Original Research Article

Quality of Labels of Some Locally Manufactured Medicines in Ghana

Abstract

Background: Labelling plays an important role in informing healthcare providers and patients with appropriate information on drugs and how to optimize their therapeutic effects whilst minimizing potential side-effects. For these reasons, drug regulatory bodies have specifications which drug manufacturers are required to conform to in the labelling of their products.

Aim: The purpose of the study was to find out whether locally manufactured medicines on the Ghanaian market meet the specifications set out by the Ghana Standards Authority.

Place and Duration of Study: The study was carried out in Kumasi, Ghana, between April 2018 and September 2018.

Methodology: The labels of one hundred locally produced drugs were assessed based on the general labelling rules for drugs outlined in the Legislative Instrument, L.I. 1541. Some parameters used for the assessment were dates of manufacture and expiry, batch number, indications, active ingredients, handling precautions, etc.

Results: Results obtained indicated that 17% of the products did not have date of manufacture; 10% did not bear expiry dates; 23% did not have batch numbers; 54% did not have indications; and 24% did not specify the active ingredients. It was also observed that 15% of the products did not have handling precautions.

Conclusion: Such products may present a serious health threat to users, as for instance, drugs without expiry dates may be consumed even after it has expired; and for those without batch numbers, it may be difficult to recall when a problem arises. Additionally, products without indications may be wrongly used. Based on the results, it is recommended that the appropriate regulatory bodies take a critical look at the labels on drugs in the market.

***Keywords**: labels, pharmaceuticals, quality, batch numbers, regulatory bodies*

1. Introduction

Many people are inadequately informed about proper use of pharmaceutical products as well as their associated hazards, and for such people, the only source of information they may have access to are those found on the labels of pharmaceutical products[1,2]. There have also been occasions where prescription medications have been misused with harmful and sometimes deadly results due to inadequate information [3–6]. Drug misuse, which refers to the use of a substance for a purpose not consistent with legal or medical guidelines, may take several forms[7,8]. These include taking the right medication in an inappropriate manner, at an incorrect time schedule, as well as taking the wrong medication which may occur as result of poor labelling of the medication[7,9]. Proper labelling of products can help avert misuse of the products. On the other hand, poor labelling, which can occur as a result of the use of out-of-date information, illegible printing, negligence, etc. [6,10,11], can accelerate drug misuse.

A label is therefore important in that it helps to make the right choice of product, give directions, and cautions as to how to use a product and make sure that patients have clear and concise information which will help one to take medication in the most efficient and proper way [12].

It is the duty of the manufacturer to make sure that the information on the label is brief, clear, and easy to comprehend as it has a great influence on the patient. However, not all relevant information is provided because there may be inadequate space to supply all the information required by law on the label of the product, specifically relating to the composition of medicines, potential side-effects, contraindications, drug interactions, etc. Sometimes the font size is reduced to accommodate the required information, but that can also result in the information being unreadable or difficult to read, and this increases the likelihood of patients overlooking serious risks or not reading [13].

Relevant regulatory bodies in many countries require some basic information on the labels of all pharmaceutical products. These include the name of the preparation, quality, quantity, generic and the brand name of the product and instructions for the patient. Other information that might be included is the details of the content of the active ingredients, directions on usage, contraindications, and storage conditions. The date of manufacture as well the batch number and date of expiry all have roles to play in determining the shelf life of a pharmaceutical [14].

In Ghana the Public Health Act authorizes the Food and Drugs Authority (FDA) to protect the Ghanaian public through the regulation of food, drugs, household chemical substances, among others [15]. Drug information offered by producers to health care providers and consumers and the labelling of the original drug package should conform to specifications outlined in the regulations of the *Ghana Standard Board, General Labelling rules, 1992* [16]. Similarly, the Food and Drugs Administration of the United States is responsible for protecting the public health by ensuring the safety, effectiveness of drugs as well as providing the public with accurate, science-based information to ensure the safe and appropriate use of both prescription and non-prescription drugs among others [17].

In the United Kingdom, the Medicines and Healthcare products Regulatory Agency approves all packaging and labelling of medicines sold in the UK and the labelling should conform to their requirements. Among other things, it requires that a label should contain the name of the medicine, expression of strength where relevant, route of administration, warnings, and posology when the product is an over-the-counter drug. These items are deemed crucial for the safe use of the medicine. Labels must also be unambiguous – thus both healthcare professionals and patients should easily be able to identify the medicine by the label [18].
From the foregoing, labels on drug products play a crucial role in ensuring that maximal benefits are obtained from drugs whilst ensuring that adverse effects or untoward reactions are minimized. With this in mind this study seeks to find out whether the labels on some locally manufactured pharmaceutical products on the Ghanaian market meet the standards set by the regulatory authorities in the country.

