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Leveraging Pharmacists to Spur National Economic Growth and Development

National economic development encompasses the steps a nation takes to improve the economic, political and social well-being of its people. This ideology has been in existence in the developed countries for centuries and has also been adopted by the developing countries. Economic growth is measured by certain indicators which include Gross Domestic Products per capita, income distribution, literacy and education, social security, modern transportation and access to healthcare, a key area where pharmacists can play an intimately direct role.

The diverse areas in the health sector itself, indeed, affords pharmacists a much larger territory to make varying degrees of impact. Pharmacists have a responsibility in sustaining the ocean of improved public health, a symbol of population-level positive health outcome through the rivulet of diverse roles they contribute. Beyond the peripheries of the pharmaceutical sector in particular, and the health sector in general, it is heart-warming to note professionals with background in pharmacy either performing amazingly well or advancing the frontiers of these non-pharmacy related fields altogether. The story of a lady pharmacist-turned banker, who has risen through the ranks of the banking industry to become the first female chief executive officer of a prominent bank in this country is a classic example of this scenario. There are also stories of some pharmacists who have braced the odds to join the country’s chieftaincy institutions, with the hope of pulling the development and economic levers of their communities through this enduring cultural heritage.

From a broader perspective, pharmacists’ collective contributions towards the nation’s developmental agenda straddles both the private and the public sector, although the former harbours the larger proportion of the practitioners. Whilst admitting that pharmacists comprise of the minority among the legion of
health professionals, it is however undeniably accurate to aver that pharmacists have a responsibility across the continuum of decision-making levels: from the bedside of the patient through to the wider corridors of policy formulation. By virtue of their expert knowledge on medications, which are a common resort—about 98% of the time—in humanity’s armamentarium for the treatment, primary and secondary prophylaxis of diseases, a greater level of expectation is placed on them and are accordingly anticipated to accept the responsibility in the development and sustainability of this weaponry.

Reducing disease burden and enhancing the well-being for people of all ages is as central to the general security as it is to the economic development of any nation. The Sustainable Development Goals (SDGs), which is a successor to the Millennium Development Goals (MDGs), provides a global direction for member states of the United Nations to build on the successes achieved under it with a vision of charting a future which promises improved socio-economic conditions for the citizens of countries who are part of the bloc. Whilst the SDG 3—Good Health and Well-Being—may appear broad, some specific goals under this objective recognizes the fundamental importance of access to safe, effective, quality and affordable medicines in attaining an envisioned world of prosperous nations and societies. For that matter, an express opportunity has been presented to pharmacists to demonstrate to the world, not only as key stakeholders but also mavens of the pharmaceutical sector, their sway as well as voice towards national and global development.

Furthermore, by keeping in sight the imperativeness of ensuring access to quality and affordable, essential medicines for societies, all elements of the life cycle of pharmaceutical products have been implicitly invoked - from the very early stages of drug discovery, often characterised by old-fashioned trial and error chemistry in the labs, to preclinical trials, human trials and to the final stages where medicines reach the market and patient starts receiving them through pharmaceutical retail outlets. In effect, the notion that every pharmacist, irrespective of the area of practice—research, regulatory, community, industry, public health, policy development, hospital, and even politics etc.—has a role to play in the nation’s economic development is overwhelmingly accurate. The overarching element here is a requirement for pharmacists to practice to the full extent of their knowledge and skills—of course guided by established regulatory and ethical frameworks—whilst being mindful that their individual quota is what will provide the impetus for the collective development of a stronger national presence for the profession.

Areas of practice under pharmacy which are dogged by challenges and require a hand up ought to be reached and given the required supportive network through the mother body, PSGH. Under the aegis of the Society’s leadership, together, pharmacists in this country can shape the national development agenda as a formidable workforce. The 2017 Annual General Meeting (AGM) which coincides with the publication of the year’s edition of the journal and being held under the theme, “Harnessing Opportunities in Pharmacy for National Economic Development”, presents an opportune moment to reflect on and assess how pharmacists are drawing on the swathe of opportunities at their disposal in contributing to author the story of Ghana’s development.
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ABSTRACT

INTRODUCTION: Approximately 50% of prescribed medicines worldwide are considered to be inappropriate. In addition to inappropriate prescribing, it has also been reported that more than half of all medicines are wrongly dispensed, whereas about half of all patients take their drugs incorrectly. Education and training of healthcare personnel has been reported to contribute to improved rational use of medicines.

AIM: The study was conducted to assess rational use of medicine indicators and to evaluate impact of training and education on Rational Use of Medicines (RUM) indicators.

METHODS: The study was a before-and-after study involving a review of 156 and 177 prescriptions, patients’ treatment folders and drug administration charts in 2015 and 2016 respectively at the Cape Coast Teaching Hospital over a four-week period. RUM indicators assessed included prescribing indicators, indicators of a valid prescription, patient care indicators and drug administration indicators.

RESULTS: A total of 177 prescriptions were assessed in 2016. The average number of medicines prescribed per patient was 2.2 in 2015 compared with 2.8 (SD=1.63) in 2016. The proportion of generic prescribing was 77.4% in 2015 as against 81.9% in 2016. Antibiotics were prescribed in 30% in 2015 compared to 13.8% in 2016 of the prescriptions whereas injections were prescribed in 8.6% and 1.6% of patient encounters in 2015 and 2016 respectively. There was significant increase in dispensing communication time in 2016 over 2015 results i.e. 42.4 seconds vrs 60.2 seconds. The unpaired t-test showed a mean difference of 17.8 seconds with 95% CI (11.2-23.7) and p < 0.001. There was marginal increase in the consulting time over the same period i.e. 12 mins vrs 13.2 mins. Tracer medicines availability level was found to be 62.7% in 2015 compared to 84.7% in 2016.

CONCLUSION: There was significant improvement in most of the RUM indicators assessed in 2016 compared to the results obtained in the year 2015. Rum education and training has an impact on optimum prescribing and dispensing practices. The improved prescribing habit likely contributed to the increase in the tracer drug availability.
KEY WORDS: Rational use of medicines, consulting time, dispensing time, tracer medicines, Cape Coast Teaching Hospital.

INTRODUCTION

Rational use of Medicines requires that patients receive the appropriate medicines, in doses that meet their own individual requirements, for an adequate period of time, and at the lowest cost both to them and their community (WHO, 2004). The need to intensify education and promote rational drug use is even more pressing considering the fact that approximately 50% of prescribed medicines worldwide are considered to be inappropriate (Hogerzeil, 1995). In addition to inappropriate prescribing, it has also been reported that more than half of all medicines are wrongly dispensed, whereas about half of all patients take their drugs incorrectly.

It has been posited that irrational use of medicines has resulted in costly and extremely harmful treatment to both individual patients and their communities as a whole (Alanis, 2006). Adverse drug events are reportedly ranked among the top 10 causes of death in the United States of America and are estimated to cost the US between US$ 30 and US$ 130 billion each year (Stausberg and Hasford, 2011). Again, the problem of growing resistance to antimicrobial agents is a particularly serious challenge to countries at all economic levels, and results largely from inappropriate prescribing and use. The development of resistance to Ciprofloxacin for example, has resulted in the cessation in the use of ciprofloxacin for the treatment of gonorrhoea (Unemo and Shafer, 2011). Instead, the CDC now recommends the use of Ceftriaxone for the treatment of gonorrhoea.

Rational drug use surveys help to identify areas where interventions aimed at improving rational use of medicines need to be targeted. Educational strategies for healthcare practitioners and consumers are essential but frequently neglected or inappropriate. Education in the rational use of medicines includes patient instruction on the principles and practical application of the use of medicine including non-medicine therapy and instruction at the time of illness on appropriate use of prescribed or dispensed medicine(s). These activities form a part of a comprehensive approach that also includes undergraduate and postgraduate medical education, continuing medical education or in-service training, standard treatment guidelines, independent information on medicines, ethical drug promotion, and balanced information provided from the industry as compared to other independent drug information sources.

It is on the basis of this that this rational use of medicine survey was conducted to assess rational use of medicine indicators and to evaluate impact of RDU workshops and education on the RDU indicators.

AIM

To assess rational use of medicine indicators and to evaluate impact of training and education on RUM indicators.

Specific Objectives

To assess the prescribing indicators at CCTH.

To assess the dispensing and drug administration indicators at CCTH.

To evaluate the impact of training and education on RUM indicators.
METHODS

Study Site

The study was conducted at the Cape Coast Teaching Hospital (CCTH), located within the Pedu sub-metro of Cape Coast Metropolis. CCTH is a 400-bed capacity hospital which serves as a major tertiary referral centre providing specialist healthcare services to residents of the Central and Western regions of Ghana. It runs specialist clinics in all the four major disciplines; internal medicine, obstetrics and gynaecology, surgery and paediatrics. It also runs a 24-hour accident and emergency services, public health and general outpatient department services. These services are supported by diagnostics, clinical and ward pharmacy practice and outpatient pharmaceutical services.

Study Design

The design was a cross-sectional descriptive before and after study involving review of patients’ treatment folders and prescriptions, dispensed medicines labelling and drug administration charts. The study also involved direct observation and record of patients consulting and dispensing communication times.

Sampling Method

Data was collected using a specifically designed data collection tool from 177 patient records. Data collection was done by trained research assistants (3 pharmacists and 3 Pharmacy Interns) over a period of four (4) weeks beginning from 1st June to 29th June, 2016. The first section of the data collection tool captured information on prescriber practices. This section sought to find out the extent to which prescribers adhered to the prescribing indicators outlined for rational prescribing. These indicators included the consulting time, number of generic prescriptions, antibiotics, injections etc. Indicators such as patient’s name, age, gender, diagnosis, name of prescriber, signature of prescriber and number of medicines prescribed from the hospital formulary were also captured. All this information was extracted from patients’ prescriptions as and when they came to the pharmacy for their medications.

The second section of the tool captured information on dispensing practices at the pharmacy. Information captured under this section included dispensing communication time, labelling (name of medicine, name of patient, strength of medicine, quantity of medicine dispensed, dosage instructions, initials of dispenser etc.) of these medicines. The research assistants also interviewed the patients after medicines were dispensed to them to find out their knowledge of the dosage regimen of medicines dispensed to them. The waiting and dispensing times were also captured in this section of the data collection tool.

Drug administration practices were captured in the third section of the tool. The drug administration chart of patients at the various wards were carefully reviewed to capture information on names, dose, route of administration, frequency of administration and duration of administration of medicines being administered. The research assistants also extracted information on appropriate time of medicine administration to patients and charting of administered medicines on the drug administration chart. Similar method was used to assess 156 prescriptions, treatment folders and drug administration chart in 2015 and compared.

Data Handling and Analysis

The data obtained was entered into SPSS version 21 and analyzed. The results of continuous variables were presented as mean and standard deviation and that of categorical variables were presented as frequencies and proportions. Paired t-test was used to assess the level of significance between the mean difference of the dispensing time. A cut-off of 0.05 was used to assess the level of significance.

Ethical considerations

Approval for the study was obtained from the Research and Development Department of the Cape Coast Teaching Hospital. The names of patients, doctors, pharmacists, pharmacy technicians and nurses involved in the study were captured to ensure that their identities were not disclosed.

