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Message from WHO

• Child Health and Use of Medicine
Dear fellows and readers,

Welcome to the 5th issue of SJRUM.

This issue will be specially designated to pediatrics. Definition of a pediatric (Child) patient differs from country to country, WHO defines pediatrics as those patients less than 15 years. The Central Bureau of statistics, Sudan defines pediatrics as those with age groups less than 18 years. Some doctors in Sudan classify pediatrics as those with age groups less than 12 years due to social and religious reasons. Children need special attention in both prescribing and dispensing particularly newborns and infants. However patients who are known to be less than 15 years but are overweight may still be considered pediatric patients given their chronological age; but weights will then need to be estimated and dose adjustment may be needed. For children with special health care needs who have any type of condition that may affect normal growth and development it is important to consider developmental age, rather than chronological age when prescribing or dispensing for this population.

Our condition in Sudan is very critical, where most pediatric hospitals and units are very crowded and many are under staffed which may contribute to irrational use of medicines. We hope in this issue to expose some of these problems.

Dr. Habab K. Elkheir

Where are we from: Childhood Medications

Problems in dose calculation e.g.
- Analgesic over dose.
- Antiepileptics under dose.

Over prescription of antibiotics.

Co- patients lack knowledge about medication e.g
- Dosing intervals.
- Right dose.

Unavailability of some essential medicines.

Unavailability of some pediatric's dosage forms.
Misuse of Multi Vitamins in Children

Multivitamins are taken daily to prevent certain illness and disease, it also used as supplements in our country particularly for children.

In London hospital, it is a pragmatic approach to give a one-a-day multivitamin to children who does not like vegetables.

Child that did not have enough nutrition from food requires a daily multivitamin, this due to a balanced diet. Although multivitamins can be beneficial to such children, vitamins, like medicine, may be harmful if misused or not given as directed. The child may be prone to mistaking vitamins for candy and consume too many. Besides, in Sudan vitamins were treated as Over the Counter Drugs (OTC) drugs and heavily consumed by people specially children. While some peoples think that is a part of the standard diet and thus must be used extensively without any control.

This may be due to poor health education, besides, the health provider may be under parent pressure while the parent under social pressure.

Some ingredients in children's multivitamins, like iron and vitamin A (lipid soluble), may be toxic or lethal if taken in too frequent form. Moreover, vitamins interact with each other when taken together leading to serious effects.

Different symptoms with a vitamin overdose will observed in children such as diarrhea, abdominal pain and headache are the most common. Additional symptoms include dry, cracked lips, lethargy and loss of appetite, convulsions, irritability, sudden mood changes and increased urination.

If, some of the above mentioned symptoms were observed immediate medical attention should be performed such as, count how many vitamins remain in the bottle to discern how many may have been taken.

Several steps can be taken to prevent the child from overdosing on vitamins.

- Keep vitamins and other medicines in a locked cabinet and in childproof containers, away from children.
- Do not refer to vitamins as candy or a treat as this may lead your child to think of vitamins as a snack and not medicine.
- Be in touch with your kids.
- Always follow dosage instructions carefully to help prevent overdose.
- Recommends speaking with your child's physician before starting a daily multivitamin to ensure it is appropriate.
- People should always buy multivitamins from a trusted source
- Parents should be educated about the danger of vitamins misuse.

Lastly, some misconceptions regarding vitamins that require rapid corrections can be listed:

1. Any multivitamin on the market must be safe.
2. Multivitamins can prevent diseases generally.
3. One can substitute multivitamins for a healthy diet with no repercussions.
Problem-based Learning Module: Poly-Pharmacy in Management of Diarrhea in Children

scenario:
A 4 year old child presented to the doctor’s clinic complaining of diarrhea (8 bouts during the last 24 hours), abdominal pain, runny nose and low grade fever. The junior doctor diagnosed gastroenteritis, and prescribed:

- Co-trimoxazole suspension 5ml twice a day
- Metronidazole suspension 5ml three times a day
- Multivitamins solution twice a day
- Hysocine butyl-N-Bromide tablets 5mg three times a day

The prescription was dispensed by the local pharmacist and the parent took the child home. Within 24 hours, the fever worsened and the child appeared listless and somnolent. The parent was worried and took the child to the emergency department where the doctor diagnosed dehydration.

Problems:
- Poly-pharmacy prescription - There is no indication for the use of multivitamins in otherwise healthy children. Multiple antibiotic prescribing has shown no evidence of efficacy in children with viral gastroenteritis.
- Inappropriate formulation - The use of tablets in children has been shown to lead to choking and asphyxiation.
- Inappropriate management of diarrhea in children, WHO guidelines for management of diarrhea in children recommends the use of Oral Rehydration Salts (ORS) in addition to zinc supplementation.
- Fever was not appropriately addressed - Fever in children can lead to complications and exacerbate dehydration. Supportive care with paracetamol, Non-steroidal Anti-inflammatory drugs and cold compresses should be advised.
- The use of hyoscine in children without appropriate hydration and fever management can potentially lead to fatal hyperthermia.
- The pharmacist dispensed the medication without counseling or referring to the WHO guidelines for management.

