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Full Length Research Paper

Feasibility of using World Health Organization (WHO) pain ladder in the management of pain at a secondary healthcare center

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The objectives of this report were to determine the feasibility of adhering to World Health Organization (WHO) three-step pain management guidelines in a secondary healthcare institution and to identify areas where improvements are needed. The study was carried out in January, 2012. Descriptive analysis of available analgesics and adjuvants was done and the cost implications were also evaluated. Analgesic options for the 3 rungs of the WHO pain ladder were available. However, 11/14 (78.6%) of all the analgesics were nonsteroidal antiinflammatory drugs (NSAIDS). No Cox-2 inhibitor was available. Tramadol and Dihydrocodeine were the only agents available for second level treatment of pain, while parenteral pentazocine was the only agent available for the treatment of severe pain. All the agents were affordable. Managing pain using the WHO pain ladder is feasible at secondary healthcare hospitals. However, there is a need to expand analgesic options at the second and third rungs of the ladder.

Key words: World Health Organization (WHO) pain ladder, analgesics, cost, Nigeria.

INTRODUCTION

Pain is the most common reason for physician consultations in health institutions (Hasselstrom et al., 2002; Katz, 2002). It is the main reason for visiting the emergency department in more than 50% of cases and is present in 30% in family practice visits (Cordell et al., 2002; Hasselstrom et al., 2002). It is a major symptom in many medical conditions and can interfere with a patient's quality of life and general functioning (Breivik et al., 2008).

A guide to pain management is the World Health Organization (WHO) pain ladder (WHO, 1996), which recommends a three-step approach to the management of pain. This ladder was originally applied to the management of cancer pain, but is now widely used in the management of other types of pain. The guidelines recommend prompt administration of drugs when pain occurs, moving from Non-Opioid to Opioid with or without adjuvant (Table 1). The choice of treatment is in a three-step ladder depending on the severity of pain as shown in Table 2.

However, despite the wide range of available analgesics, inadequate treatment of pain is still common throughout surgical wards, intensive care units, accident and emergency departments, and in general practice (Soyannwo and Amanor-Boadu, 2001; Brown et al., 2004). Despite the availability of pain assessment tools, they are underused resulting in under-evaluation and under-treatment of pain (Elusiyan and Senbanjo, 2005). Studies on pain management have also shown that the available options for pain management are inadequate especially the strong opioids which are recommended for the treatment of severe pain (Adenipekun et al., 2002).

Effective management of pain requires knowledge of locally available options and their cost implications (Erkan et al., 2002; Faponle and Soyannwo, 2002). Patients' financial status affects their ability to afford and thus adhere to prescribed medications. In Nigeria where majority of the population is living below the poverty line, it is pertinent for physicians managing pain to have adequate knowledge of guidelines, available drug options,

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Table 1. A basic drug list for cancer pain WHO (1996).

Category	Basic drugs	Alternatives
Non-Opioids	Acetylsalicylic Acid (ASA)	Choline Magnesium Trisalicylate
	Paracetamol	Diflunisal
	Ibuprofen	Naproxen
	Indomethacin	Diclofenac
Opioids for mild to moderate pain	Codeine	Dihydrocodeine
		Dextropropoxyphene
		Standardized opium
		Tramadol
Opioids for moderate to severe pain	Morphine	Methadone
		Hydromorphone
		Oxycodone
		Levorphanol
		Pethidine
		Bupronorphine
Opioid antagonists	Naloxone	
Adjuvants		
Antidepressants	Amitryptiline	Imipramine
Anticonvulsants	Carbamazepine	Valproic acid
Corticosteroids	Prednisolone	Prednisone
	Dexamethasone	Betamethasone

Table 2. WHO three-step ladder for pain management.

Rung of ladder	Analgesic category
Mild Pain	Non-Opioid ± Adjuvant
Moderate Pain	Weak Opioid ± Non-Opioid ± Adjuvant
Severe Pain	Strong Opioid ± Non-Opioid ± Adjuvant

and their cost implications. Studies in pharmacoeconomics are also needed to clearly define the relationship between cost and adherence to prescriptions.

This short report examined the available analgesics in a secondary health center in Ibadan, Southwest Nigeria. The feasibility of using the available analgesics in accordance with recommendations of the WHO three-step ladder approach to pain management, analgesics cost implications, and identification of areas where improvements are needed were the main objectives of this study.

METHODS

Study location and period

The study was carried at a secondary healthcare facility in Ibadan, Southwest Nigeria in January 2012. The hospital is a one hundred and eighty bedded facility with an average monthly patient turnover of 6500. The pharmacy had two qualified Pharmacists and fifteen pharmacy assistants at the period of study.

Classification of analgesics

The analgesics were classified under the following categories in accordance with the WHO guidelines for management of cancer pain described in the introduction: Non-Opioid, Mild Opioid, Strong Opioid, Adjuvants.