RESULTS

Prescribing indicators

This study involved the assessment of a total of 177 prescriptions. The average number of medicines prescribed per patient was 2.8 (SD± 1.63). A total of 399 (81.9%) medicines were prescribed by generic names. Antibiotics were prescribed in 13.8% of the prescriptions whereas injections were prescribed in 1.6% of patient encounters. Almost all the medications (98.2%) were prescribed from the essential medicines list. (Refer to Table 1)
Table 1: Summary of results for prescribing indicators assessed

<table>
<thead>
<tr>
<th>% Encounter</th>
<th>Average/Percentage 2015</th>
<th>Average/Percentage 2016</th>
<th>WHO Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average number of medicines per encounter</td>
<td>2.2</td>
<td>2.8</td>
<td>2</td>
</tr>
<tr>
<td>Percentage of medicines prescribed by generic</td>
<td>77.4%</td>
<td>81.9%</td>
<td>100</td>
</tr>
<tr>
<td>Percentage of encounters with antibiotics</td>
<td>30.0%</td>
<td>13.8%</td>
<td>20</td>
</tr>
<tr>
<td>Percentage of encounters with injections</td>
<td>8.0%</td>
<td>1.6%</td>
<td>20</td>
</tr>
<tr>
<td>Percentage of medicines from essential medicines list</td>
<td>97.7%</td>
<td>98.2%</td>
<td>100</td>
</tr>
</tbody>
</table>

Valid Prescription Indicators

Most (95.5%) of the prescriptions issued by prescribers had the diagnosis of the patient indicated on them. About 55% of the prescriptions had the gender and ages of the patients indicated on them. Surprisingly, none of the prescriptions had the address of the prescribers indicated on them. The names and signatures of the prescribers were however indicated on 65.5% and 46.9% of the prescriptions respectively. (See Table 2)

Table 2: Summary of results for valid prescription indicators

<table>
<thead>
<tr>
<th>Valid Prescription Indicators</th>
<th>% Encounter</th>
</tr>
</thead>
<tbody>
<tr>
<td>% prescriptions with Diagnosis indicated</td>
<td>95.5</td>
</tr>
<tr>
<td>% prescriptions with Age indicated</td>
<td>55.4</td>
</tr>
<tr>
<td>% prescriptions with Gender of patient indicated</td>
<td>54.8</td>
</tr>
<tr>
<td>% prescriptions with the Name of prescriber indicated</td>
<td>65.5</td>
</tr>
<tr>
<td>% prescriptions with the Prescriber's address indicated</td>
<td>0</td>
</tr>
<tr>
<td>% prescriptions with Prescriber's signature indicated</td>
<td>46.9</td>
</tr>
</tbody>
</table>

Patient Care Indicators

The average consulting time recorded in this study was 13.2 minutes (SD 12.05) with a minimum consulting time of one minute and a maximum of 58 minutes. An average dispensing time of 60.2 seconds (SD 43.66) was recorded with the shortest dispensing time being 5 seconds and the longest being 247 seconds (approximately 4 minutes). Medicines which were actually dispensed to patients constituted 71.3% of the total number of medicines prescribed and 75.9% of these dispensed medicines were adequately labelled. A good percentage of the patients (90.1%) had knowledge of correct dosage of the medicines dispensed to them (See Table 3).
### Table 3: Summary of results for patient care indicators assessed

<table>
<thead>
<tr>
<th>% Encounter</th>
<th>Average/Percentage 2015</th>
<th>Average/Percentage 2016</th>
<th>WHO Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average consultation time (min)</td>
<td>12</td>
<td>13.2</td>
<td>5</td>
</tr>
<tr>
<td>Average dispensing time (sec)</td>
<td>42</td>
<td>60.2</td>
<td>60</td>
</tr>
<tr>
<td>Percentage of tracer drug availability</td>
<td>62.7</td>
<td>84.7%</td>
<td>100%</td>
</tr>
<tr>
<td>Percentage of medicines adequately labelled</td>
<td>63.0</td>
<td>75.9%</td>
<td>100%</td>
</tr>
<tr>
<td>Percentage of patients with knowledge of correct dosage of medicines</td>
<td>72</td>
<td>90.1%</td>
<td>100%</td>
</tr>
</tbody>
</table>

### Drug Administration Indicators

The percentage encounters for the drug administration indicators assessed were within 83% and 89%. However, about half of the patients assessed (45.9%) missed some doses of their medicines and 75.7% had their medicines administered to them at the right time (Refer to Table 4).

### Table 4: Summary of results for drug administration indicators

<table>
<thead>
<tr>
<th>Drug Administration Indicators</th>
<th>Results (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medicines indicated on drug administration chart</td>
<td>89.2</td>
</tr>
<tr>
<td>Dose of medicines indicated on chart</td>
<td>89.2</td>
</tr>
<tr>
<td>Route of administration indicated on chart</td>
<td>89.2</td>
</tr>
<tr>
<td>Frequency of administration indicated on chart</td>
<td>89.2</td>
</tr>
<tr>
<td>Duration of therapy indicated on chart</td>
<td>83.8</td>
</tr>
<tr>
<td>Medicine administered at the right time</td>
<td>75.7</td>
</tr>
<tr>
<td>Medicine administration charted</td>
<td>89.2</td>
</tr>
<tr>
<td>Dose of medication missed</td>
<td>45.9</td>
</tr>
</tbody>
</table>

### Impact of Staff Training and Education on RUM Indicators

The average consulting and dispensing times increased by 1.2 minutes and 20.2 seconds respectively after staff training and education. The least percentage increase recorded (4.5%) was for percentage of generic medicines prescribed whiles the highest (18.1%) was for percentage of patients with knowledge of correct dosage of medicines prescribed. Though all the variances were not very remarkable, they were all statistically significant (p<0.05) (Refer to Table 5).
Table 5: Summary of results showing the impact of staff training and education on RUM indicators

<table>
<thead>
<tr>
<th>Average/ Before Training 2015</th>
<th>Average/ % After Training 2016</th>
<th>Time Increase/% Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average consulting time (min)</td>
<td>12.0</td>
<td>13.2</td>
</tr>
<tr>
<td>Average dispensing time (sec)</td>
<td>42.0</td>
<td>60.2</td>
</tr>
<tr>
<td>% Generic medicines prescribed</td>
<td>77.4</td>
<td>81.9</td>
</tr>
<tr>
<td>% Antibiotics prescribed</td>
<td>30.0</td>
<td>13.8</td>
</tr>
<tr>
<td>% of medicines adequately labelled</td>
<td>63.0</td>
<td>75.9</td>
</tr>
<tr>
<td>% of patients with knowledge of correct dosage</td>
<td>72.0</td>
<td>90.1</td>
</tr>
<tr>
<td>% of medicines prescribed from EDL</td>
<td>97.7</td>
<td>98.2</td>
</tr>
</tbody>
</table>

DISCUSSION

Prescribing Indicators

One manifestation of irrational medicine use is inappropriate prescribing. This occurs when medicines are not prescribed in accordance with guidelines based on scientific evidence to ensure safe, effective and economic use (WHO). From this study, the average number of medicines prescribed per encounter was 2.8. This value is slightly higher than the recommended value of 2.0 by WHO (WHO, 1993). In similar studies conducted in certain tertiary care institutions in some developing countries, the average number of drugs per encounter was high in Nigeria (3.8) but low in Sudan (1.4), and in Zimbabwe (1.3) (Bannenberg et al., 1991). The results in our study is however not surprising since most of the patients might have presented with multiple chronic diseases. Concomitant use of several medications may be justified in the treatment of multiple chronic diseases (Gallagher, Barry and O’mahony, 2007; Shi, Morike and Klotz, 2008).

The percentage of medicines prescribed by generic name was 81.9%, which was quite low compared to the WHO standard of 100%. Our result is however similar to that obtained in a national baseline study on drug use indicators conducted in Ethiopia in which a value of 87% was obtained. Similar studies in some developing countries revealed percentages of 58%, 63%, 82% and 94% for Nigeria, Sudan, Tanzania and Zimbabwe respectively.

A possible explanation for these discrepancies is the prescription of drugs that are not listed on the essential medicines lists, which could lead to the use of brand names. Marketing strategies in the pharmaceutical industry, emphasizing the brand name of products, may also contribute to this finding. However, regardless of the level of health care delivery, prescribing drugs by generic name may reduce duplicity, improve access to medicines and, consequently, increase patient compliance with drug therapy and disease control and also ensure less potential for confusion and error, especially when brand names are similar (Mukherjee, 2013).

WHO suggests a limit of 20% for the percentage of antibiotics to be prescribed per encounter. In our study, the percentage of antibiotics prescribed in each prescription was 13.8%. This was a remarkably lower value compared to those obtained in some studies conducted in Sudan (63%), Uganda (56%) and Nigeria (48%). Nevertheless, the low rate of antibiotic prescription in the present study does not indicate that the antibiotic prescribing pattern at CCTH is better than in other countries, since the criteria justifying the clinical indication for the antibiotic order was not analysed. Differences observed among the studies are probably due to the epidemiological profile of infections in the different geographic areas. Prevalence of specific types of pathogens in the community, adequacy of infrastructure in the geographic area analysed (e.g.: water supply, sewage system, and hygiene habits), and health care accessibility may lead to different infection prevalence rates and distinct antibiotic prescribing patterns (Gavazzi, Herrmann and Krause, 2004).
With regards to the presence of injections on a prescription, WHO recommends a limit of 20% per encounter. This study revealed a percentage of 1.6%, which was far lower than the recommended value but close to the rate of 3% reported by Vallano et al., (2004). The possible reason for this low value obtained is because majority of the prescription evaluated were sampled from the out-patient department where there is very little likelihood for injections to be prescribed. The low level of injection prescribing could also be attributed to the change in antimalarial policy from use of chloroquine to artemisinin-based combination therapy (ACT).

In this study, the percentage of medicines prescribed from the essential medicines list (98.2%) was almost identical with WHO’s recommendation of 100%. In a study conducted in a teaching and referral hospital in Ethiopia, the percentage of drugs prescribed from the essential drug list was 96.6%. Similar result (99%) was obtained in a national baseline study on drug use indicators in Ethiopia 99%. Using an essential medicines list (EML, 2010) makes medicine management easier in all respects; procurement, storage and distribution are easier with fewer items, and prescribing and dispensing are easier for professionals if they have to know about fewer items.

### Patient Care Indicators

The average consulting time recorded in the study was 13.2 minutes. The result in this study is significantly better compared to average consulting times ranging from 3.4 to 5.75 minutes reported in studies conducted in some developing countries (Chedi, Abdu-Aguye, and Kwanashie, 2009; Massele, Nsimba and Rimoy, 2001). The mean time obtained in our study highly transcends the recommendation of 5.0 minutes by WHO. The longer time recorded however does not necessarily confirm that patients receive better care as a number of factors may influence the results of this indicator.