2.0 METHOD

2.1 Study Design

The study was conducted to assess the level of compliance of labels on some locally manufactured drugs. The data collection was carried out between April 2018 and September 2018.
The labels of one hundred different drugs were observed and the details on the contents of the labels were recorded. Different facilities in different locations were visited for the survey and

the information on the labels of available locally produced drugs were observed and recorded. The inclusion criterion was drugs produced locally in Ghana.

2.2 Study Site, Population and historical background

The study was carried out in the Kumasi Metropolis in the Ashanti Region. Kumasi, the second largest city in Ghana, is the capital city of the Ashanti Region. It is in the rain forest region and is popularly referred to as the Garden City of Africa. It is made up of people from all the sixteen regions of Ghana and it is estimated to have a population of over three million.

2.3 Data Collection Tool

The data on each of the 100 selected products was collected using a questionnaire which was developed based on the labelling requirements set out in the legislative instrument that governs the labelling of Food, Drugs and other goods in Ghana [16]. The data was obtained through direct observation of the labels on the dosage forms.

2.4 Sampling Technique

The study involved purposively sampling of locally manufactured drugs found in pharmacies and licensed chemical stores (Over-the-Counter Medicine Sales outlets).

2.5 Statistical Analysis

Descriptive statistics was used to present the data obtained on the various labels on different products from the facilities visited. Graphs, charts, tables and others were employed to analyze the data using Microsoft excel spread sheet version 2016.

3 RESULTS

The data obtained based on the labelling requirements for drugs in Ghana as outlined in L.I. 1541 is as found in Table 1. The items available were designated as present and those unavailable as absent.

Table 1: Data on the labels of locally manufactured drugs in Ghana

Item observed	Present (%)	Absent (%)
Name of drug	100	0
Batch / Code	77	23
Manufacturer's Address	100	0
Handling precautions	85	15
Date of Manufacture	83	17
Expiry date	90	10
Active ingredient	76	24

Drug Indications	46	54
Contraindications	3	97
Net weight / Volume	88	12
Direction for use	48	52
Route of Administration	37	63
Net weight / Volume	88	12
Direction for use	48	52
Route of Administration	37	63

Dosage Forms

On the dosage forms, liquid preparations comprising mixtures, syrups and suspensions constitute 46 percent of the products and these were followed by tablets which constituted 20% of the products. The others range from 10 to 12%. Figure 1 gives a summary of the various dosage forms encountered in the study.

