabs	Antidepressant	E	85	78
Citalopram 20 mg tabs	Antidepressant	NE	36	33
Paracetamol 120 mg/5 ml syrup	Antipyretic	E	100	92
Mefenamic acid 50 mg/5 ml	Antipyretic	NE	98	90
Alfuzosin 10 mg tabs	Alpha blocker	NE	55	50
Tamsulosin 0.4 mg caps	Alpha blocker	E	60	55
Glibenclamide 5 mg tabs	Antidiabetic	E	95	87
Glimepiride 4 mg tabs	Antidiabetic	NE	40	36
Salbutamol inhaler 100mcg/dose	Anti-asthmatic	E	87	80
Symbicort inhaler (budesonide/formoterol 160/4.5mcg)	Anti-asthmatic	NE	66	60
Omeprazole 20 mg caps	Proton-pump Inhibitor	E	85	78
Esomeprazole 20 mg tabs	Proton-pump Inhibitor	NE	61	56
Salbutamol 4 mg tabs	Anti-asthmatic	E	85	78
Montelukast 5 mg tabs	Anti-asthmatic	NE	40	36

*Percentage availability represents the proportion of pharmacies that had the medicine in stock out of 92 surveyed facilities

included in the survey were generics, as generic substitution is the recommended policy in Zimbabwe. Medicines belonged to different pharmaceuticals classes including anti-asthmatics, anti-hypertensives, anti-infectives, anti-depressants, anti-inflammatory medicines and anti-acids. Local disease prevalence and needs were also considered in the selection. For example, anti-hypertensives and chemotherapy medicines were included in the surveyed list because hypertension and cancer are some of the leading causes of death [18]. Additionally, the HIV/AIDS prevalence remains high in Zimbabwe despite low incidence rates in recent years, thus Anti-retroviral drugs were included in the study [19].

Data collection instruments and approach

Data collection was done between 01 May 2021 and 31 August 2021. Email addresses were obtained from the Zimbabwean Pharmacy Premises and Persons Register available online from the Medicines Control Authority Online portal. Due to the ease of collecting data via electronic mail and the anticipated low response due to limited operation hours during COVID, we purposely included all pharmacies (167) in the metropolitan area of Harare in our study. An electronic questionnaire was sent via email to one pharmacist per community pharmacy. The questionnaire consisted of two sections.

Section A of the survey questionnaire tool collected pricing data. Information on medicine name, dosage form, strength, pharmacological class, category of essentiality and pack size was captured in a table format. The questionnaire also collected information on wholesale selling price, community selling price and dispensed price (community price plus dispensing fee). Cost prices from wholesalers and community selling prices were collected from the pharmacies. Community pharmacy prices were collected for the most sold generics.

Section B of the study focused on understanding how community pharmacists determined their pricing strategies and gaining insights into pharmacists' perspectives on mark-up regulation. A diverse range of survey questions was employed. Closed-ended questions were included to gather information about the specific pricing strategies utilized by community pharmacies and the reasons influencing their choices. This was followed by open-ended questions, which allow pharmacists to elaborate on the factors guiding their pricing decisions. These responses were then categorized thematically and analyzed quantitatively.

Power calculation

The statistical power of the study, with a sample size of 92 pharmacies (55% response rate), was calculated to be approximately 0.17. If responses had been obtained from all 167 pharmacies, the power would have been 0.23. The power calculation was based on an effect size derived from the observed response rate, with an alpha level of 0.05. This reflects the relationship between sample size and the study's ability to detect significant effects. This indicates that the study was underpowered to detect significant effects at the current sample size. This limitation is due to the small effect size and the small total population size. Since this was a pilot study with a relatively small sample size, the results should be interpreted as more explorative, acknowledging this limitation in the study design.

Data analysis

Data analysis was done using the Microsoft Excel workbook and STATA 15 statistical package. Zimbabwe current uses multicurrency; therefore, medicines are priced in United States dollars (USD). Percentage mark-ups were calculated. Descriptive statistics were calculated (range, median) to summarize quantitative data. Percentage availability represents the proportion of pharmacies that had the medicine in stock out of 92 surveyed facilities. Open-ended responses were grouped thematically and analyzed quantitatively using percentages. The Mann-Whitney U test was used to compare median mark-ups across different mark-up strategies. All statistical tests were concluded at 5% level of significance.

Results

167 questionnaires were sent out in the pilot survey to all pharmacies in the metropolitan area of Harare, out of which 92 responses were received (the response rate was 55%). Half (50%) of the community pharmacies were located in the central business district, 30% were located in the high-density suburbs and 20% were located in the low-density suburbs. 80% of the respondents had between 5 and 10 years of experience, while 20% had 2–5 years of experience.