The pharmacy staff spent an average of 60.2 seconds in dispensing medicines to patients. Similar studies elsewhere recorded average dispensing time as low as 18.4 seconds (Binu et al., 2013; Vania dos Santos et al., 2004). Such inadequacies were also reported in literature in Nigeria (12.5 seconds), and Bangladesh (23 seconds) (Hogerzeil et al., 1993). The mean time recorded in our study is almost equal to the recommendation of 60 seconds made by WHO. This time allows dispensing staff to emphasize on the fulfilment of the dosage, interaction with other medications, acknowledgement of potential side effects, conditions for appropriate product storage among others during dispensing.

The study showed that 28.7% of prescribed medicines were not available in the hospital’s pharmacy. This is comparable to, though better than the results obtained in a similar study by Ferreira et al, 2013, where 34.1% of the medicines prescribed were not obtained at the facility where the study was conducted. This percentage increased to 46.3% in centres without primary health care services. Access to medicines is a key priority in the rational use of medicines (WHO 2008). Several factors, including lack of knowledge or prescribers’ non-adherence to the essential medicines list and medicines stock out, which may influence the prescriber’s choice of ‘non-essential medicines’, may have contributed to the findings in this study. To improve upon this current situation, selected medicines must be updated periodically by a multidisciplinary committee, and the list appropriately disclosed to prescribers. Regular supply of medicines should also be maintained in the pharmacy (Ferreira et al, 2013).

Also 75.9% of the medicines dispensed to patients were adequately labelled. Most of the medicines which were not well labelled did not have the name of the patient and/or the name or initials of the dispenser indicated on the label. Though the value obtained in this study was lower than 100% as recommended by WHO, it was higher than the 28.2% obtained in a study by Tadesse and Jimma, 2015. The practice of labelling should however be improved since incomplete labelling of drugs leads to irrational use of medicine.

About 90% of the patients were able to repeat the correct dosage regimen of the medicines dispensed to them. This value, though higher than the 82% obtained in a similar study (Tadesse and Jimma, 2015), was still lower than the recommended value of 100% made by WHO. Factors such as language barrier, educational
background and age of the patients may contribute to their understanding of dosage instructions given to them. This further emphasizes the need for adequate labelling of medicines which will help patients recollect instructions in the event of forgetfulness or lack of understanding.

**Drug Administration Indicators**

The parameters assessed under drug administration indicators had percentage encounters within the range of 75% to 89%. However, the percentage encounter recorded for ‘missed doses’ was 45.9%, indicating that about 50% of the patients assessed missed some doses of their medications during the admission period. This is quite alarming for a tertiary care institution. Several factors may account for this observation.

One of the factors has been attributed to delay in collection of medications from the pharmacy for patients either because folders are not sent to the pharmacy at the time the prescriptions were issued or there may be a huge workload at the pharmacy. Many a time, medications are served close to mid-day and there is the likelihood of patients missing some doses, especially their morning doses.

In the event where patients have to be transferred from one unit or ward to another within the hospital, their medications are sometimes not transferred to the new ward. When there is a delay in retrieving these medications, patients are likely to miss some doses.

Also medicines which may not be available at the hospital’s pharmacy are written on either a pharmacy card (insured medications) or a prescription form (non-insured medications) to be given to carers of patients concerned. A delay in giving these prescription forms to the carers, or a delay in the purchasing of medicines by patients’ carers may result in a delay in getting the medicines to the patients. Consequently, patients may not be able to start their drug regimen on time, resulting in some missed doses.

**Impact of Staff Training and Education on RUM Indicators**

WHO advises countries to implement national programmes to promote rational use of medicines through policies, structures, information and targeted education. A combination of healthcare provider education and supervision, consumer education, and an adequate medicines supply is effective in improving the rational use of medicines (WHO, 2010).

This current study in 2016 revealed an improvement in the results obtained when the same parameters were investigated in the same facility in 2015. The percentage increments recorded were as follows: percentage of generic medicines prescribed (4.5%), antibiotics prescribed (16.2%), medicines adequately labelled (12.9%), patients with knowledge of correct dosage (18.1%) and medicines prescribed from essential medicines list (0.5%). The average consulting and dispensing times increased by 1.2 minutes and 20.2 seconds respectively. One obvious reason for these increments is the continuing in-service education and training which was organized for some prescribers, nurses and pharmacy staff on the rational use of medicines following the realization of the results of the RUM study in 2015.

This training focused on promoting the need for generic prescribing as well as prescribing from the essential medicines list. Owing to the inappropriate unethical promotion of medicines by pharmaceutical companies, prescribers were also advised to get medicine information from independent sources such as clinical guidelines rather than individual pharmaceutical companies. Prescribers were also encouraged to spend reasonable time on each patient during consultation in order to avoid poor diagnosis and treatment. This aspect of the training contributed to the increase in the average consulting time as well as percentage of generic medicines prescribed and the percentage of medicines prescribed from the essential medicines list.

The pharmacy staff were also educated and trained to have a good knowledge (common use, correct dose, common side effects, common interactions with other medicines or food, storage needs etc.) of medicines dispensed to patients. Attitudes and skills required to communicate effectively with patients were also emphasized. Particular attention was drawn to adequate and appropriate labelling which should include name of medicine, name of patient, strength of medicine, route of administration, quantity to be taken, time that medicine is to be taken, initials of the dispenser and other instructions appropriate to the
medicine being dispensed. It is therefore not surprising that a greater percentage of the medicines dispensed during this study were adequately labelled and more patients had good knowledge of correct dosage of medicines in this study as compared to the one done in 2015. These improved activities also led to the improved dispensing time recorded in this study.

**CONCLUSION**

There is evidence of impact of RUM training on prescribing and dispensing practices. This is reflected in the improved consulting and dispensing times.

There was generally high level of appropriate medication prescribing except that prescription validity indicators such as address of prescriber was absent in all prescriptions reviewed.

**RECOMMENDATIONS**

- The findings of the Rational Use of Medicines survey should be disseminated to all the clinical staff with the view to improving the RUM indicators.
- RUM training focusing on Drug Administration Practices should be organized specifically for all categories of nurses at the wards.
- There should be policy review to encourage doctors to include address as part of the prescriptions to ensure improved validity of the prescriptions.

**REFERENCES**


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Emerging and Re-Emerging Diseases

Emerging and re-emerging diseases are a threat to human existence and cause substantial impact on health of communities and countries. They may be infectious or non-infectious; the causes of these may be through some natural disasters, biological warfare, poor environmental sanitation management, poor urban planning, weak health systems and transmission for infected animal populations.

The communal nature of living alongside suboptimal hygiene and stressors in the community place populations at a higher risk of contracting emerging infectious diseases. Some of these diseases spread quickly within populations resulting in large outbreaks, and people are often immunologically naive to otherwise uncommonly-encountered pathogens.

Several historical and contemporary outbreaks of such infectious diseases have resulted in mass deaths and threatened large population. The plague of Athens in 430BC during the Peloponnesian war resulted in the deaths of millions of people as a result of the poisoning of water reservoirs by the Spartans.

In 2011 in India, there was an outbreak reported in a military establishment suspected to be due to possible contamination of food. In March 2014, the WHO reported an outbreak of hemorrhagic fever in four South-eastern Districts of Guinea: Gueckedou, Malenta, Nzerekore and Kissidougou. This spread to cover the two (2) neighbouring countries of Sierra Leone and Liberia and caused a major concern throughout West Africa and the world. It was not until June 2016 that the WHO declared the pandemic over. There is as yet no known confirmed medication or treatment for ebola virus disease (EVD) (Lai, Ng and Cheng, 2014). A number of experimental treatments, including vaccines and other blood products, are undergoing clinical trials.

Re-emerging and neglected diseases have also become a major concern for researchers. These include but not limited to lymphatic filariasis, river blindness, guinea worm etc.

They are happening as a result of a number of factors including the invention of new drugs to fight cancer or autoimmune diseases which result in immunosuppression. Additionally, antimicrobial resistance resulting from misuse and abuse of antibiotics can be cited as a significant culprit.
However, such challenges also provide opportunities for the advancement of preventive and therapeutic medicine. Some of these include improved surveillance, new vaccines and drugs, better public health interventions and inter-agency co-operations. The legacy of successes in dealing with infectious diseases is a reminder of the importance in sustaining efforts aimed at ensuring a safer environment for the community at large.

**New Chemical Agents**

With the increasing complexity of emerging and re-emerging diseases, researchers are challenged to come up with agents, whether biological, chemical or physical, for the management and treatment of such diseases. The drug development process begins with the exploratory and synthetic science to identify a potential candidate to be screened through animal testing before it is taken through the various clinical trial processes.

A new chemical entity (NCE) is, according to the U.S. Food and Drug Administration, “a drug that contains no active moiety that has been approved by the FDA in any other application submitted under section 505(b) of the Federal Food, Drug, and Cosmetic Act” (US FDA, 2016).

A new molecular entity (NME) is a drug that contains an active moiety that has never been approved by the FDA or marketed in the US (EMA, 2009).

An active moiety is a molecule or ion, excluding those appended portions of the molecule that cause the drug to be an ester, salt (including a salt with hydrogen or coordination bonds), or other non-covalent derivative (such as a complex, chelate, or clathrate) of the molecule, responsible for the physiological or pharmacological action of the drug substance.

An NCE is a molecule developed by the innovator company in the early drug discovery stage, which after undergoing clinical trials could translate into a drug that could be a treatment for some disease. Synthesis of an NCE is the first step in the process of drug development. Once the synthesis of the NCE has been completed, companies have two options they can resort to. They can either go for clinical trials on their own or license the NCE to another company. The latter option allows companies to avoid the expensive and lengthy process of clinical trials as the licensee company would be conducting further clinical trials and subsequently launch the drug.

**Phases of Clinical Trials**

The clinical trial process involves:

Phase I which assesses the safety of the drug or device with small number of healthy volunteers (20 to 100). In this phase absorption, metabolism and excretion of the product are studied.

Phase II studies the efficacy of the candidate product. Here, there is comparison between patients who take a standard treatment or a placebo and involves several 100s of patients.

Phase III involves randomized and blood testing in several hundred to several thousand patients and usually studies some safety and efficacy and clinical effectiveness.
Phase IV involves the studies on the safety and efficacy of the product after it has been licensed and given marketing authorization in a given jurisdiction. Here, periodic safety updates are to be filed with the regulator for review and causality assessment and where necessary variations are made during the validity period of the registration.

**Innovation and Regulation**

Progress in every endeavor of life including new drug development for emerging diseases is driven by innovation. In this wise, the USFDA’s Center for Drug Evaluation and Research (CDER) supports the pharmaceutical industry at every step of the process. As regards innovation in the development of new drugs and therapeutic biological products, the USFDA provides scientific and regulatory advice needed to bring new therapies to market using its human resource capacity that understands the science used to create new products, testing and manufacturing procedures, and the diseases and conditions that new products are designed to treat.

The availability of new drugs and biological products often means new treatment options for patients and advances in health care for patients.

Each year, CDER approves a wide range of new drugs and biological products. Some of these products are innovative new products that have never been used before in clinical practice. Others are the same as, or related to, previously approved products, and they will compete with those products in the marketplace.

The process of clinical development and regulatory review of new therapeutics in the United States was significantly changed by a number of legislative acts passed in the 1980s and 1990s. These acts were designed to encourage the development of innovative products, especially for rare, serious or life-threatening diseases, and to ensure that patients had timely access to these treatments.