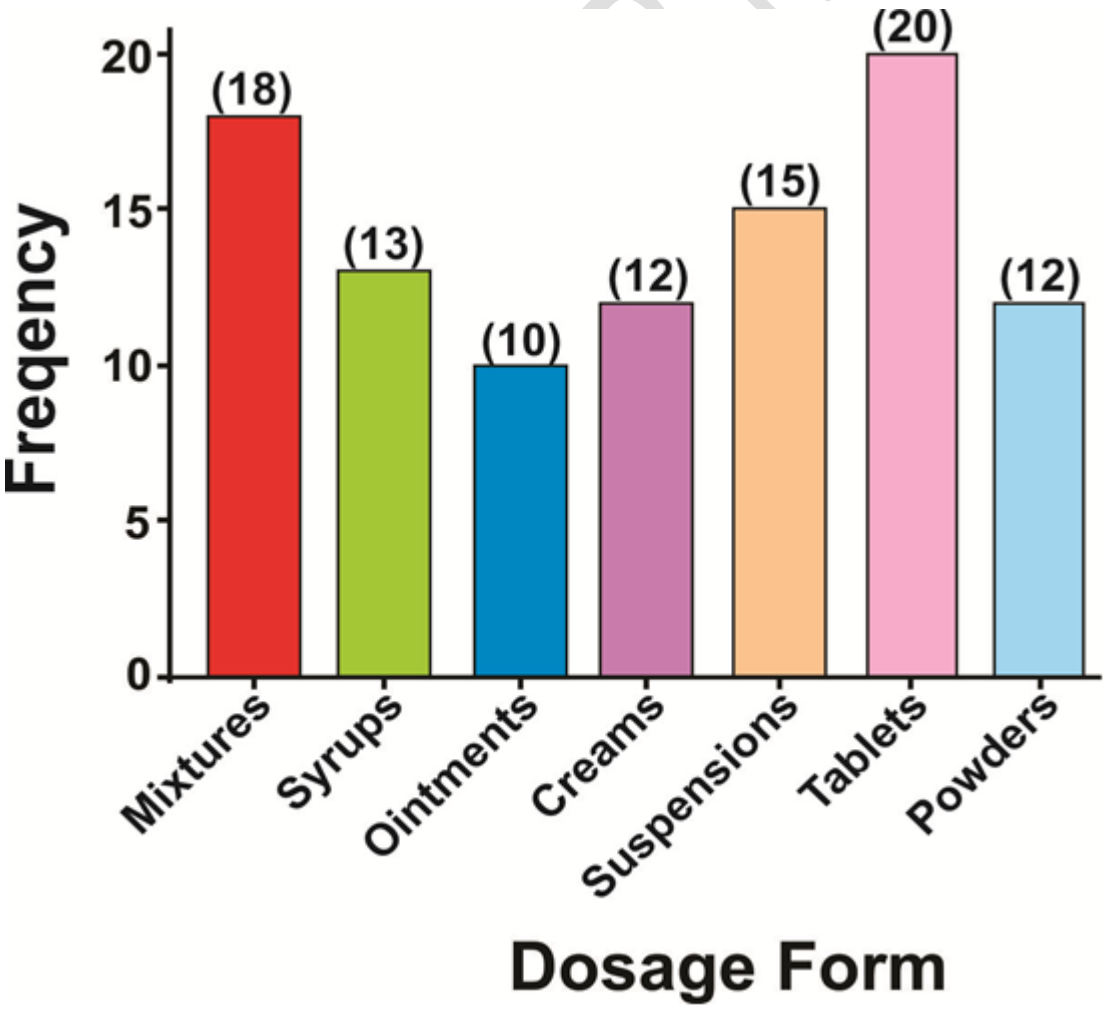

Figure 1: Dosage forms of Drugs

4. DISCUSSION

The survey covered 100 locally manufactured pharmaceutical products in some community pharmacies and licensed over-the-counter medicine sellers' shops in Kumasi. The dosage forms in this survey include mixtures, syrups, ointments, tablets, creams, etc.

As found in Figure 1, about half of the products considered were liquid oral dosage forms, comprising mixtures, syrups, and suspensions; and a fifth of the products considered were tablets. Thus, liquid oral preparations and tablets were the most common products, possibly because of their popularity among consumers and prescribers. The other dosage forms had varying percentages that ranged from 12% for creams to 10% for powders.

Liquid dosage forms provide a convenient means of drug administration to those who are unable to swallow tablets and capsules as in the case of children and the elderly. It also has an advantage of the drug being dissolved in the formulation and hence being immediately available for absorption. Masking the bitter taste of some drugs may also be readily achieved [19]. The relatively high percentage of the liquid oral preparations compared to the tablets may be due to that fact some local manufacturers may not have the capacity to produce tablets.

Tablets, on the other hand, are a convenient way of carrying medication, and an elegant dosage. In addition, tablets may also be formulated to either release the drug rapidly or in a controlled manner (controlled release), thus reducing the number of daily doses required and this may increase patient compliance to therapy. They are also generally inexpensive dosage forms and it is easier to mask the taste of bitter drugs using tablets than other dosage forms, e.g. liquids [19]. These reasons may account for the relatively high number of the dosage forms being tablets.

Creams and ointments each constituted about a tenth of the products surveyed. The relatively small proportion of the products being creams and ointments may be due to the fact that these dosage forms are mainly applied topically to exert a local effect such as treating a skin infection or to manage pain as compared to tablets and liquid oral preparations which are administered for systemic effects.

The labels of these drugs were evaluated according to the specifications spelt out in the Legislative Instrument 1541 (1992) of the Ghana Standards Board (Food, Drugs and other goods) general labelling rules, 1992. Under this regulation, the name of the product and the address of the manufacturer are among the items required on the label of a drug. These two are what identifies the drug and its source and hence a product without a name and manufacturer may not be identified and as such must not be ideally marketed. These items were present in all the products observed, and this is appropriate as the products can be identified easily.

However, in about a fifth of the products, the batch number which "is a distinctive combination of numbers and/or letters which uniquely identifies a batch on the labels, its batch records and corresponding certificates of analysis" [20] were not stated although it is one of the requirements by the law. This will make it difficult to trace and recall samples from the market, in case a problem arises and some of the batches must be withdrawn.