Interventions:
- The healthcare team at the hospital reviewed the prescription and stopped the antibiotics.
- The child was rehydrated using intravenous Dextrose/Saline.
- On discharge, the WHO recommendations were as followed by providing ORS, paracetamol suspension and zinc powder.

Guidelines:
- The WHO recommendation for management of simple viral diarrhea should be disseminated to all healthcare professionals involved in managing children’s ailments.
- Rational prescribing of antibiotics should be restricted to cases with proven bacterial infections.
- Teamwork between healthcare staff in the community should be promoted.
- Standard treatment guidelines should be developed and implemented.
Rational prescribing refers to the selection of the most appropriate therapeutic regimen for a specific patient. The process of rational treatment starts with defining the patient’s problem, (diagnosis), and specifying the therapeutic objective(s). Prescription writing is a crucial step in the treatment process and should always be based on strong clinical grounds as well as thorough knowledge of the pharmacokinetic and pharmacodynamic profile of drugs. This is quite challenging in pediatric patients; due to the scarcity of pediatric licensing on the majority of available medications. Approximately 80% of drugs on the market do not have pediatric dosing or safety information.

Children are not small adults and drugs that are relatively safe in adults may have adverse effects in children and may accumulate toxic levels as a result of slower metabolism and excretion. Pediatric doses should always be obtained from a pediatric dosage reference text and should not be extrapolated from the adult dose.

Children are usually classified according to age as neonates, infants, child and adolescents. However, it is safer and more accurate to prescribe drug doses according to body weight and not age as children of the same age may vary significantly in weight. The principles of prescribing for children do not differ much from that of adults. However, special attention should be given to factors such as body weight, body composition, surface area, nutritional status and organ maturation.

Prescriptions should always be legible with the name, age and weight of the child. The exact dose should be carefully calculated according to weight and (if liquid) volume required for administration should be clearly specified. Calculated doses should be double checked and special care taken with decimal points. For amounts less than 1 milligram, it is advised to prescribe in micrograms to avoid confusion over the placing of decimal points. Abbreviations should be avoided as much as possible, especially when using micrograms.

Compliance is one of the important issues in children and is greatly influenced by the formulation, taste, appearance and ease of administration of a preparation. Parents should be given enough information about the name of the drug, the reason for the prescription, administration of the drug, appropriate and safe storage and common side-effects.

In summary, pediatric prescribing is much more complicated than prescribing for adults and practitioners should prescribe judiciously, select carefully the safest dosage regimen available, and appropriately educate patient’s parents and caregivers.

References:
Acceptability and Adherence to Zinc Sulphate in Treatment of Acute Childhood Diarrhea (Omdurman)

Badreldin O. Alsir
Kamal Eldin E. Ibrahim

Introduction
It is now well known that mild to moderate zinc deficiency is prevalent worldwide especially in least developed countries due to low intake of zinc from animal sources, high dietary phytate content –hinders zinc absorption- and inadequate food intake in general1. Zinc is a micronutrient which is a component in many metallo-enzymes and polyribosomes involved in cellular function. It supports growth and development during intrauterine, childhood and adolescence. It is essential for metabolism, cellular growth and immune function2. It helps the gastrointestinal epithelium to regenerate and enhances absorption of water and electrolytes. Clinical trials have shown that Zinc sulphate shortens the duration of diarrhea episodes, reduces the risk of an episode, and reduces the risk of future episodes and pneumonia as well; in general it reduces the overall mortality3.

Irrational use of antibiotics for diarrhea may contribute to remove in increased rates of antimicrobial resistance in developing countries. Studies have shown that use of zinc sulphate in treatment of childhood diarrhea reduced antibiotics use markedly3.

UNICEF and WHO in 2005 made a joint statement on recommendations for treatment of acute childhood diarrhea in children under five years of age that includes zinc sulphate in a dose appropriate to the child’s age for 10-14 days regardless of the cause4,5.

Objective
To evaluate the acceptability of zinc sulphate use in children by care givers, dosage form, price and their adherence to instructions of its use.

Methods
This is a community based descriptive study of children aged 3-59 months old that had acute diarrhea and were prescribed zinc sulphate. The study was conducted in Omdurman in four localities (Omdurman, Karary, Al-amir, Dar el Salam). Community pharmacies that had supplies of zinc sulphate were selected; patients’ care givers who sought assistance from these pharmacies were included in the study. The sample size was 200. Data was collected by a pretested questionnaire filled by the investigator following informed consent of the participants, and analyzed statistically by SPSS.