Between January 1 and February 28, 2017 the CDER approved the following new drugs for use:

<table>
<thead>
<tr>
<th>No.</th>
<th>Drug Name</th>
<th>Active Ingredient</th>
<th>Approval Date</th>
<th>FDA-approved use on approval date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>plecanatide</td>
<td>Trulance</td>
<td>1/19/2017</td>
<td>To treat Chronic Idiopathic Constipation (CIC) in adult patients.</td>
</tr>
<tr>
<td>2.</td>
<td>Parsabiv</td>
<td>etelcalcetide</td>
<td>2/8/2017</td>
<td>To treat secondary hyperparathyroidism in adult patients with chronic kidney disease undergoing dialysis</td>
</tr>
<tr>
<td>3.</td>
<td>Emflaza</td>
<td>deflazacort</td>
<td>2/9/2017</td>
<td>To treat patients age 5 years and older with Duchenne muscular dystrophy (DMD)</td>
</tr>
<tr>
<td>4.</td>
<td>Siliq</td>
<td>brodalumab</td>
<td>2/15/2017</td>
<td>To treat adults with moderate-to-severe plaque psoriasis</td>
</tr>
<tr>
<td>5.</td>
<td>Xermelo</td>
<td>telotristat ethyl</td>
<td>2/28/2017</td>
<td>To treat carcinoid syndrome diarrhoea</td>
</tr>
</tbody>
</table>

With the primary aim of promoting innovation and the development of new medicinal products by smaller companies, the European Union (EU) has offered incentives by Regulation (EC) No 2049/2005 research based companies which applies equally to the human and veterinary sectors, and include:

- Administrative and procedural assistance from the European Medicine Agency’s (EMA) Small and Medium Enterprise (SME) office;
- Fee reductions for scientific advice, inspections and (for veterinary medicines) establishment of maximum residue limits;
- Fee exemptions for certain administrative services of the EMA;
- Deferral of the fee payable for an application for marketing authorization or related inspection; Conditional fee exemption where scientific advice is followed and a marketing authorization application is not successful;
- Assistance with translations of the product information documents submitted in the application for marketing authorization.
- 90% fee reduction for scientific advice (all issues relating to the development of new medicinal products)
- 90% fee reduction for any Good Manufacturing Practice(GMP) inspection requested by the EMEA
The Common Technical Document (CTD) was designed to provide a common format among Europe, USA, and Japan for the technical documentation included in an application for the registration of a human pharmaceutical product. The CTD dossier is divided into five main modules: Module 1 – Administrative Information and Prescribing Information; Module 2 – Overviews and Summaries of Modules 3–5; Module 3 – Quality (pharmaceutical documentation); Module 4: Non-clinical Reports (pharmacology/toxicology); Module 5: Clinical Study Reports (clinical trials). Detailed guidelines are provided describing the content of each module and the majority of submissions must now follow the CTD format for submission of dossiers.

Although the development of the CTD has been largely successful and all dossiers now use the CTD format (with newer dossiers moving to the eCTD format), some regions still prefer to retain some of their original pre-CTD dossier requirements. However, it is of debate whether this has resulted in the suggested reductions in time and resources needed to compile applications and the times National Medicine Regulatory Authorities (NMRAs) use to review such dossiers.

In West Africa, plans are far advanced by the Steering Committee of the ECOWAS Medicines Regulatory Harmonization Project under the West African Health Organization (WAHO) to harmonize the CTD developed by WAHO and that developed by West Africa Economic and Monetary Union (UEMOA).

The WHO has provided technical assistance in this direction and will shortly be rolled out for use by NMRAs.

The quality requirements for NCEs focus specifically on NCE for human medicinal products. More data is required in the review of sterile products/solutions, aseptic manufacture/sterilization validation, packaging requirements, in-use stability) and some cases less (physical characteristics).

The drug substance should be well characterized and manufactured by well-described, and adequately controlled manufacturing methods.

It must have the International Non-Proprietary Name (INN) which should be applied for from the WHO during the early clinical development.

Module 3.2.S requires that general information on structural formula, including stereochemistry, molecular formula and molecular mass, as well as Physico-chemical properties including; solubility, pKa, log P, permeability, polymorphism and isomerism, which might impact on safety and efficacy must be provided and reviewed.

The NCE must be manufactured according to Good Manufacturing Practices (GMP). The process should be described in detail to include flow charts, process parameters, In-process Controls (IPCs), reagent quantity and yields.

Starting materials should be assigned appropriately as to whether they are simple or complex molecules which are commercially available or synthesized in-house. They must be fully characterized with appropriate specifications and analytical method validation.

Potential impurities should be described and whether any is carried over into the final product. Measures to control intermediates, the quality and use of reagents, catalysts and solvents should be justified.

Intermediate specifications and IPCs and batch data (process validation) reassure that the process is well controlled, understood and reproducible.

There should be a minimum of three (3) primary (pilot scale) batches manufactured by the same synthetic route and method of manufacture as the proposed commercial process with reassurance of scale up capability.

There should be evidence that no significant changes to the manufacturing process affect the overall quality of the drug substance.
Characteristics such as, but not limited, to presence of chiral centres, stereochemistry potential for isomerism (cis/trans), enantiomers, racemates, polymorphism, particle size and impurities (including residual solvents and inorganic impurities) must be thoroughly studied and reported on as they have potential to affect the quality, safety and efficacy of the product.

Information on analytical method of validation protocols and results, system suitability parameters used to demonstrate method robustness and stability studies including forced degradation and photostability testing are also required.

Pharmaceutical development documentation including a logical progression of development work resulting in a robust, optimized formulation proposed for marketing, including justification of the choice of excipients and manufacturing process.

A summary of formulations used during clinical development should be provided. Any changes between the proposed commercial formulation and the formulations used in early and pivotal clinical studies should be described and justified. Comparative in vivo bioequivalence (bridging) studies and/or in vitro dissolution studies will be required.

The quality requirements for the drug product are per similar requirements for the drug substance where specifications are set in accordance with the type of dosage form and the guidelines for new drug products; limits are proposed for batch release and shelf-life on the basis of batch analytical and stability data with consideration of general quality requirements; analytical methods are described and validated.

**Quality Requirements for Sterile NCEs**

Whilst most of the key issues for the development of a NCE are similar, some key considerations when the NCE is to be developed as a sterile product are as follows;

- Manufacturing authorization should state type of product (e.g. lyophilised aseptically prepared) and the manufacturing should be in accordance with Good Manufacturing Practice (GMP)
- No microbial limits for excipients or active substance
- Vial headspace gas should be sterile filtered
- Justification for method of sterilization
- Effect of sterilization method (terminal) on packaging. Ensuring all parts of the packaging are sterilized using the proposed method
- Pre-filtration bio-burden not stated or too high
- Availability of data to support bulk holding times
- Lack of media fill data or information
- Availability of process validation data at production scale when non-standard processes are used.

In summary, the new drug substance synthesis should be robust and well controlled. Starting materials should be adequately defined and potential impurities should be identified and accurately determined. The quality of the drug substance is required to be maintained throughout clinical development. The commercial formulation of the drug product should be optimized, can be reproducibly manufactured to the intended quality and is stability.

**Non Clinical Information Module 2.4 and Module 4**

Information presented in the form of written and tabulated summaries are presented as part of the submissions under Module 2.4 while the detailed reports of the studies conducted are presented in Module 4. These cover studies confirming the absorption, distribution, metabolism, excretion, pharmacokinetics, drug interactions and toxicology studies on the candidate substance and product.

**Clinical Information Module 2.5 and Module 5**

The Clinical Overview is primarily intended for use by regulatory agencies in the review of the clinical section of a marketing application. It is a useful reference to the overall clinical findings for regulatory agency staffs involved in the review of other sections of the marketing application. The Clinical Overview presents the strengths and limitations of the development programme and study results, analyze the benefits and risks of the medicinal product in its intended use, and describe how the study results support critical parts of the prescribing information.

In order to achieve these objectives, the Clinical Overview:

- describes and explains the overall approach to the clinical development of a medicinal product, including critical study design decisions.
- assesses the quality of the design and performance of the studies, and include a statement regarding Good Clinical Practice (GCP) compliance.
• provides a brief overview of the clinical findings, including important limitations (e.g., lack of comparisons with an especially relevant active comparator, or absence of information on some patient populations, on pertinent endpoints, or on use in combination therapy).

• provides an evaluation of benefits and risks based upon the conclusions of the relevant clinical studies, including interpretation of how the efficacy and safety findings support the proposed dose and target indication and an evaluation of how prescribing information and other approaches will optimize benefits and manage risks.

• addresses particular efficacy or safety issues encountered in development, and how they have been evaluated and resolved.

• explores unresolved issues, explains why they should not be considered as barriers to approval, and describes plans to resolve them.

• explains the basis for important or unusual aspects of the prescribing information.

The detailed clinical study reports for all the Phases are provided under Module 5.

Collaborative Efforts

It is established that most medicines regulatory authorities in developing countries have limited capacity to adequately and comprehensively review dossiers for NCEs. There is therefore a global move for harmonization and recognition of assessments, reports and decisions from better endowed NMRAs. In West Africa, the Expert Committees that have been formed under the ECOWAS Harmonization project is expected to provide scientific opinions for guidance of member state NMRAs. On the African continental science, the coming into force of the proposed African Medicines Agency (AMA) will provide additional coordination effort for the review of NCEs for emerging diseases. WHO has been coordinating a number of world efforts to support such reviews as exemplified by its actions during the EVD outbreak in West Africa.

Article 58 is a cooperation between World Health Organisation (WHO) and EMA to allow EMA’s Committee for Medicinal Products for Human Use to give expert opinions on medicines and vaccines for human use that are intended exclusively for markets outside of the European Union. Using the expert opinions and assessment reports, African countries can commission an abridged review, subsequently reducing medicines approval timelines and assuring fast access to critical drugs, particularly those for emerging diseases and neglected tropical diseases.

The aim of Article 58 is to address public health challenges existing in low and middle income countries to improve global health. Some of the products eligible for processing through Article 58 procedure includes: (i) Vaccines or medicines used to prevent or treat public health priority diseases; (ii) Vaccines used in the WHO Expanded Programme on Immunization; (iv) Medicines for protection against diseases, such as HIV/AIDS, malaria and tuberculosis; (v) Medicines for maternal and new-born healthcare. However, since the inception of Article 58 in 2004, only eight (8) products have received positive scientific opinion.

The planned establishment of AMA serves as a unique platform to enhance the EMA-Africa collaboration and accelerate implementation of Article 58.

References


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Introduction

Male Pattern Baldness (MPB) refers to a state of having no hair or lacking hair where it usually grows, especially on the head. MPB also known as Androgenic Alopecia is the most common form of baldness and involves progressive hair thinning. As the name suggests, hair loss occurs in a well-defined pattern, beginning from the side of the head behind the eyes called the temples (David, 1998).