Medicine availability was calculated for each medicine across the 92 community pharmacies. At the time of the survey, on average 71% of the essential medicines and 46% of non-essential medicines were in stock. Paracetamol syrup had the highest availability at 100% while anti-neoplastic drugs had the lowest availability at 10% across all the community pharmacies, Table 1.

Overall, the median mark-up for all medicines was 60%, with an interquartile range of 50–82%. We found a statistically significant difference in the median mark-up by essentiality of medicines ($p<0.001$), essential medicines had a median mark-up price of 62% while non-essential medicine had 56%. Antipsychotics had the highest median mark-up, 82%, while anti-neoplastic medicines had the lowest mark-up at 36%, Table 2.

61 community pharmacies (65%) applied the cost-plus fixed percentage mark-up strategy, 34% applied the cost-plus declining percentage mark-up strategy, 9% applied the cost-plus fixed dispensing percentage mark-up strategy and 5% applied the maximum allowable price mark-up strategy. None of the community pharmacies applied the cost-plus differential dispensing percentage mark-up strategy. Some community pharmacies (25%, $n=23$) applied a combination of cost-plus fixed percentage and cost-plus declining percentage mark-up strategies.

The study revealed a statistically significant difference ($p<0.01$) in the median mark-up when the cost-plus declining percentage mark-up strategy was used (55%) versus when it was not used (61%). A statistically

Table 2 Mark-up by class of the drug

Class of drug	Median mark-up (IQR)
Alpha blocker	53 (50–57)
Analgesic	60 (50–85)
Anti-asthmatic	60 (55–87)
Anti-inflammatory	53 (50–59)
Antibiotic	67 (51–100)
Anticonvulsant	60 (55–88)
Antidepressant	67 (54–100)
Antidiabetic	63 (50–100)
Antifungal	58 (30–239)
Antihistamine	63 (50–150)
Antihypertensive	67 (54–100)
Antimalarial	60 (50–74)
Antineoplastic	36 (25–50)
Antipsychotic	82 (52–100)
Antipyretic	69 (59–100)
Antiretroviral	50 (33–55)
Proton-pump Inhibitor	57 (52–67)

Table 3 Mark-up by other study variables

Variable	Median mark-up (IQR)		*p*-value
Mark-up strategy	**Uses the mark-up strategy**	**No use of mark-up strategy**	
Cost + fixed percentage	60 (50–82)	58(51–85)	0.050
Cost + declining percentage	55 (50–74)	61 (50–88)	< 0.001
Cost + fixed dispensing fee	60 (50–81)	60 (50–83)	0.421
Maximum allowable price	67 (53–167)	59 (50–82)	< 0.001
Consideration for mark-up	**Considered**	**Not considered**	
Procurement/distribution process	61 (50–99)	60 (50–82)	0.067
Market Prices	62 (50–100)	59 (50–79)	0.002
Class of drug	59 (51–86)	60 (50–82)	0.429
Value of the drug	60 (50–83)	60 (50–82)	0.219
Regulation	65 (52–100)	59 (50–82)	< 0.001
Expiry date	52 (41–67)	60 (50–83)	< 0.001

significant difference ($p=0.05$) in the median mark-up price was also observed when the cost-plus fixed percentage was used, Table 3. Similarly, there was a statistically significant difference ($p<0.001$) on the median mark-up when the maximum allowable price strategy was used (67%) versus when it was not used (59%). When other factors which may affect median mark-up of the dugs in community pharmacies were considered, market prices ($p=0.002$) and regulation by the Community Pharmacists Association (CPA) ($p<0.001$) had statistically significant difference. Expiry date also had a statistically significant ($p<0.001$) on the median mark-up price, Table 3.).

Community pharmacists who participated in the survey expressed different views regarding the regulation mark-ups. More than half of the community pharmacists, 55% ($N=51$) did not support that mark-up regulations. Overall, 61% ($N=56$) agreed that unregulated mark-up and pricing strategies inflate medicines prices.

Discussion

This is the first pilot survey exploring mark-up strategies in the community pharmacy sector in Zimbabwe. The findings are insightful: community mark-ups in Zimbabwe remain significantly high, median mark-up of 60% (IQR: 50–82%), with essential medicines attracting high mark-up (62%) compared to non-essential medicines. The 60% median mark-up was higher compared to other LMICs such as Sudan and China where community mark-ups were reported around 15% and 15–30% respectively [20, 21]. Other findings have also indicated that western countries have lower mark-up margins around 4–25% compared to Asian countries, where mark-ups are about 50% [22].