Results and Discussion
Among the children included in the study 104 (52 %) were 6 months to 2 years of age and 125 (62.5%) were breastfed. Of the children diagnosed with diarrhea 122 (61%) experiences 4-7 bouts of diarrhea a day, and 62 (31%) had 1-3 bouts. Of the 200 children; 164 (82%) were given zinc sulphate twice daily, the rest were given once daily. Only 33 (16.5%) children adhered to the recommended duration of use of ten days. A substantial portion 95 (47.5%) gave zinc for seven days and 63 (31.5%) for five days and only 9 (4.5%) children used zinc for three days (Figure 1). Improvement of symptoms was the cause of discontinuation in 61(30.5%) of the respondents. 23 (11.5%) reported that the amount provided in the bottle was not enough to cover the full duration of use. This would require buying another bottle which would add to the cost.

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2. Department of Pharmaceutical Chemistry, University of Khartoum, Sudan
ORS were prescribed with zinc sulphate in 135 (67.5%) of the cases, i.e. substantial percentages (32.5%) of children with acute diarrhea are denied the benefits of ORS treatment. Failure to prescribe ORS might indicate that prescribers do not follow the standard treatment protocol of acute diarrhea in children under five.

Prescriptions contained other drugs; beside zinc; (82%); these were: antibiotics, antipyretics, analgesics and antiemetics. However, antibiotics represented 32% (55) of medicines prescribed beside zinc and ORS.

Generally, caregivers regard the present form of zinc sulphate powder for reconstitution acceptable, tasting like other medicines (165, 82.5%), with acceptable colour (163, 81.5%), of good appearance and packaging (134, 67%). Such acceptance could contribute positively to patient’s compliance. However, the availability of different dosage forms will enable prescribers to select appropriate forms for their individual patients’ according to suitability.

Many regard zinc supplement as not affordable (66%). This had affected adherence to the full use for the recommended duration since cost of therapy is an important factor in compliance especially when patients buy their own medicines.

Conclusions and Recommendations
Zinc sulphate is acceptable as reported by parents and care givers, yet they do not stick to the full recommended duration of use. More effort is needed to improve compliance. Use of ORS is not as desired and hence need to be promoted.

References
Evaluation of Management of Expired Drugs' Disposal at Khartoum State in 2009

Shaima S. Mohammed
Habab K. ElKeir

Introduction
Expired pharmaceuticals do not represent a serious threat to public health or to the environment in general, but improper disposal may be hazardous as it may lead to contamination of water supplies or local resources used by nearby communities or wildlife\(^1,2\). Expired drugs may come into the hands of scavengers and children if a landfill is insecure. Pilfering from a stockpile of waste drugs or during sorting may result in expired drugs being diverted to the market for resale and misuse\(^2\).

There is an enhanced international awareness that the improper disposal of unwanted and unused medications may have a detrimental effect on the environment\(^3\). The World Health Organization (WHO) published guidelines for safe disposal of unwanted pharmaceuticals in and after emergencies in March 1999\(^2\). The guidelines provide advice on the implementation of safe disposal of unusable pharmaceuticals and described a number of methods for safe disposal of pharmaceuticals include those suitable for countries with limited resources and equipment\(^2\). According to WHO, it is the responsibility of the qualified appropriate authority to implement the guidelines in coordination with regional and local health authorities, as well as with the directors of health facilities that face the problems of drug disposal\(^2\).

In SUDAN, only one published study conducted in 2008 was identified and it did not cover all aspects concerned and there is still gap in information that needs to be addressed \(^4\). The aim of this study was to analyze the present status of expired drugs’ disposal management at Khartoum state through 2009.

Methods
A descriptive, cross-sectional, retrospective study was conducted in Khartoum state. Qualitative data about the present status of management of expired drugs’ disposal at Khartoum state was collected using an open ended fourteen question structured interview with the responsible person for disposal of expired drugs in the target institutions. Quantitative data about the amount and types of expired drugs that had been disposed in 2009 was collected from the records of disposal expired drugs. Data was obtained from 14 governmental pharmaceutical institutions and 42 pharmaceutical agencies which were identified using a systematic random selection technique.

The data from the interview was analyzed manually into categories and quantifies prior to being entered into the SPSS (version 14.0) software computer program. The data from records were analyzed using Microsoft office Excel 2003 computer program.

Results and Discussion
Findings from the study identified great variations in practices and regulations concerning the disposal of expired drugs between involved authorities. The National Medicines and Poisons Board (NMPB) issued guidelines for safe disposal of unwanted pharmaceuticals in 2008. These guidelines stated that the state pharmacy regulatory authority (GDP) is the body responsible for managing safe disposal of waste from the state’s pharmacies, factories and hospitals (the pharmaceutical agencies were not included). A committee must be formed to decide on the safe methods to dispose certain waste. While the pharmacist in Inspection and Statistic department in NMPB stated that since 2009 NMPB is the main authority for disposing expired and non-complying drugs. All interviewees reported that this new measure was not announced to all pharmaceuticals institutions and neither officially announced to
the state pharmacy regulatory authority. The General Directorate of Pharmacy- Khartoum State (GDOP-KS) had no written regulations. There were two main methods of disposing of expired drugs at Khartoum State, incineration and burying in landfill. Both methods were done without any direct supervision by authorities. There was no proper recording or documentation of the amount of expired drugs and methods of disposing these drugs in all pharmaceutical institutions included in the study. Records found in governmental institutions were not systematic, unclear, handwritten, and drugs' data incomplete. 54% of pharmaceutical agencies had no records at all.