It is argued that although female experience hair loss to a certain extent, this syndrome predominantly occurs in males (David, 1998). In some instances, hair is lost on the whole head known as Alopecia Totalis. However, in Alopecia Universalis, which is the most extreme form of MPB, there is loss of hair affecting the head and also the entire body (David, 1998). As a result of these dynamics, it is claimed that a complete understanding of the mechanisms involved in the pathophysiology of MPB is key to unravelling the scientific basis of current management of the disorder.

The following sections will focus briefly on prevalence of MPB in the general population, its causes and particularly, current available treatments.

Prevalence and Causes

MPB is a common phenomenon. It usually affects young adults. The prevalence of MPB has been observed to increase with increasing age. The prevalence of MPB is estimated at 33% among individuals aged about 30 years and increases to about 50% for those in their 50s (David, 1998). MPB develops over a period of 25 years, but in some people it usually takes a relatively shorter time of about five (5) years to manifest (Ziering, Katona & Williams, 2010). MPB has been described as a genetic condition inherited from both parents (BBC News, 2011). There is however a close linkage between inherited genes and the effects of dihydrotestosterone (DHT). DHT is produced from the male androgenic hormone testosterone by 5-alpha reductase enzyme (5-AR). This happens as a result of over-sensitivity of the hair follicle to normal levels of DHT, thereby stimulating the hair loss gene (Brian, Mark & Dennis, 1989). It is argued that not every hair follicle is associated with this gene, suggesting why some hair falls out whilst others do not (BBC News, 2016). Recently, it has been claimed that the development of MPB is associated with a defective stem cell. This claim is viewed as a significant step in the scientific advances towards finding a lasting treatment for the disorder (Cotsarelis, 2004).
Furthermore, other researchers, upon observing and comparing the hair follicles in the patches and hairy areas of the scalp claimed that, although bald areas had the same number of hair-making stem cells as the normal scalp, there were fewer mature progenitor cells (BBC News, 2016). This observation led to the assumption of the presence of hair follicles in bald patches, except that they are minute compared to normal follicles. Hence, a mechanism for reactivating stem cells converting progenitor cells in bald scalp gives hope for the treatment of MPB (BBC News, 2016). Some authors also consider MPB as an autoimmune disease whereby the immune system recognises some part of the body as a pathogen and attacks it with the view of getting rid of it. Alopecia areata is a typical example of an autoimmune MPB that results in hair loss ranging from just one location (alopecia areata monolocularis) to every hair on the entire body (alopecia areata universalis) (BBC News, 2016).

### Other Causes of Baldness

It is important to note that besides the genetic and hormonal involvement, there are other causes of baldness leading to several types of baldness. Therefore, a clear understanding of the other forms will inform appropriate diagnosis before the initiation of treatment for MPB. These include:

1. **Traction alopecia**, which is most commonly found in people with ponytails or cornrows who pull on their hair with excessive force. The constant use of force leads to mechanical tearing off of the hair, leading to hair loss.

2. **Trichotillomania**; this is the loss of hair caused by compulsive pulling and bending of the hairs. It tends to occur more in children than in adults. In this condition, the hairs are not absent from the scalp but are broken, possibly, due to immature hair and frequent plaiting. Where they break near the scalp, they are typically shorter, compared to intact hair.

3. **Traumas** such as chemotherapy, childbirth, major surgery, poisoning, and severe stress may cause a hair loss condition known as telogen effluvium. Hair follicles in the growing phase are affected by chemotherapy while this treatment targets dividing cancer cells. Therefore, almost 90% of hairs fall out soon after chemotherapy starts.

4. **Worrisome hair loss** often follows childbirth without causing actual baldness. In this situation, the hair is actually thicker during pregnancy due to increased circulating estrogens. After the baby is born, the estrogen levels fall back to normal pre-pregnancy levels and the additional hair foliage drops out. A similar situation occurs in women taking the fertility-stimulating drug Clomiphene.

5. **Iron deficiency** is a common cause of thinning of the hair, though frank baldness is not usually seen.

6. **Radiation to the scalp**, as happens when radiotherapy is applied to the head for the treatment of certain cancers there, can cause baldness of the irradiated areas.

7. **Infection**; some fungal infections can lead to significant hair loss. Tumour and skin outgrowth can also lead to hair loss. For example, basal cell carcinoma and squamous cell carcinoma. Syphilis can also cause hair loss.

8. **Hypothyroidism** can cause hair loss, typically frontal, and is particularly associated with thinning of the outer third of the eyebrows.

9. **Hyperthyroidism** can also cause hair loss, which is parietal rather than frontal.

10. **Temporary loss of hair** can occur in areas where sebaceous cysts are present for considerable duration; normally one to several weeks in length.

11. **Congenital triangular alopecia**: It is a triangular, or oval in some cases, shaped patch of hair loss in the temple area of the scalp that occurs mostly in young children. The affected area mainly contains vellus hair follicles or no hair follicles at all, but it does not expand. Its causes are unknown and although it is a permanent condition, it does not have any other effect on the affected individuals (Rebora, 2004; Nnoruka & Nnoruka, 2005; Pappas, et al., 1995).

The development of Male Baldness can be divided into four stages based on the onset and degree of baldness as illustrated in figures 1-4 (Ziering, Katona & Williams, 2010).
Many people with male pattern baldness believe there is no hope of getting treatment. As a result, they choose to accept the condition as it is. Others still continue to explore all avenues with the aim of getting their normal hair restored. Although MPB is a common disorder with added burden in terms of cost and social stigma and attendant psychological effects on those affected, it is heartwarming that ongoing research provides hope of obtaining effective therapy. Indeed, treatments which reduce or halt hair loss, particularly in the early stages are available whiles others entirely reverse the hair loss (Rxlist.com, 2010).

**CURRENT TREATMENTS**

Understanding of the pathophysiology and disease pattern has brought about interventions for halting the disease process and to some extent re-growth of hair loss (Hayley, 2011).
Lifestyle modification

Regular vigorous aerobic exercise and diet with moderate levels of fat have been shown to reduce baseline insulin levels as well as total and free testosterone. The linkage between aerobic exercise and cessation in the progression of MPB can be illustrated in figure 5 (Daly, et al., 2005).

Aerobic Exercise

- Increase glucose utilization by cells
- Decrease insulin resistance
- Increase insulin sensitivity
- Cause increase in protein binding
- Low level of insulin
- Low level of free androgens
- Negative 5α reductase
- Low level of androgens leads to inactive 5α reductase resulting in low
- Increased level of SHBG
- SHBG binds to androgens
- Low level of DHT
- DHT unavailable to act on hair loss
- MPB progression halted

Fig. 5 Illustration of linkage between aerobic exercise and MPB

Aerobic exercise has been shown to improve glucose utilization by cells resulting in lower insulin levels. Lower insulin levels and reduced stress both result in raised levels of sex hormone-binding globulin (SHBG). SHBG binds to testosterone leading to low levels of free testosterone to be converted to DHT. Hair loss gene cells are therefore unable to recognise DHT, hence halting the progression of MPB (Barnard, et al., 2002; Barnard & Aronson, 2005).

Surgical hair transplant

It involves the transfer of a portion of the scalp that are genetically stable and hair will not be lost to the part of the head where hair is lost. The portion of the scalp that is taken is genetically programmed to produce hair for the entire lifespan of the individual. This is more useful in patients more than 25 years with only frontal and mid-frontal hair loss (Bernstein & Rassman, 1997; Unger & Unger, 2003).

Figure 6. Example of graft transplantation (Wikimedia Foundation Inc., 2011).
It has been suggested that hair grows naturally in follicles containing groupings of 1 to 4 hairs. This suggestion has been employed in a surgical technique known as Follicular Unit Transplantation (FUT) to transplant these naturally occurring 1–4 hair “follicular units” in their natural groupings. As a result, harvested hair maintains the same appearance as the natural hair (Unger, 1994). The methods usually used by surgeons in harvesting donor hairs are Strip Harvesting and Follicular Unit Extraction (Unger, 1994).

Strip Harvesting: In this procedure, a strip of scalp is removed under local anaesthesia, after which the wound is then sutured. Grafts are made from the scalp tissue, removed, and transplanted back into the bald area of the head (see Fig. 6). Because it involves making an incision, a scar is created at the donor area (Unger, 1994).

Follicular Unit Extraction: It involves removal of individual follicles of hair under local anaesthesia; this micro removal uses tiny punches of between 0.6 mm and 1.25 mm in diameter. Each follicle is then reinserted back into the scalp in the thinning area using a micro blade. Because single follicles are removed instead of tissues as in Strip Harvesting, there are usually no visible scars after the surgery. It is reported that patients recover from FUE within seven (7) days while it takes twice this duration in the case of Strip Harvesting (Unger, 1994).

PHARMACOTHERAPY

Finasteride (Propecia)

Mechanism of action: Finasteride is a 4-aza analogue of testosterone and is a competitive inhibitor of both tissue and hepatic 5-alpha reductase. This results in inhibition of the conversion of testosterone to dihydrotestosterone. Finasteride markedly suppresses serum dihydrotestosterone levels (Stoner, 1990).

Dose: Recommended dosage for adult males only is 1 mg once daily with or without meals. In general, daily use for three (3) months or more is necessary before benefit is observed. Continued use is recommended to sustain benefit. Withdrawal of treatment leads to reversal of effect within 12 months (Kaufman, et al., 1998).

Evidence of Efficacy: One study conducted by Merck, a manufacturer of finasteride to determine the minimum effective dose of finasteride and its long-term effects on 1,553 men between ages 18 and 41, with mildly to moderately thinning hair, revealed the following: Over 83% of the 1,553 men experiencing male hair loss had actually maintained or increased their hair count from baseline when given 1mg daily for a period of two years. Visual assessments concluded that over 80% had improved appearances (Barth, 2000).

Side Effects: Testosterone-dependent processes such as fertility, muscle strength, potency, and libido are minimally affected by finasteride (Stoner, 1990).

Minoxidil

Mechanism of Action: Minoxidil is believed to block influx of Ca2+ ions into the cells. The resultant vasodilating promotes blood flow for the follicles to receive oxygen and nutrients that are needed to induce the production of thick healthier hair (Nicole & Marc, 2008).

Dose: It is applied topically for the treatment of alopecia androgenetica involving the top (vertex) of the head. The recommended dose is 1 ml of the regular strength (2%) or the extra strength (5%) solution applied to the affected areas of the scalp twice daily (maximum total
daily dose is 2 mls). The hair and scalp should be dry prior to application of minoxidil. Hair growth generally occurs after two (2) to four (4) months of continuous use and further growth continues for up to 1 year of therapy (Nicole & Marc, 2008).

**Proper Use of Minoxidil:** Minoxidil is made up of two products called dexpanthenol and carrier lotion. On the surface of the scalp is a substance called sebum. Sebum is made up of fat and debris of fat-producing cells. It is similar to wax and blocks the absorption of minoxidil deep into the scalp to the dermal papilla level, where it exerts its effects. When minoxidil is blocked by the sebum, it stays on the scalp. Since minoxidil contains alcohol, it causes irritation on the scalp and dryness. The dexpanthenol then dissolves the sebum on the scalp, paving the way for minoxidil to travel all the way to the dermal papilla level. Dexpanthenol also hydrates the outer layer of the skin around the hair shaft making it more permeable to liquid application of minoxidil. The carrier lotion with minoxidil neutralises the alcohol and allows better penetration and minimises irritation on the scalp.