Similarly, the dates of manufacture and expiry are two important parameters required by regulatory authorities in almost all countries including Ghana. It gives information on when the drug was produced and when it is likely to expire and therefore not fit for consumption. The date of expiry is determined based on the stability of the active and inactive ingredients at ambient temperatures. Thus, the shelf-life of a dosage form may be shortened or extended

based on the conditions under which it is stored [21]. From Table 1, the manufacturing date for about 20% of the products were not given even though it is a legal requirement, thus if even the expiry date has been stated, it does not give any clue of how long the product has been on the shelf. Likewise, in about a tenth of the products the expiry dates were not stated. This makes it difficult for one to determine whether these products have expired or not. When drugs break down, the products may be toxic, for instance, the formation of epianhydrotetracycline from tetracycline [22], in this case the continuous use of the product may lead to deleterious effect. These proportions of the drugs without manufacturing date and expiry dates should be of great concern to the pharmaceutical industry and the public as whole.

Another parameter of prime concern is the handling precautions which give instructions on how to keep the drug to preserve its activity or efficacy within the stated shelf life; thus, some drugs should be stored in a refrigerator whereas others can be stored under room temperature. Keeping the product under harsh conditions may lead to a reduction in the shelf life stated on the product [23]. From Table 1, about 1 in 7 of the products did not bear any handling precautions, and hence if these products are not stored under appropriate conditions, it may lead to their rapid deterioration and consequently shorten its shelf life.

Contraindications of a drug give potential users with pre-existing conditions who cannot or should not take the drug and hence a very important aspect of labelling to warn people who may have adverse effects of the drug. From Table 1, about 97% of the products did not have contraindications as part of their labelling and this may have serious implications on consumers. For instance people with asthma should not be taking beta blockers as antihypertensives as these drugs may precipitate an acute asthmatic attack [24]. It is the contraindication that will give information to patients as to whether the product would be appropriate for them or otherwise.

A drug product is made up of both inactive and active ingredients, the latter being the chemical substance with activity and the former being ingredients which aid in the formulation of the product such as a syrup which is used to sweeten a liquid solution or cream that is used to prepare a semisolid preparation. When these ingredients are stated on the label it may warn people who are allergic to any of the components to stay away from the product to prevent an untoward reaction to the drug. From Table 1, more than a fifth of the products did not bear the ingredients used in their preparation. When the active ingredient is not stated on a product, one may take similar product concomitantly without knowing. For example, if one takes a product containing aspirin which is not indicated on the label he/she may still take another product which contains the same aspirin without knowing.

Again, from Table 1, about half of products did not have the indications on them, but since these drugs may be issued either on a physician instruction (on a prescription) or on the recommendation of a pharmacist in the case of ‘pharmacy only medicines’ and other drugs which can be sold on the advice of a pharmacist, there is a higher likelihood that these may not have a serious effect on society as the people who decide on the indications have adequate information on the indications of the drug. Misuse may, however, arise if the product is an over-the-counter medicine, and the client buys it and uses it for the wrong indication.

Another issue worth considering on the labels of drugs is the net weight (for solid dosage forms) and volume (in the case of liquid preparations) of the product. The net weight or volume gives an idea of the contents of a drug product. When prescriptions are being served, there is a need to calculate the quantity /volume of drug to be dispensed (in the case of liquid preparations) and this will inform the dispenser how many bottles of the preparation should be given to the patient. If the net content is not stated, then it becomes difficult for the dispenser to predict how many bottles should be given to fully comply with the prescription.

From the results in Table 1, about one in every ten of the products considered did not indicate the net content of their preparations. This may lead to inaccuracies in dispensing, such as under dosing with its attendant problems.

5. Conclusion

It has been established that the labels of some of the locally manufactured drugs in Ghana do not meet the specifications for labelling set by the Legislative Instrument that governs the labelling of drugs in the Country.

Authors' contributions

This work was done in collaboration among all authors. All authors read and approved the final manuscript.