GDOP-KS insist that two persons from the institution must attend the process. All governmental pharmaceutical institutions included in the study except one, attended the disposing process. One pharmacist at least attended the process. While only 48% of private pharmaceutical agencies did attend the disposal process and 36.4% of them send a pharmacist to attend it. No representative from NMPB or GDP-KS attended the disposal of any of private agencies.

65.22% of private pharmaceutical agencies did not practise sorting before disposal process and only two governmental institutions did sorting.

The cytotoxic drugs and narcotics disposed with other types of wastes in a landfill. The expired vaccines and immunological drugs were the most dominant type (96.11%) in the expired injectable types. All these expired vaccines and immunological drugs were disposed by burying in a landfill without being treated or made inert first and they included attenuated viruses.

Total cost of expired drugs that had been disposed in Khartoum State at 2009 known was 1,735,458.52 SDG (1,675,501.22 SDG from Central Medical Supplies Corporation).

**Conclusion**
The overall practice of expired drugs disposal at Khartoum State is alarming.

There are different formal channels for disposing expired drugs in Khartoum State. No clear, organised, and scientific system for disposing expired drugs was adopted in all pharmaceutical institutions included in the study. The authorities’ role is to give permission for disposing of expired drugs and gave the final disposal release document without being involved in the process itself.

There was no proper recording or documentation of the amount of expired drugs and methods of disposing these drugs in all pharmaceutical institutions included in the study.

**Recommendation**
Training course in proper disposing procedures should be organized by authorities for their employees and for all pharmaceutical institutions.

More research in the same area and a pharmacoeconomical research to find out the real cost of the expired drugs and their disposal process should be done.

**References**


Role of Community Pharmacists in Treatment of Childhood Diarrhea

Introduction

Diarrhea is usually defined as passage of watery stools at least three times in 24 hrs period\(^1\). It is caused by many microorganisms; rotavirus is the leading cause in 40% of all hospital admissions in children under five years of age, in developing countries\(^2\). Many bacteria like E. coli, Shigella, campylobacter, and Salmonella and Vibrio cholerae are known to cause diarrhea. Cryptosporidium has been recognized to cause 5-15% of childhood diarrhea in developing countries.

The current recommendations for treating childhood diarrhea in the developing world are set by the UNICEF/WHO statement 2004\(^3\). The treatment focuses around; fluid replacement to prevent dehydration and zinc supplementation. Antimicrobials should not be used routinely in management of diarrhea.

The role of pharmacists has expanded significantly during the past few years, their role developed in new ways to support patients with their medicines. Pharmacists need to ask adequate questions to reach a diagnosis, and determine whether to treat or refer to medical care, and what to give if treatment was appropriate\(^4\). Proper advice and counseling are required in all cases.

It is well recognized that parents and caregivers in developing countries go directly to retail pharmacies and drug sellers to manage diarrhea in their children\(^5\). The WHO recognized the important role of pharmacists and drug sellers in management of diarrhea and developed a training guide\(^6\).

This study aims to investigate the dispensing practice of pharmacists regarding treatment of acute diarrhea in children, and to see whether the pharmacists’ recommendations are consistent with WHO recommendations.

Methods

This is a non-intervention descriptive cross-sectional study conducted in Khartoum state; sample size calculation was carried out using random sampling from a list of registered pharmacies provided by the General Directorate of Pharmacy 2010. From a total of 1126, 333 were selected; 123 from Khartoum, 120 from Omdurman and 90 from Khartoum North.

Data was collected by a simulated client; a female who presented a standard scenario of an eight months old male infant suffering from simple watery diarrhea for two days for which ORS and zinc sulphate supplement were appropriate. Data was collected using a standard checklist based on WHO guidelines and recorded after leaving the pharmacy. Data was analyzed statistically using SPSS.

Results and Discussion

Treatment was suggested in 93.9% of the cases. ORS was advised in only 19.7% (61), zinc sulphate in 34% (72), antimicrobials (alone) in 49.7% of the visits. Antimicrobials were recommended either alone or in combination to other therapies in 62% of the situations (Figure 1). Regarding the number of questions asked, table 1 displays the range of questions. It is evident that pharmacist asked too few questions to enable them to reach an accurate diagnosis, and failed to eliminate serious cases by asking about risky signs and symptoms like dehydration. However, pharmacists were too ready to give treatment specially antimicrobials.

ORS and zinc sulphate supplements were not advised as in the WHO guidelines. Only 0.9% (29) pharmacists advised the client to consult

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a doctor; both immediately and if symptoms do not improve whilst 0.02% (8) pharmacists gave specific advice about hygiene and boiling the child’s drinking water. Only 31 pharmacists emphasized the importance to rehydration. None of the pharmacist showed the client how to recognize dehydration. Only 9.3% gave nutritional advice. The results imply that pharmacists visited give little advice on referral, what to do if symptoms worsen or do not improve, and on how to alleviate the adverse effects of diarrhea.