**Evidence of Efficacy:** It has been demonstrated that target area hair counts reveal increases in hair density. The hair growth seems to peak at 16 weeks. The placebo controlled trials of target area hair count and expert panel review of global photographs at year one (1) and hair weight studies over two years confirm that there is a slow of further hair loss with continued use of minoxidil (Olsen, et al., 2002; Price, Menefee & Strauss, 1999). This drug is reported to work effectively in about 30% of the population affected by MPB and it is sold as over the counter product (Trancik, et al., 2001).

**LASER LIGHT THERAPY**

Some devices claim to use low-level laser therapy to stimulate hair growth through photo-biostimulation of the hair follicles. Low-level laser therapy (LLLT) is a medical and veterinary treatment that uses low-level lasers or light-emitting diodes to alter cellular function (Ghanaat, 2010).

**Mechanism of Action**

The concentrated monochromatic light beams in the red spectral wavelength and fired at low intensities, the laser light can stimulate blood flow, causing better hair growth. It also helps in the protein synthesis for hair regeneration. Laser light therapy best suits people with increased shedding, so that they can keep the hair they still have on their head (Leavitt, et al., 2009). Although there is some level of evidence to support its use in medical practice, research is ongoing to determine the appropriate dose, wavelength, timing, pulsing and duration of treatment (Huang, et al., 2009).

**Evidence of Efficacy**

An example of a laser device is the HairMax LaserComb as shown in Figure 7.

In clinical studies, HairMax treated hair loss and restored hair for 93% of those who used it in as little as 12 weeks. HairMax users also report improved quality, shine and manageability (Lexington International, 2009).

*Fig. 7 Illustration of Use of HairMax LaserComb*
Cell Therapy

Mechanism of action

It is a new type of baldness treatment which increases blood flow to the scalp and re-awakens inactive hair. Stem cells in the hair follicles of mice have been discovered by researchers and found that these cells grow into hair follicles and produce hair when transplanted into skin. This has paved the way for the discovery of new drugs and innovative surgery for the treatment of hair loss (Cotsarelis, 2004).

Evidence of Potential

In a study published in the Journal Nature Biotechnology, stem cells within the bulbous follicle at the base of a hair shaft were isolated. It was realised from the study that the follicles go into a permanent resting phase at times, thereby halting hair regeneration. However, when those stem cells were transferred into the skin of other mice, hair follicles began to re-grow within four weeks (Cotsarelis, 2004).

Conclusion

Considering the key hormone, DHT, involved in the pathophysiology of MPB, it is necessary to engage in regular aerobic exercise to reduce stress and improve insulin resistance. A low cholesterol diet which contains less saturated fat, supplemented with fruits and vegetables that ensures optimum calorie also helps regulate baseline insulin and DHT. Although a number of pharmacological, surgical and non-pharmacological options are available for patients, more research into the genetic involvement of MPB is required to develop more cost-effective interventions for the treatment of MPB.

References


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In pre-modern times before the advent of western medicine, village healers, herbalists and clerics were the primary care givers in Ghana. After the country gained independence in 1957, the Government purposefully promoted western medicine as Ghana's official mainstream medical system. However, the country over the years has acknowledged the role of both Complementary and Alternative Medicine or Traditional Medicine (CAM/TM), particularly herbal medicine in healthcare delivery.

Ghana has a universal healthcare system, which has been touted as the most successful healthcare system in Africa by Bill Gates, the American business magnate and philanthropist. The National Health Insurance Council (NHIC) was established by the National Health Insurance Act, 2003 (Act 650) to ensure universal access to basic healthcare services to all residents of Ghana. Despite the progress made in healthcare over the years, in the state of the nation's address delivered by former President John Mahama on February 13th, 2013, he stated that Ghana’s healthcare system still lacks adequate health professionals with some service deficiencies despite the human capacity development programmes being implemented. In 2012, there was one doctor available for every 10,452 people and one nurse to 1,251 people (Report on the Ghana Shared Growth and Development Agenda, 2010 – 2013). There is inadequate number and uneven distribution of health facilities in the country; well over half of all hospitals are located in one of two regions,
Ashanti and Greater Accra. On the contrary, the Ministry of Health (MOH) aims to reduce inequalities in access to health, population and nutrition services and health outcomes. For this reason, it is evident that Ghana, like many other African countries, should find it necessary to harness all healthcare resources to enable her to effectively enhance the healthcare system on prevention, care and treatment of diseases, and other maladies. This is where Herbal Medicine becomes a very viable option.

Herbal medicine has a long traditional use outside of allopathic medicine. The use of herbal medicine predates recorded history, dating back as far as over 60,000 years ago. Ancient Chinese and Egyptian Papyrus writings describe medicinal uses of plants as early as 3000 BC. Currently, the WHO estimate that 80% of people worldwide use herbs for medicinal purposes for some aspect of primary healthcare especially people in Africa and Asia. Even though modern medicine continues to regard herbal medicine as a form of alternative medicine, major headways have been achieved in areas of clinical research and quality control, thereby making herbalism gradually become a mainstream.

Luckily in Ghana, successive governments have acknowledged the role of herbal medicine in promoting health. The formation of the Ghana Psychic and Traditional Healers Association in 1961 and the establishment of the Centre for Scientific Research into Plant Medicine in 1975 attest to this fact. Furthermore, the MOH has a Traditional and Alternative Medicine Directorate. The objective of the Directorate, according to their website, is “to ensure the effective development and integration of Traditional and Alternative medical practice system within the National Health Care System.” Being a member state of the WHO, Ghana has supported the idea of modernizing CAM/TM with the aim of facilitating its integration into the national healthcare delivery system.

Even though many stakeholders have called for the modernization and eventual integration of Herbal Medicine into mainstream practice, the integration process in Ghana has not been optimal. Traditional health system exists in parallel with orthodox medicine. The former receives state support and funding and has become the official medical model with developed infrastructures and human resources. Even though some level of consumer engendered integration exists, a full institutional integration is yet to be seen. A wealth of theoretical and empirical evidence exists to suggest that integrating the two recognized health systems would enhance healthcare delivery and boost the national health economy in Ghana. Several studies assert the readiness of conventional health practitioners to accept integrative medicine. This incorporates aspects of allopathic medicine and evidence-based TM-CAM; those practices with high-quality scientific proof of safety and efficacy, while emphasizing the importance of patient participation in health advancement, disease prevention and health management.

In many developing countries including Ghana, traditional medicine has assumed a greater role in the primary healthcare of individuals and communities. Like other developing countries, herbal medicine continues to be part of the people’s healthcare system. The widespread usage of herbal medicines in Ghana and elsewhere in Africa is a clear indication of the attitude and beliefs people have about the medicine. The social impact of herbal medicine therefore lies in its cultural acceptance, availability and accessibility. Additionally, the fact that herbal supplements and remedies are believed to cause little or no side effects explains its wider acceptance.

Typically, discussions about integrative medicine have centred on efficacy and safety concerns of herbal medicine and other alternative therapies. However, with the resurgence of economics as an integral part of decision making models in healthcare, and with successive government’s professed commitment to improving major macro and micro-economic indicators, coupled with the increased scrutiny of healthcare expenditure,
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the economic benefits of herbal medicines should be considered an important determinant in the integration of herbal medicine and conventional medicine.

International Health Economic standards admonish Governments to spend a minimum of US$86 per person in order to provide basic health services. In 2013, the Government of Ghana only achieved about 70% of this target, amounting to an average expenditure of US$63 on each person's health. While the planned 2014 budget increased this to US$69, this is still below target. These figures translate into 3.3% and 2.9% of the country's Gross Domestic Product (GDP) for 2013 and 2014 respectively. Governments can and should spend at least 5% of their country's GDP on health to achieve a satisfactory health economic gains.

In an attempt to ease budgetary pressures while increasing nationwide healthcare coverage, among other prospects, the Government of Ghana should focus on reforming the current healthcare system. This provides an opportunity for herbal medicine acceptance as a cheaper alternative or adjunct to current therapies. Unfortunately, quantifying the true financial impact of herbal medicine is challenging due to the scarcity of literature. Theoretically, however, herbal medicine seems a good candidate for cost-effectiveness, chiefly because the herbs are mostly used in its crude form with less refinery. Consequently, it avoids high technology and offers inexpensive and non-invasive remedies.

Besides improving the health of Ghana's health economy by providing cheaper alternatives, herbal medicine creates numerous employment opportunities; Apart from formally-trained Medical herbalists and Pharmacists, trading in herbs has a significant socio-economic importance as it allows millions of people, especially women, to generate an income by plant collection and marketing.

Medicinal plants and their various products should be viewed as an important commodity items for sustainable economic development of the country. Ghana should harness the growing economic value of medicinal plants in order to improve her economic and healthcare delivery system. Unfortunately, despite the abundance of medicinal plants in the country, Ghana tends to export them at very cheap rates to industrialized countries only to import pharmaceuticals made from them at very exorbitant prices that most often affect her foreign exchange. The potential economic benefit of herbal medicine is on the other hand beginning to attract large pharmaceutical companies in other parts of the world. GSK, for example, has set up a number of research labs in China that are looking for ways to utilize the Traditional Chinese Medicine. It is clearer now than ever that Ghana needs to harness all the economic potentials of herbal medicine to augment what conventional medicine provides.
For personal reasons, I have not been a fan of watching television, though very educating at times, until recently when I revisited the old habit of long television hours. I came across something on a particular channel, one that has a lot of viewers due to the catchy entertainment programmes that are showed. What I came across was a constant display of herbal practitioners who paraded themselves as medical practitioners to get a lot of the public into believing in them so that their services can be patronized. I find this disturbing and so seeking to use your outlet to seek some answers and appropriate action from the authorities.

I have a background in pharmacognosy and I appreciate the important role that herbal medicine practice plays in helping to alleviate ailment. The potency, effectiveness and great benefit of the active principles that are found in plants, animals and minerals that have pharmacological properties cannot be overlooked. I also acknowledge the worldwide patronage of herbal medicines and the relevance of its practice in Africa, especially Ghana.

However, poor regulation of the practice of herbal medicine in Ghana is still worrying. This has been a long-standing battle between the authorities and the practitioners, since the advent of drug marketing in vehicles to the modern days of neo-medico-herbal practice. The latter is where I have concerns because there seem to be no clear cut between a medical doctor and ‘herbal doctor’ in Ghana.

This is a practice that must be nipped in the bud before it gets out of hand. I believe the regulatory bodies are doing very well in the monitoring and protection of public health but there is still work to be done. I must laud at this point the move to halt advertisement of alcoholic drinks by celebrities on media to protect the ‘liver’ of the youth and clamp down on unsocial behaviours. It is in the same light that I call on the regulatory bodies to clamp down on some practices of ‘herbal hospitals’ and ‘herbal clinics’ that parade as medical doctors on the various media.