The range of mark-up strategies indicated the usage of a regressive mark-up approach, whereby higher cost medicines incur a lower percentage mark-up. The use of regressive mark-up is consistent with the recommendation by WHO in Country Guidelines which suggests that where mark-ups are regulated, using regressive mark-ups is recommended [21–23]. Regressive mark-up ensures that high-cost medicines are not excessively expensive, as those would attract the least mark-up [21]. Additionally, the 2020 WHO guideline on country pharmaceutical pricing policies recommends that mark-up regulations should be implemented together with other pricing policies as incentives for supplying specific medicines such as generic medicines, low-volume medicines, as well as orphan drugs [23]. Lee et al., (2021) found that western countries adopt various pricing practices along their supply chains [21]. For example, Italy, France, Greece, and Canada, have no price caps or additional dispensing fees, while fixed mark-up percentages are widespread in Norway, the UK, and Germany [21]. Medicines classified as essential had higher percentage mark-up than non-essential medicines, with a statistically significant difference. Prior studies have reported high cost of essential medicines in Zimbabwe [5]. However, high mark-up for essential medicines revealed by our survey could to some extent be attributed to the study area where our study was conducted, which is the metropolitan area of Harare where the prices of commodities in general are likely to be high due to high operating costs .

Despite acknowledging that high mark-up results in high cost of drugs, more than half of the community pharmacists who participated in the survey were not in favor of mark-up regulation. The CPA of Zimbabwe suggests a mark-up of 16% for insulin injection, anti-retroviral, and oncology drugs and an average mark-up of 33%

for other classes of medicines. The CPA also proposed a $1 dispensing fee, $2 for handling narcotics/controlled drugs, and a $5 compounding fee. However, these are non-legally binding recommendations as the CPA is a professional body that deals with professional practice of its registered members, not the community pharmacy market. There is a critical need for policy interventions to regulate mark-up on medicines in the community pharmacy sector to improve medicine affordability and accessibility in Zimbabwe [4, 5, 24].

Comparable situations of high prices and constrained access to medicines have also been observed in other LMICs, such as Ethiopia, South Africa, and China [25–27]. The prevailing free-market economy grants practitioners unrestricted power to determine medicine prices. While a policy promoting medicine availability and safety is in place, there exists an opportunity to further develop the Zimbabwe National Medicines Policy to encompass medicines pricing, to offer market guidance for optimal pricing.

Strengths and limitations

Amidst the insightful findings from our pilot study, certain limitations warrant consideration. We acknowledge that our sampling method was convenient, and was based on medicines that are commonly available, sold, and bought from community pharmacies in Zimbabwe. This has unfortunately limited our ability to include vital medicines. We also acknowledge that the community pharmacies surveyed were all located in the metropolitan area of Harare, which is the capital city; mark-up strategies in other parts of the country might differ. Additionally, generics were treated as a broad category without accounting for differences in manufacturers across pharmacies, which may have affected the accuracy of price comparisons. We also recognize that transparency from pharmacists about their pricing strategies could be a limitation, as some may use arbitrary methods for setting prices, which we were unable to fully mitigate. Furthermore, we did not use all the features of the WHO/HAI methodology such as expanding our study area and employing independent, trained researchers for data collection as we intended this study to be a pilot survey, thus the generalizability of our findings might be limited. Nevertheless, our study has mitigated important potential biases, enhancing the strength of our conclusions.

Recommendations

We recommend further research, which employs all the features of the WHO/HAI, to assess the impact of mark-up regulation strategies and allow tailored pricing policies that suit the Zimbabwean context. Furthermore, we recommend regulation of mark-up and other conditions of trading in the community pharmacy sector in Zimbabwe. We also emphasize the use of multiple mark-up and pricing strategies to address the rising cost of medicines.

Conclusion

The pilot survey revealed that most pharmacies in Zimbabwe use cost-plus fixed percentage mark-up strategy. Currently there is no mark-up regulation in Zimbabwe, and the majority of community pharmacists find mark-up regulation unfavorable. Complementing existing government policies such as generic prescribing and zero value-added tax on medicines with mark-up regulation could play a pivotal role in improving consistency and transparency in medicine pricing.

Abbreviations

VEN	Vital, Essential, Non-Essential
WHO	World Health Organization
NEML	National Essential Medicine List
LMICs	Low- and Middle-Income Countries
WHO/HAI	World Health Organization/ Health Action International
USD	United States Dollar
CPA	Community pharmacists Association

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Author contributions

PT and VB conceptualized and designed the study, PT collected data, and drafted the manuscript. HN and VB provided guidance for completion of the study and reviewed the manuscript, and PT and HN wrote this paper. All authors have approved the final version for publication.

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Data availability

No datasets were generated or analysed during the current study.

Declarations

Ethics approval and consent to participate

This study was approved and authorized by the Medical Research Council of Zimbabwe (MRCZ), reference number: MRCZ/B/2068. Informed consent was obtained from the participants and the confidentiality of the participants was assured.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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