**Conclusions and Recommendations**

These results display a deficient practice in management of childhood diarrhea. It is evident that pharmacists do not follow the WHO protocol; they are reluctant to provide ORS or advice on rehydration. Zinc supplement were dispensed more frequently than ORS but yet lesser than desired. Antimicrobials were dispensed readily and alone in most of the case; this trend is alarming as it contributes to antimicrobial resistance and shows irrational medicines use.

Regulation of management of diarrhea is necessary to improve this practice. Education and training on how to manage childhood diarrhea are required, along with promoting the WHO protocol.

**Table 1 Questions asked by pharmacists in response to the scenario**

<table>
<thead>
<tr>
<th>Question</th>
<th>% of pharmacists asking the questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age of the child</td>
<td>94</td>
</tr>
<tr>
<td>Duration of symptoms</td>
<td>11.1</td>
</tr>
<tr>
<td>Frequency of diarrhea</td>
<td>13.8</td>
</tr>
<tr>
<td>Nature of diarrhea</td>
<td>58.6</td>
</tr>
<tr>
<td>Presence of fever</td>
<td>10.8</td>
</tr>
<tr>
<td>Presence of vomiting</td>
<td>3</td>
</tr>
<tr>
<td>Spasm/abdominal cramps</td>
<td>9</td>
</tr>
<tr>
<td>Other symptoms</td>
<td>1.2</td>
</tr>
<tr>
<td>Dehydration</td>
<td>2.1</td>
</tr>
<tr>
<td>Child takes food</td>
<td>6.3</td>
</tr>
<tr>
<td>Teething</td>
<td>17.7</td>
</tr>
<tr>
<td>No question at all</td>
<td>2.1</td>
</tr>
</tbody>
</table>

**References**

1. WHO. Treatment of diarrhea; a manual for physicians and other senior health workers. WHO, Geneva 2005
5. Forsberg B. Diarrhea in low and middle income countries. thesis for PhD. Karolinska; 2007.
Diclofenac has higher cardiovascular risks than other non-selective NSAIDs

Drug Safety Update October 2012

A new review by the European Medicines Agency, on the cardiovascular safety of NSAIDs has shown that the use of diclofenac is associated with a small but consistent rise in cardiovascular risk (development of coronary artery disease) when compared to other non-selective NSAIDs and similar to COX-2 inhibitors. Naproxen and ibuprofen are still considered to carry the least cardiovascular risk but a higher risk of gastrointestinal bleeding. It is recommended that these agents should always be used with the lowest effective dose to reduce the risk of side effects.

FDA warns of serious adverse events from accidental ingestion of over the counter eye drops and nasal sprays by children

FDA October 2012

The FDA has issued warnings following investigations into accidental ingestion of eye drops used to relieve redness and decongestant sprays by children. The cases involved children aged 5 years or younger who accidentally ingested products containing tetrahydrozoline, oxymetazoline or nephazoline. Although no deaths have been reported but the children required hospitalization for the management of serious events such as nausea, vomiting, lethargy, tachycardia, decreased respiration, bradycardia, hypotension, hypertension, sedation, somnolence, mydriasis, stupor, hypothermia, drooling and coma.

These events may occur in children from doses as small as 1-2 ml of eye drop solution. Consumers are advised to store medicines in locked cupboards out of the reach of children at all times.

Alternative Medicines for the management of chronic pain

Archives of Internal Medicine October 2012

Chronic pain is often a debilitating condition that may result in impairment of the quality of life for sufferers as well as loss in income. The use of long-term medication is associated with side effects and is frequently ineffective. Although acupuncture is widely used in the management of chronic pain, there is still considerable controversy. The Acupuncture Trialists’ Collaboration conducted a systematic review of 29 clinical trials for the use of acupuncture in back pain, shoulder pain, osteoarthritis and headaches. Statistical analysis showed that acupuncture was modestly effective treatment for chronic pain.

Pediatric Clinical Trials

Reuters Health news November 2012

Children have traditionally been excluded from clinical trials because they cannot give informed consent to enter studies testing vaccines and drugs. This presents therapeutic dilemmas with regards to dosing drugs in this population because children are not small adults and have unique pharmacokinetic and pharmacodynamic characteristics.

In the previous 10 years, USA based drug companies have started conducting clinical trials on children after obtaining informed consent from parents. Recent worries have centered on these companies shifting their work to developing countries where regulations are weak. However, a recent FDA analysis shows that although 38% of clinical trials are being conducted in developing countries, they are mostly for infectious diseases and hence of benefit to these children. In addition 28.5% of these trials are conducted in the wealthier developing countries where regulations are somewhat strong. Although, much needed, clinical trials in children should only be conducted following appropriate ethical considerations.
Introduction

Nurses’ clinical competence is related to professional roles as defined by the scope of standard of practices, the code of professional nursing conduct, clinical guidelines and protocols that govern safe and effective quality nursing care based on current evidence.