Back to what I have observed in the media, especially on television of late, herbalists call themselves ‘Doctors’, which in the mind of the average Ghanaian is a medical doctor, and often have unlimited access to equipment that aids in diagnosing conditions that may not even be available to some competent and well trained medical practitioners. They have ‘nurses’ and ‘laboratories’. They take scans and claim to cure ALL conditions including the ones that have long been known in the regulated world as ‘chronic’. In addition to all these is admission of patients and carrying out of kidney dialysis. This is no different from an orthodox clinic or hospital as the ordinary Ghanaian knows. Are these practices, as mentioned above, and the intricate nature of diagnosis not worth the almost a decade worth of studies that medical doctors go through? If modern equipment can be operated in some few months of experience, then why bother with all the relevant and copious studies by medical students in preparation to better handle the health of their patients?

I am happy with the move to integrate herbal practice into medical practice in hospitals, where patients can have a chance to choose that which he or she is comfortable with but this should be a calculated and deliberate process that will offset any conflict or barrier of practice between any of the bodies. Herbal or natural products are not completely safe and it is no new knowledge that the active principles in these products have pharmacological properties which may interfere with orthodox products in the short or long term. I find it patronizing when advertisers claim that
due to the ‘natural’ nature of herbal products, it is ‘safe’ and harbour no side effects. These are not new to the appropriate authorities but my concern is why the practice of herbalists in herbal clinics and herbal hospitals are seemingly unregulated.

Who is to ensure that the public is educated on the scope of practice of these neo-herbalists in ‘herbal clinics and hospitals’ before they commit their whole life into their hands?

Will we continue to be onlookers until they perform surgeries before we make a move to regulate the practices of herbal clinics and hospitals?

I do not see surgery afar of, when the ‘outmoded’ bloodletting practice is performed by some herbalists on television as advertisement decorated with the message of it being the bane of health practice by our forefathers in polycythemia and congestive heart failure. True, but are they authorized to carry out such dangerous procedures? To the best of my knowledge, such training is not given in BSc Herbal Medicine.

Let me conclude by mentioning something that is also a worry: the combination of herbal with orthodox medicines. Few herbal medicines like the St Johns Worts have had enough studies done on them when it comes to the interactions between herbal and orthodox medicines. Others such as the ones usually patronized by the indigenes have seen little research into the interactions they have with some medicines, usually drugs used to manage chronic diseases such as diabetes and hypertension. Such interactions must not be overlooked with the assumption that it is minimal as acclaimed, but must be backed with scientific data and research, which is often not the focus of our researchers and scientists.

Herbal medicines use is good and I have had the opportunity to work with a herbal practitioner whose therapy choices brought comfort, relief and wellness to a number of people, but such practices, especially the springing up of herbal clinics and hospitals, must be regulated so that the lives of Ghanaians can be protected in this country.
Introduction

Although it hardly takes a centre stage during performance review meetings, nor given priority attention in health sector reports, institutional Revolving Drug Fund (RDF) remains a key driver of institutional care performance.

Described as the life-blood of health institutions, it is the wheel around which clinical care revolves, without it clinical services in public health institutions would be grounded to a halt. Accordingly, health policy makers, care managers, and providers must consider the prudent management of the RDF as a priority to ensure its financial sustainability.

Concepts and Definitions

The RDF concept is a full cost recovery drug supply scheme instituted by the Ghana government three decades ago as a sustainable drug financing mechanism. This was to ensure optimal access to safe, effective, and good quality medicines in all public health facilities.

Established by the Hospital Fees Regulations of 1985 (LI 1313), it allowed medicines to be billed to patients at full cost in order to generate revenue to address the problem of drug shortage at that time. The guidelines specified in that law allowed for the central procurement of medicines meant for the public sector and a mark-up of 10% for the Regional Medical Stores (RMS) and for Service Delivery Points (SDPs), an arrangement to decentralize health service and drug management.

A ministerial directive dating back to the early 90s led to the enactment of Accounting, Treasury, and Finance (ATF) Reporting Rules and Instructions (2010), a financial management guideline for the public health sector. According to this guideline, there should be three primary signatories to the Drug Account’s Internally Generated Fund (IGF) for Budget Management Centres (BMCs) at the regional levels and below: Head of the BMC, Head of Finance, and the Head of Pharmacy.

Prudent management of the RDF would not only result in improved availability of quality essential medicines, but also would ensure availability of funds for infrastructural development of health facilities.

Recent Developments and Trends

Recent reports however suggest that the RDFs of some facilities and RMSs in the country are in severe distress, making it difficult for these institutions to procure sufficient quantities of essential medicines to meet the needs of their clientele. This has also led to high indebtedness of some institutions to pharmaceutical suppliers. A former Director General of the Ghana Health Service (GHS) two years ago cautioned that “the RDF of some institutions have taken a nose dive.”
Contributory Factors

Beyond the prevailing challenge of delay in reimbursement by the National Health Insurance Authority (NHIA) to various institutions being a contributory factor to the predicament of the institutional RDF, other factors can also be cited. These include: frequent unauthorized non-drug expenses from the IGF Drugs Account, which constitutes misapplication of the funds; failure of some BMCs to transfer the full complement of the drugs’ component of NHIS reimbursement into the IGF-Drug Account; excessive borrowing from the fund; disregard to established rules and directives guiding the management of the fund, a situation which makes it difficult for pharmacy managers to monitor how the funds are applied.

A disturbing trend realized ever since the institutionalization of the RDF is the flouting of a ministerial directive which requires spending from the RDF to be co-signed by the three signatories to these accounts. Dr. Elias Sory and Prof. Agyemang Badu Akosa, both former Director Generals of the GHS, at their time of office once in separate letters to health facilities expressed concerns about the misapplication of the RDF. RDFs in most institutions are not ring-fenced as required by policy, making it vulnerable to all forms of illegal exploitation. This poses a great level of danger to the financial sustainability of supply of essential drugs as well as the NHIS.

Implications

Failing to reverse these trends could result in serious negative implications. Apart from the risk of experiencing acute shortage of medicines at health facilities, there is also a danger of going back to the dreaded cash-and-carry era as well as deterioration of quality of health care. Should the trends go unresolved, the new government policy of de-capitalization of institutional RDF can cause a major public health threat.

Strategies and Way forward

One of the encouraging achievements in the first 100 days of this government was massive recruitment of some health professionals. However, missing was similar efforts to recruit professionals (pharmacists and pharmacy technicians) for the pharmaceutical sector. The professionals for this sector are the key human resources that are responsible for the management of the RDF and pharmaceutical supply chain at all levels of care. Medicines constitute the mainstay of modern health care. The Ministry of Health estimates that pharmaceuticals constitute 60-80% of Ghana’s healthcare expenditure.

Currently, the inadequate number of pharmacy personnel in the public sector has been identified as major roadblock in the provision of pharmaceutical services. A case in point is the Northern region which has 10 districts without pharmaceutical personnel. At the beginning of this year, a hospital in one of the districts in this region was downgraded to a Public Health Centre with a Doctor, primarily because this facility had no pharmacist. The pharmacy in this hospital was being managed by a nurse with the help of two pharmacy assistants.

To address this challenge, the government should, as a matter of urgency, improve the working conditions of professionals in the pharmaceutical sector in order to attract and retain them in the public sector. Again, it is important for the government to take a proactive measure to avoid the collapsing of the public pharmaceutical sector. Some of the measures could be compelling BMCs to come out with comprehensive payment plans to ensure that all borrowed funds and unauthorized payments from the IGF-Drugs Accounts are refunded by the end of the year; enforcing the three-primary signatory requirement; issuing separate NHIS reimbursement cheques for drugs and services; instituting a requirement that an approval should be granted from a higher level to back a decision to apply RDF on non-pharmacy related projects and activities. On no account should unauthorized payment be made from the RDF, apart from specific activities the funds are earmarked for.

The appointment of a health minister with a background in finance and accounting probably demonstrates the government’s commitment to demand accountability from health managers. However, the government’s resolve to implement the new financial management policy, and the policy on IGF which recommends among other things, retention of 66 percent of Internally Generated Funds of health facilities, is indicative of times of uncertainty ahead.

Conclusion

The NHIS is a pro-poor health policy which has become the main vehicle of financing healthcare in Ghana, and serves as a replacement to the cash-and-carry system. While the availability of medicines alone does not guarantee adequate care, they are nonetheless the cornerstone of healthcare delivery. Inadequate supply of medicines will always lead to loss of confidence in the healthcare system.
Why the Pharmacy Profession Refuses to Die

Wisdom Twumhene

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I begin this piece by making an unapologetic statement that, Pharmacy as a profession is older than us and will outlive us.

The history of pharmacy reveals that the profession started many years ago. Therefore, unlike other professions, pharmacy is an already established and rooted profession, it is not a new profession trying to find its grounds, as many people wrongfully think.

There have been bitter lamentations about the profession within the last few years, particularly in our country Ghana.

On the lips of professionals are statements like, “pharmacy is dying”, “pharmacy faces an extinction”, “do not go to pharmacy school”, and many other negative and uninspiring words that demoralizes and reduces the zeal and passion of people who once had the desire to catch up with the evolving trend or pattern of the profession.

Although some may have valid reasons for putting up such arguments, I believe the time has come for us to be able to identify and, with all honesty, put things in their right perspectives.

Is it the profession that is at the verge of extinction or it is the professional? In an attempt to answer this question, I reiterate that the pharmacy profession is older than us. There were pharmacists before us, and there will be pharmacists after us. If pharmacy was able to survive even in the medieval era, then I beg to differ from the popular opinion that pharmacy is on the verge of extinction. Even history proves to us that pharmacy is far from extinction.

As professionals, we need to clearly understand and define our roles; do you function as a medication "disher", a medication counter or a pharmacist? If you identify with the first two, then I am sorry to say you will soon be replaced and will indeed be extinct. However, if you identify and function as the latter, a pharmacist, then as long as the profession remains, you will remain relevant and an indispensable asset.

How you define yourself will determine your fear or hope. Again, the pharmacy profession refuses to die because the situations or events that cause people to come out with negative statements and attitudes
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towards the profession are not experienced globally. I am not downplaying the reality of challenges; people face challenges everywhere. Challenges are inevitable and are a part of life. That is why the grass may seem green on the other side until you get there.

But my point is that most of the lamentations of pharmacists in Ghana ends at the borders of Ghana. One therefore cannot make a general conclusion based on a country’s experience.

In conclusion, whether you believe it or not, the country is looking up to us to be professionals and good examples. Young pharmacists, intern pharmacists, student pharmacists and children who aspire to be pharmacists, are looking up to us for hope and direction. But what are we giving them? Bitter complain, unsatisfactory responses, teaching them about the blame game and many more.

They come to the hospitals and pharmacies with high hopes and good spirits but leave demoralized, confused and heartbroken because we sow seeds of discontent in them even before they become fully fledged professionals.

I believe we can do better than we are currently doing. Let’s become beacons of hope, inspirers and encouragers of each other. We have complained and lamented for too long and have had no positive response. Probably there is a better way, let’s have a game-change plan, for the fact remains, and whether we believe it or not, pharmacy has proven itself and stood the tests of time. The profession refuses to die, the profession is not going to extinction anytime soon but the professional can easily go extinct and be irrelevant. The way forward then is to stay together as a body, give ourselves to constant learning, embrace and adapt to the rapid changes that the profession is undergoing, stay positive and indeed reflect on the fact that we are friends of the human race.
Introduction

The University of Health and Allied Sciences, Ho (UHAS) was established in November 2011, by an Act of Parliament (Act 828). The Act mandates the University to focus on the education of health professionals. The University’s vision is to be a pre-eminent research and practically oriented health educational institution dedicated to community service.