Data collection

This was a descriptive and exploratory study. Data used was obtained from the central pharmacy of a secondary healthcare center. A list of available analgesics and their costs was obtained from the chief pharmacist and pharmacy personnel were further interviewed on aspects of the pharmacy relevant to the study.

Analgesic drugs purchase

Data on drugs purchased and used in the month of

Table 3. Available analgesics and adjuvants at the pharmacy of the secondary healthcare center studied.

Category	Available option and unit cost ($)
Non-Opioid	Tablet paracetamol - 500 mg (0.006) Tablet aspirin - 300 mg, (0.007) Tablet ibuprofen - 200 mg (0.02) Tablet ibuprofen - 400 mg (0.03) Tablet diclofenac - 50 mg (0.13) Parenteral paracetamol - 300 mg/ 2 ml ampoule (0.17) Tablet naproxen - 250 mg (0.2) Parenteral diclofenac - 75 mg/ 3 ml ampoule (0.23) Capsule tenoxicam - 20 mg (0.45) Syrup paracetamol - 120 mg/5 ml (0.93) /bottle Syrup ibuprofen - 100 mg/5 ml (1.53) /bottle
Opioids for mild to moderate pain	Tablet dihydrocodeine (0.16) Capsule tramadol (0.18)
Opioids for moderate to severe pain	Parenteral pentazocine - 30 mg/1 ml ampoule (1.27)
Adjuvants	Tablet amitriptylline - 25 mg (0.02) Tablet prednisolone - 5 mg (0.03) Parenteral dexamethasone - 4 mg/1 ml ampoule (0.17) Tablet carbamezapine - 200 mg (0.23)

$1.00 = 150 Naira.

January 2012 was systematically collated. Drugs were purchased from certified drug companies to ensure quality of products. A Pharmacy and Therapeutics Committee recommended purchases; factors that were considered by the committee included drug utilization rate, drug safety profile as reported in literature and from reports of National Pharmacovigilance committees, cost of products, and manufacturers' integrity as a measure of quality control. Purchases were made as soon as stock decreased to specified reorder levels, or on the recommendation of the Hospital Pharmacy and Therapeutics Committee. There was no controlled drugs cupboard in the pharmacy at the time of the study.

Cost implications

Patients obtaining the drugs from the pharmacy were evaluated. The exchange rate between the Naira (Nigeria's local currency) and the American Dollar was set at the current rate of 150 Naira to $1.00. Only generic names of the drugs were used.

Data analysis

Data was analyzed within and among analgesic groups by comparison of numbers, proportions, and costs of the drugs.

Ethical approval

The study was approved by the hospital ethics committee before the commencement of data collection. This project was not funded by any agency and the authors declare no conflict of interest.

RESULTS

Availability of analgesics

A total of 14 analgesics of the different rungs of the WHO ladder were available at the pharmacy during the period of the study. The three broad categories of analgesics and adjuvants were available (Tables 3 and 4).

Non-Opioid analgesics

The widest range of options was in the Non-Opioid group 11/14 (78.6% of available analgesics) and they were the cheapest. All the drugs in this category were oral with the

Table 4. Dosage forms of available analgesic at the period of study.

Dosage form	Available options
Tablet	Aspirin (300 mg)
	Diclofenac (50 mg)
	Dihydrocodein (30 mg)
	Ibuprofen (200 mg)
	Ibuprofen (400 mg)
	Naproxen (250 mg)
	Paracetamol (500 mg)
Syrup	Ibuprofen (100 mg)
	Paracetamol (120 mg)
Capsule	Tenoxicam (20 mg)
	Tramadol (50 mg)
Parenteral	Diclofenac (75 mg/3 ml)
	Paracetamol (300 mg/2 ml)
	Pentazocine (30 mg/ml)

exception of Paracetamol and Diclofenac, which also had parenteral preparations. Tablet Paracetamol was the cheapest analgesic in this category at $0.06 per tablet while syrup Ibuprofen was the most expensive at a cost of $1.53 per bottle. On recommendation of the Pharmacy and Therapeutics committee of the hospital as at the period of study the Pharmacy did not have any COX-2 inhibitor.

Opioid analgesics

Available opioid analgesics for management of mild to moderate pain were oral agents but for parenteral pentazocine. Parenteral pentazocine was also the only available opioid for severe pain at the cost of $1.27 per ampoule. Other agents used as alternatives to pentozocine were parenteral paracetamol and Diclofenac.

Adjuvant drugs

Available options in this category were all oral preparations (Table 3). They were antidepressants, anticonvulsants, and corticosteroids.

Comparative cost of analgesics

Overall, the prices of all analgesics increased as options changed from oral to parenteral preparations. Parenteral preparations were available as single units (ampoules) preparations. It was not a policy of the Pharmacy to have more than one brand of the different analgesics in stock, thus analysis of cost differences of different brands of the same analgesic was not achievable.