Nurses are part of the professional health team, and are equally responsible and accountable for any actions or emissions on their part.

Rational use of medicines is one of the important responsibilities of nurses and it requires that “patients receive medications appropriate to their clinical needs, in doses that meet their own individual requirements, for an adequate period of time, and at the lowest cost to them and their community”.

Therefore, nurses have to be aware of medicine efficacy and safety as well as identifying problems with medicines use.

Sudan Situation

In the approximately 25 nursing education programs in Sudan, the basic curricula include pharmacology for nurses. Recently, clinical pharmacology for nurses was added as mainly in postgraduate nursing studies at the Masters level. RUM teaching for nurses should focus on the following components:

1. Explain the concept of RUM.
2. Implement the tools of rational use of medicines – STGS (standard Treatment Guidelines), EML (Essential Medicines List), and PTCs (Pharmacy and Therapeutic Committees) in selection, administration and dispensing of medicines.
3. Explain the essential concepts of medicines’ management.
4. Apply the appropriate procedures involved in the administration of medicines.
5. Manage the common and serious side effects of medicines.
6. Provide medication counselling to patients regarding how to use medicines, store medicines, adverse medicines reaction and drug interactions.
7. Liaise with the health team about the rational use of medicines.

Conclusion

Our professional nurses in Sudan, must work together with other members of the health team mainly physicians and pharmacists to improve and promote health care environments that are conducive to risk reduction that assure safe, therapeutic, ethical and quality nursing practice.

These types of interactions may be avoided by separating medication and juice consumption by at least 4 hours. FDA has released educational tips for patients regarding potential fruit juice interactions (www.fda.gov/ForConsumers/ConsumerUpdates/ucm292276.htm). These informational points include important points about the education of patients, pharmacists and other health care provider about grapefruit and other juices interactions with prescribed medications. It also encourages patients to read the Medication Guide or patient information sheet that comes with prescription medications to identify any fruit juice interactions.
Advice on Using Spacer with Inhalation Medication

Inhalation is the best way to take most asthma medications. We now know that asthma medication given through a metered dose inhaler and spacer relieves asthma symptoms just as well as a nebuliser. The use of a spacer poses more benefits than when using an inhaler on its own e.g. more medication gets to the lungs where it is needed.

The following advice should be given to parents or children care givers to explain the use of Metered Dose Inhalers (MDI) and spacers in childrens:

1. Assemble the spacer following manufacturer’s instructions.
2. Remove the protective cap from the inhaler.
3. Shake the inhaler well and insert it firmly into the end of the spacer.
4. Place the mask over your child’s face, making sure that it covers the mouth and nose. In older children you may wish to use the mouthpiece on the spacer, rather than the mask.
5. Get your child to breathe out gently.
6. Press the inhaler once to release a dose of the medicine into the spacer. Do not remove the inhaler.
7. Allow your child to breathe in and out 4 or 5 times. This usually means leaving the spacer in position for about 15-20 seconds (do not remove the mask in between each breath - there is a 2 way valve system which will prevent any of the medication from escaping from the chamber).

If further puffs are needed, shake the inhaler again and repeat steps 4-7.

How to care for the spacer

1. The spacer should be cleaned once a week.
2. Take the spacer apart and wash it in warm water containing a little dishwashing detergent or mild soap.
3. DO NOT RINSE. Allow it to air dry. This can be done overnight.
4. Put the spacer back together
5. Do not allow anyone else to use your spacer.

1. **What temperature is considered a fever in children?**

Fever is a normal response to a variety of conditions, it occurs when the body’s temperature is elevated as a result of the body’s thermostat being reset to a higher-than-usual temperature.

Because of the normal variation in body temperature, there is no single value that is defined as fever. However, the following are generally accepted values:

- Rectal temperature above \(38^\circ C\)
- Oral temperature above \(37.8^\circ C\)
- Axillary temperature above \(37.2^\circ C\)

2. **What are the most common causes of fever in children?**

Children may develop fever as a symptom of a wide variety of illnesses as well as from infections. For example, certain blood disorders and inflammatory disorders (e.g. juvenile arthritis) may cause fever. Fever can also be caused as a side effect of some childhood immunizations. However, most episodes of fever are caused by viral or bacterial infections, generally viral infections cause fever for 48-72 hours, while bacterial infections can last longer depending on the treatment timing and sensitivity to antibiotics prescribed.

3. **When should antipyretics be considered?**

The use of antipyretic agents should be considered in children with fever who appear distressed or unwell. Antipyretic agents should not routinely be used with the sole aim of reducing body temperature.

Either paracetamol or ibuprofen can be used although should not be administered at the same time and they should not routinely be given alternately to children with fever. However, use of the alternative drug may be considered if the child does not respond to the first agent.

Antipyretic agents do not prevent febrile convulsions and should not used specifically for this purpose.