To fulfil its core mandate, UHAS is expected to establish a minimum of eight (8) schools, namely the School of Basic and Biomedical Sciences (SBBS), School of Medicine (SOM), School of Nursing and Midwifery (SONAM), School of Allied Health Sciences (SAHS), School of Dentistry (SOD), School of Pharmacy (SOP), School of Public Health (SPH) and Graduate School of Sports and Exercise Medicine (GSOSEM), and three (3) institutes (i.e. Institute of Medical Education, Institute of Traditional and Alternative Medicines and Institute of Health Research). Accordingly, SOM, SPH, SAHS, SBBS and SONAM were founded at the inception of the University. The School of Pharmacy (SOP) and the Institute of Health Research (IHR) have just been established. The establishment of the School of Pharmacy and introduction of the Pharm D programme is the newest addition in fulfilment of this mandate. The pioneering batch of students in the School of Pharmacy are 31 in number and were admitted in September, 2016. They are currently being accommodated in Ho but will move to Keta when the permanent infrastructures for the School are ready for use.
The Pharm. D Programme

The School runs a Doctor of Pharmacy (Pharm. D) programme, which is a professional doctorate degree of six (6) years duration. There are six (6) core areas making up the academic departments which contribute to the Programme. These departments are Pharmacy Practice, Pharmaceutics, Pharmaceutical Chemistry, Pharmacology and Toxicology, Pharmacognosy and Herbal Medicine, and Pharmaceutical Microbiology. The programme will provide classroom-based foundation courses in the Social, Basic, Biomedical, Pharmaceutical and Clinical sciences in the first five (5) years, along with Introductory Pharmacy Practice Experience (IPPE). The sixth and final year of the programme will include Advanced Pharmacy Practice Experience (APPE), which is set in the healthcare environment, and also a capstone course leading to a final year project. The programme is designed to provide students with knowledge, skills and attitudes that support lifelong learning and opportunities for the advancement of pharmaceutical knowledge through research. It will also equip pharmacists emerging from the programme with the necessary skills and knowledge to provide a globally acceptable pharmaceutical care and service that will improve health and quality of life of people in their communities.

Research Component

All the students are required to undertake at least two research projects. The first is based on the Pharmaceutical sciences and is taken at Level 400. The aim of this project is to whip up the interest of the students and encourage them to pursue graduate programmes in the Pharmaceutical sciences and possibly take careers in academia. The second project is based on relevant problems in the practice of Pharmacy as pharmaceutical care providers. Each student is required to write a proposal for the project, defend it and be granted approval before commencing the research work. A pass in an oral defence of the final results and a write-up is required for graduation.

Staff of the School

The School at the moment has 20 core academic staff, four (4) technicians, an administrative assistant and a faculty officer. The School has at its disposal lecture halls, laboratories for students and a research laboratory for faculty. The Acting Dean of the School is Pharm. Prof T.C. Fleischer, the current Pro-Vice Chancellor of the university.
Currently, there are four pharmacy training institutions in the country: Faculty of Pharmacy and Pharmaceutical Sciences, Kwame Nkrumah University Science and Technology (KNUST); School of Pharmacy, University of Ghana; Department of Pharmacy, Central University and School of Pharmacy, University of Health and Allied Sciences. UHAS and KNUST are presently running the PharmD programme. The uniqueness of the UHAS curriculum lies in the institutionalization of an eight-week vocational training programme which is scored as a four-credit hour course, and the emphasis it puts on community service, in fulfilment of the University’s vision. The vocational training programme is designed to expose the students to the work environment in all the health facilities within the 28 districts of the Volta Region during the recess terms of the academic calendar.

The introduction of a new course like the Ghanaian and African Studies, and also Community Entry and Organization into the curriculum, will enable students to develop a framework for analyzing socio-cultural issues affecting their immediate environment. This standpoint will enable them appreciate the global challenges and services from the same perspective. It will also empower their sense of judgement in creating an enduring, empathic and enabling relationship with individuals, groups, organizations, and communities.

**Short term goals**

- **Formation of Students Association**

  There are plans to form a UHAS Pharmacy Students Association under the Federation of Ghana Pharmaceutical Students Association. This will enable them participate in the activities of the National Federation and the International Pharmaceutical Students Federation (IPSF).

- **Community Outreach**

  The School of Pharmacy plans, in conjunction with various interest groups, to carry out outreach programmes in the Ho Municipality, Volta region and the country as a whole. The aim of these outreach programmes is to increase drug safety awareness among the people and project the image of the School and the Pharmacy profession.

- **Reactivating and running of the Manufacturing Unit at the Volta Regional Hospital**

  The School intends to collaborate with the Pharmacy Department of the Volta Regional Hospital to reactivate the manufacturing unit to compound extemporaneous preparations, and manufacture selected pharmaceutical products which could be supplied to other pharmacies and hospitals across the region.

**Long term goal**

The long term goal is to become a leading pharmacy training institution providing academic opportunities not found anywhere else, with values unmatched by any public university in this country and the sub-region. We hope to introduce postgraduate programmes in all the six departments of the School and become a hub of interdisciplinary health-related research within the University and the country at large.
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The President of the Republic of Ghana, Nana Addo Dankwa Akufo-Addo, underscored the critical roles pharmacists play in the health sector, adding that it was critical their concerns were addressed with dispatch in order to ensure a smooth provision of pharmaceutical service across the country.

The President made this known when the leadership of the PSGH called on him at the Flagstaff House on June 21 this year to welcome him into office and also share with him some key issues of concern to pharmacists and stakeholders of the pharmaceutical sector.

The PSGH President, Pharm. Thomas Boateng Appiagyei, who led the PSGH delegation congratulated the President on his ascension to the highest seat of the land and seized the opportunity to introduce the PSGH to government as an important ally in the country’s developmental agenda. Pharm. Appiagyei provided a brief exposition of the historical background of the PSGH as well as its makeup.

Pharm. Kofi Abu, the Vice President of the PSGH who served as the spokesperson for the delegation, highlighted four (4) key areas of concern the Society wished to draw the attention of government to. According to him, the excessive delay in reimbursement of claims to service providers under the National Health Insurance Scheme (NHIS) was hobbling the provision of smooth pharmaceutical services...
to patients as suppliers of pharmaceuticals were also indirectly affected by this delay. He appealed to the government to, as a matter of urgency, secure a bailout for the NHIA as an immediate measure to clear an outstanding debt of 1.2 billion Ghana Cedis it was owing its service providers. Towards long term sustainability of the NHIS, he said the PSGH had some of its members with solid background in pharmacoconomics who would be willing to make their expertise available to the government in reviewing the payment model the NHIS used for reimbursing service providers.

Pharm. Abu also intimated to government that the PSGH had had snippets of information which indicated that some foreign investors were seeking to capitalize on the government’s mission of reviewing the Ghana Investment Promotion Centre (GIPC) ACT, 2013 (ACT 865) to remove parts of that law which reserves the retailing and operation of certain businesses to Ghanaians only, including “the retailing of finished pharmaceutical products to Ghanaians and wholly-owned Ghanaian companies.” He said acceding to this motive would be a harbinger for pharmacies operated by its members and the country’s economy in general.

The PSGH also advocated for a sustained government’s support to local pharmaceutical manufacturing companies. It commended government for restricting 49 essential medicines from importation in order to grant local manufacturers the monopoly of producing and distributing such drugs.

Pharm. Abu, speaking on behalf of the PSGH said such efforts should be sustained with the vision of making Ghana the India for Africa, considering the enormity of the economic prospects of this dream. He further appealed to government for financial support to local pharmaceutical manufacturers so they could have the structural and technical footing to meet WHO prequalification and also produce medicines that would compete with the best global pharmaceutical giants.

Pharm. Agyemang Badu, the GHOSPA chairman who was also part of the PSGH entourage was given the opportunity to present GHOSPA’s concerns to Ghana’s President. After providing a brief overview of the make-up of his constituents, he said his Association had protracted issues with their migration onto the Single Spine Salary Structure (SSSS) which required a finality.

The issues, according to him, were the Grade Structure (GS), Interim Market Premium (IMP) of public hospital pharmacists.

He expressed worry about the disparity in IMP between public university/hospital pharmacists—whose IMP were pegged at 114%—whilst that of pharmacists working in agencies under the health ministry, according to him, receive stratified IMP (58% for Pharmacists and Senior Pharmacists; 68% for Principal Pharmacists; 75% for Specialists Pharmacists and Deputy Director of Pharmaceutical Services (DDPS)).

Pharm. Badu said this disparity ran counter to the spirit of the SSSS which had been introduced by the previous administration of the NPP government with the aim of ensuring “equal work of same qualification for equal pay.” “This has been the cause of many unrests from the pharmacy front,” he bemoaned.

Another issue the GHOSPA chairman revealed to the President bothered on the lack of Conditions of Service (COS) for his members. According to him, GHOSPA remained the only group of healthcare professionals in the health ministry without any COS. Owing to this, he said the morale among public hospital pharmacists was at its lowest ebb. He said he believed that finality to the constellation of issues bothering his members could only be found by the Presidency.
President Akufo-Addo welcomed the delegation to the seat of the country’s Presidency. According to him, pharmacists are an extremely important workforce in the health sector, and therefore considered the PSGH’s concerns also important.

He said the issues raised required more in-depth discussions which, in his opinion, a courtesy call could not provide the platform for an exhaustive discourse. Nonetheless, he requested the Minister of Health, Hon. Kwaku Agyemang Manu who was also present at the meeting to provide an overview of measures he had been taking to address them if they had been brought to his attention already.

The health minister averred that he had been engaging the finance minister on ways to quickly clear all outstanding debts of the NHIS, adding, he was hopeful a significant proportion would be settled by July ending.

The President lauded the concept of making Ghana the India for Africa. In his view, considering the present gains of the country compared to other African countries in the area of local pharmaceutical production, Ghana proved a logical base to position itself as the leader in the exportation of locally-made pharmaceuticals. He expressed his desire to pursue this agenda.

On the matter of the GIPC law review, he said the GIPC would be engaged to ensure that the protectionism provision guiding the retailing of finished pharmaceutical products remained unchanged.

With regards to GHOSPA’s concerns, he said the issue of IMP was somewhat technical but went ahead to give an indication of finding solutions to it. He also expressed his dissatisfaction with the lack of COS for GHOSPA members, describing it as “anomalous.” He said it required resolution “ASAP”—a statement which attracted applause from the PSGH delegation. He asked the health minister whether he had any reservations to the issues raised by GHOSPA. In response, the health minister replied “no”, adding, he would treat the matter with dispatch.

In his concluding remarks, the President commended the PSGH delegation for visiting him. Whilst admitting that he had inherited a dried treasury from the previous administration, he reiterated his determination to, as a matter of urgency and with sincerity, resolve key issues confronting GHOSPA: GS, IMP, and COS.
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