DISCUSSION

The study was conducted to evaluate the feasibility of complying with WHO recommendation of adequate treatment of pain using the three-step ladder approach and to give an idea of the cost of doing so. The results showed that at this secondary healthcare center, which is typical of many similar facilities in Nigeria, adequate treatment of pain is feasible. Non-opioids formed the bulk of available analgesics, thus managing pain at level one of the ladder was relatively easy and affordable. However, other than paracetamol, all the agents were nonsteroidal antiinflammatory drugs (NSAIDS) known for gastric ulceration and are contraindicated in conditions like peptic ulcers, asthma, bleeding dyscracias, third trimester of pregnancy, and history of allergy to the drugs. This limited the control of pain in patients with these conditions.

Cox 2 inhibitors were not recommended for purchase by the hospital Pharmacy and Therapeutics Committee in view of the reported adverse effects attributed to their use when they were introduced (Simon and White, 2005). However, newer agents of this category of analgesics have been reported to be safe and effective and more recently their use is being advocated (Latimer et al., 2009). Physicians and Hospital Pharmacy and Therapeutics Committees need to re-evaluate the withdrawal of Cox-2 inhibitors from their pharmacies in light of emerging evidence in support of their use. Expanding analgesic options by including selective Cox-2 inhibitors in the hospital formulary will enhance the management of pain.

Other results of this study showed that changing from the first to the second ladder of pain management narrowed the available analgesic options. Codeine, which is the recommended drug for second ladder pain control, was not available. Dihydrocodeine and Tramadol were the only second level analgesics in stock. This reduction in available options may be one of the factors contributing to inadequate management of moderate to severe pain at our secondary healthcare centers. The situation becomes even more narrowed at the third rung of the ladder where parenteral pentazocine was the only analgesic available for management of severe pain. Morphine, which is the option of choice by the WHO listing was not available. It is thus a common practice at the hospital to use pentazocine in all cases of post-operative pain, sickle cell crises, and other severe pain.

The use of pentazocine in the management of severe

pain in Nigeria is very common and reports of efficacy are encouraging. However, fatal adverse reactions have been reported (Osifo and Aghahowa, 2008). Oral morphine elixir became available in Nigeria in 2006 (Eyelade et al., 2012). Reports of its use are few but they show that the analgesic efficacy of the drug is good when used in the management of severe pain (Eyelade and Ajayi, 2012). However, its use is still limited and in hospitals like the one that studied the drug was not available at the pharmacy. This may be related to the need for more experience in the use of morphine, concerns about its addictive property, and the absence of controlled drugs cupboard due to lack of the required number and classes of persons authorized to supply and handle controlled drugs. This therefore made it impossible to effectively use the WHO pain ladder in the management of severe pain.

The WHO recommends the use of adjuvants at any step of the ladder where their use is known to be beneficial. They can be used alone or in combination with analgesics to improve therapeutic outcomes. The available adjuvants were adequate for the three-level approach to pain management. The availability of single brands of all the drugs mentioned in this report was to avoid brand duplication which has been shown to be associated with dispensing, recording, and medication errors (Aronson, 2009). Patients' may also be confused over identities of medications where different brands of the same drug are prescribed at different times.

CONCLUSIONS AND RECOMMENDATIONS

In, pain management in secondary healthcare centers like the one studied can be done in accordance with the WHO three-step ladder approach, but with certain limitations. While the available options at level one of the ladder were adequate, only NSAIDS that are not suitable for certain conditions were in stock. This poses a challenge in the management of pain in patients with clinical conditions that do not allow for the use of NSAIDS. There is thus a need to include agents like COX-2 inhibitors to pharmacy analgesic options in order to cater for patients who have contraindications to use of NSAIDS. The second and third level options were inadequate but the available options provided limited cover for the management of moderate to severe pain at the secondary health care center.

The cost of all the analgesics was affordable in Nigeria where the National Minimum Wage per month is Naira 18,000.00 ($ 120.00). These results are encouraging and there should be little or no reason why pain cannot be adequately and effectively managed. In addition, the results point out the areas where improvements should be made for more effective control of all degrees of pain.

It is thus recommended that hospital pharmacies should expand the options at the different levels of the ladder, especially the second and third rungs. Regular update workshops on the management of pain should be encouraged at Hospitals and the use of Morphine should be particularly emphasized. Qualified pharmacists who can operate and maintain a controlled drugs cupboard containing morphine and other strong opioids should be employed as a mandatory requirement in pharmacies. Continuous research on efficacy and toxicity of analgesics should be encouraged in hospitals in order to monitor the effects and adequacy of pain control measures, and perhaps detect early substandard drugs which are a major problem in developing countries.

Finally, the WHO should regularly update the list of drugs for control of pain in the three rungs of the ladder and publish updates to guidelines for pain management. The comfort of the patient, which is majorly freedom from pain, ought to be of primary interest to all stakeholders involved in the care of patients.

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