4. **When should a child with fever be considered as a low risk?**

Children who have all of the following features, and none of the high or intermediate risk features, should be recognized as being in a low-risk group for serious illness:

- Strong cry or not crying
- Content/smiles
- Stays awake
- Normal colour of skin, lips and tongue
- Normal skin and eyes
- Moist mucous membranes

5. **When should a child with fever be considered as at an intermediate risk?**

Children with any of the following symptoms should be recognized as being in at least an intermediate-risk group for serious illness:

- wakes only with prolonged stimulation
- Decreased activity
- Door feeding in infants
- Not responding normally to social cues/no smile
- Dry mucous membranes
- Reduced urine output
- A new lump larger than 2 cm
- Pallor reported by parent or carer

6. **When should a child with fever be considered as at a high risk?**

Children with the following symptoms or signs should be recognized as being in a high-risk group for serious illness:

- Unable to rouse or if roused does not stay awake
- Weak, high-pitched or continuous cry
- Pale/mottled/blue/ashen
- Reduced skin turgor
- Bile-stained vomiting
- Moderate or severe chest indrawing
- Respiratory rate greater than 60 breaths per minute
- Grunting
- Bulging fontanelle
The paediatric population represents a spectrum of different physiologies. The internationally agreed, and arbitrary, classification of paediatric population is:

- Preterm newborn infants
- Term newborn infants (0 to 28 days)
- Infants and toddlers (> 28 days to 23 months)
- Children (2 to 11 years)
- Adolescents (12 to 16 to 18 years)

(Ages are defined in complete days, months and years)

The dynamic process of maturation is one of the differences between paediatric and adult populations. The developmental changes in physiology and, consequently, pharmacology, influence efficacy, toxicity and dosing regimens of medicines used in children. It is, therefore, important to review the relevant changes.

- Gastrointestinal tract and oral absorption:
  Clinically important developmental changes in the gastrointestinal tract occur predominantly during the newborn period, infancy and early childhood. These changes affect gastric acidity, emptying time, gut motility, gut surface area, metabolizing enzymes and transporters, secretion of bile acids and pancreatic lipases, first-pass metabolism, enterohepatic recirculation, normal flora, and diurnal variations. For example, preterm, neonates and term infants have greatly reduced gastric acid secretion, so absorption of medicines like phenytoin, phenobarbital and rifampicin is low. In contrast, intact protein and high-molecular-weight medicines such as immunoglobulins, are more easily taken up.

- Medicine distribution: Newborn infants have a much higher extracellular fluid volume than any other paediatric population or adults. Total body water is also much greater in neonates. As medicines are distributed based on their lipid/water partition coefficient, these changes in body composition influence distribution of a medicine in various body compartments. For water-soluble medicines such as aminoglycoside and cephalosporins, larger initial doses, on a mg/kg body weight basis, need to be given to achieve plasma concentrations similar to adults. In addition, the volume of distribution of many medicines may be increased as plasma protein binding in neonates is less than in adults. The blood-brain barrier is also functionally incomplete in neonates.

- Hepatic and renal function and the elimination process:
  Total-body clearance of many medicines is primarily dependent on hepatic metabolism followed by excretion of parent compound and metabolites by the liver and kidneys. Nonpolar, lipid-soluble medicines are typically metabolized to more water-soluble compounds prior to excretion, whereas water-soluble drugs are usually excreted unchanged by the kidney. In general, the more premature the infant the poorer the hepatic metabolizing and renal excreting capacity. For medicines that are cleared by the liver, this leads to a longer plasma half-life and thus a longer time to reach steady-state. Similarly, for medicines that are entirely eliminated renally, the greater the prematurity, the longer their half-life.

- In young children, the hepatic and renal elimination capacity for many drugs may exceed that in adults, which makes administration of a higher maintenance dose necessary.

- Pharmacodynamics during development:
  Information regarding developmental changes in pharmacodynamics (medicine action and toxicity) is limited. Medicine targets, such as receptors, transporters and channels, are also subjected to developmental processes as metabolizing enzymes. For example, earlier development of opioid receptors specifically in the medulla and pons, where respiratory and cardiovascular centres are located, is consistent with a clinically observed higher incidence of respiratory depression and bradycardia associated with insufficient analgesia in newborns who receive opioids.
The consequences of the current status use of medicines in children include:

- Medicines are often used outside their licence; because of limited clinical in children.
- Wrong dosage causes short-term toxicity or treatment failure.
- Non-availability of appropriate paediatric formulations forces health care providers to administering crushed tablets, dissolving tablets in solvents or administering the powder inside capsules; without any data regarding their bio-availability, efficacy and toxicity.
- Formulations of strengths suitable for administration to neonates, infants and young children are not always available. Adult formulations therefore need to be diluted. This leads to administration errors in dosage calculation and dilution, especially in emergency units, paediatric and neonatal intensive care units.
- Inappropriate packages and lack of awareness among parents and caregivers about the methods for preventing accidents and poisoning lead to accidental poisoning in infants and children.
- Adolescents may ingest medicines with suicidal intent or may experience health problems from illicit drug abuse.
- Medicines can interact with traditional and herbal medicines.
- Medicines may have long-term safety problems. For example long-term use of inhaled corticosteroids in early infancy may increase the risk of growth retardation and/ or osteoporosis.
- In resource-poor countries, co-morbidity or malnutrition may exacerbate toxicity. Dehydration is frequently associated with ibuprofen-induced renal failure and malnutrition with paracetamol hepatotoxicity.
- Cultural differences can lead to misunderstanding of medicine instructions.
- Reconstitution of nonsterile oral powder can be a risk for stability or safety. It is important to remind health-care providers that water must be clean and filtered, and after reconstitution, the product has a strict expiration date.