References

1. Alshammari TM, Devadasu VR, Rathnam RP. Comparison of the safety information on drug labels in three developed countries: The USA, UK and Canada. Saudi Pharm J 2017;25:1103–7. https://doi.org/10.1016/j.jsps.2017.07.006.
2. Kalsher MJ, Wogalter MS, Racicot BM. Pharmaceutical container labels: Enhancing preference perceptions with alternative designs and pictorials. Int J Ind Ergon 1996;18:83–90. https://doi.org/10.1016/0169-8141(95)00033-X.
3. Misra SC, Santagostino A, Dine G, Bonhomme Faivre L. Acute Kidney Injury Following High-Dose Methotrexate Administration in a Day Care Hospital. Drug Saf - Case Reports 2019;6:1–4. https://doi.org/10.1007/s40800-019-0106-7.
4. Fusco JA, Paulus EJ, Shubat AR, Miah S. Warfarin and Rivaroxaban Duplication: A Case Report and Medication Error Analysis. Drug Saf - Case Reports 2015;2:1–5. https://doi.org/10.1007/s40800-015-0007-3.
5. Makary MA, Daniel M. Medical error-the third leading cause of death in the US. BMJ 2016;353:1–5. https://doi.org/10.1136/bmj.i2139.
6. Adler D. Medication Packaging and Dispensing. US 8,025,314 B2, 2011. https://patientimages.storage.googleapis.com/56/85/17/0205a6beefe288/US8025314.pdf
7. World Health Organization. Lexicon of alcohol and drug terms. 1994. https://apps.who.int/iris/bitstream/handled/10665/39461/9241544686_eng.pdf:jsessionid=424B11F12A59359ED4681ECAA5ACDF36?sequence=1
8. National Collaborating Centre for Mental Health. Drugs Misuse, Psychosocial interventions National Clinical Practice Guideline Number 51. 2008.
9. Katzung B.G.(Ed). Basic & Clinical Pharmacology. 14th Edition. McGraw-Hill Companies, Inc.; New York; 2018.p. 575
10. Boyce RD, Horn JR, Hassanzadeh O, Waard A de, Schneider J, Luciano JS, et al. Dynamic enhancement of drug product labels to support drug safety, efficacy, and

effectiveness. J Biomed Semantics 2013;4. https://doi.org/10.1186/2041-1480-4-5.

11. Drug misuse, abuse, and addiction: What's the difference? - Meridian Psychiatric Partners, LLC n.d. https://meridianpsychiatricpartners.com/drug-misuse-abuse-and-addiction-whats-the-difference/ (accessed 3 May 2022).
12. Yabite H, Tessema S, Wabe NT. Dispensed Medications: Labeling Patterns and Patient Knowledge at a Tertiary Care University Hospital in Southwest Ethiopia. Drug Inf J 2012;46:688–93. https://doi.org/10.1177/0092861512456977.
13. Duke J, Friedlin J, Ryan P. A quantitative Analyses of Adverse Events and 'Overwarning' in Drug Labeling. Arch Intern Med 2011;171:944–6.
14. Rees JA. Pharrmaceutical Practice. 5th Edition. Churchill Livingstone; 2014.pp. 299-302
15. Public Health Act 2012, Act 851. Ghana: 2012. https://bcp.gov.gh/acc/registry/docs/PUBLIC HEALTH ACT, 2012 (ACT 851).pdf
16. LI 1541. Ghana Standards Board (Food, Drugs and other goods) general labelling rules, 1992 1992:1–6.
17. Food and Drugs Administration. A Guide for Health Professionals. 2020.https://www.fda.gov/about-fda/fda-basis/what-does-fda-regulate
18. MHRA. Best practice guidance on labelling and packaging of medicines 2016:3–6.
19. Jones D. FASTTrack Pharmaceutics _Dosage Form and Design. London: Phamaceutical Press; 2008.
20. WHO. Quality Assurance of Pharmaceuticals: A compendium of guidelines and related materials. 2nd Edition. WHO; 2007. https://doi.org/10.1081/e-ept4-120003783.
21. ICH Q1A(R2). International Conference on Harmonization (ICH). Guidance for industry: Q1A(R2) STABILITY TESTING OF NEW DRUG SUBSTANCES AND PRODUCTS. Ich Harmon. Tripart. Guidel., vol. 4, 2003, p. 24.
22. Bajaj S, Singla D, Sakhuja N. Stability testing of pharmaceutical products. J Appl Pharm Sci 2012;2:129–38. https://doi.org/10.7324/JAPS.2012.2322.
23. WHO. Annex 5: Guidelines for Stability Testing of Pharmaceutical Products Containing Well Established Drug Substances in Conventional Dosage Forms. 1996.
24. BNF. British National Formulary. vol. 76. London: BMJ Group and Pharmaceutical Press; 2018. https://doi.org/10.1017/CBO9781107415324.004.