Albendazole

Four children under 36 months died from choking on albendazole tablets during a deworming campaign in Ethiopia in 2007. Forcing very small children to swallow large tablets may cause choking and asphyxiation. Recommendations for the administration of such tablets are as follows: scored tablets should be broken into smaller pieces or crushed for administration to young children; older children should be encouraged to chew tablets of albendazole or mebendazole. It is strongly recommended that manufacturers of anthelminthics for public health programmes targeted at preschool children develop formulations that are appropriate for this age group. The formulation should be a safe single-dose formulation (e.g. granules or liquid for oral use) to replace the tablets currently in use.

Reference

This is a modified excerpt from WHO publication: Promoting safety of medicines for children.

http://www.who.int/medicines/publications/essentialmedicines/Promotion_safe_med_childrens.pdf
A Step-by-Step Guide to Developing Protocols

Protocols are comprehensive set of rigid criteria outlining the management steps for single clinical condition (e.g. management of anaphylaxis) or aspects of organization (surgical referral, ICU admission). It may be: disease-based, problem-based, treatment-based, and client-group-based.

A protocol can improve care in almost any setting. It is a valuable tool for implementing Rational Use of Medicines.

Protocols can be developed in a variety of different ways. The purpose of this article is to offer one option for an 8 step-by-step approach towards development.

Step One: Select and Priorities a Topic
The topic to be covered by the protocol should be selected through two main routes:
• The publication of national standards
• The identification of local service improvement priorities.

Step Two: Set up a Team
Experience has shown that the involvement of the staff responsible for the hands-on delivery of care is central to the successful development and use of protocols. The first step in the process, therefore, is to set up a multi-disciplinary team, made up of all clinical and non-clinical staff involved in care delivery.

The optimum number of people to have in a team is between 6 and 10 that may include a clinical leader, information specialist and a patient representation.

Once the team is established, it will need to agree on:
• A communications plan.
• The timescale for the project.
• A project plan and meeting schedule.
• An implementation plan.
• Goals and objectives for the protocol (see Step 4).

Step Three: Involve Patients and Users
Various mechanisms can be used to involve patients and users in the decisions on current service development. For example, information could come from:
1. Patient representatives on the protocol development team.
2. Consumer or interest group representatives on the protocol development team.
3. Patient associations.
5. Analysis of patient and user feedback – both positive and negative.

Step Four: Agree on Objectives
Clear objectives that are specific, measurable and have targets for achievement e.g. if the objective is to reduce the prescribing of antibiotics by 50%.

Step five: Build Awareness and Commitment
The implementation of protocol-based care can only be successful if there is visible, high-level support and awareness within an organisation. Strong clinical support is essential. Awareness can be raised among users e.g. making presentations about the benefits of protocols to key groups of staff, patients’ forum members and board members.

Step Six: Gather Information
Information should be sought on:
• National standards
• Published evidence of good practice
• Other organisations’ experience and protocols
• The views of patients and service users, through local information and the programme of national surveys of patient experience.
• Protocols should be built on an evidence base of what is required
to achieve good care. If there are limited sources of information about the area of care under consideration, then the team will need to reach a consensus on good practice.

**Step Seven: Baseline Assessment**
The next step is to determine the baseline of current performance. This can help the team to analyse local services and to identify where improvements might be made.

**Step Eight: Produce the Protocol**
The development team will need to review and confirm their objectives for the protocol before starting the creation of the document. Successful protocols are simple documents that guide staff through the process. They are not comprehensive documents that describe how each procedure is delivered to the patient. The team will need to agree on appropriate format and try it out to ensure that it is easy to use. Some organisations may have developed a corporate format for protocols that contains standardised core elements.

The protocol should be submitted for approval so that it can be signed off at a corporate level before proceeding to the pilot phase.

The protocol should:

1. Focus on the needs of patients and users of the service.
2. Create a single record of care (it should contain information about all aspects of the care and treatment delivered to the patient during a sequence of care).
3. Simple in design and easy to use, short and concise.
4. Follow a logical sequence.
5. Make information easy to find – some organisations use colour coding of sections to assist rapid retrieval of information.
6. Include realistic goals, timeframes, and measurable outcomes.
7. Make variations from care, the reasons for them, and the alternative actions taken, easy to record.
8. Facilitate audit.
9. Highlight responsibilities, including accountability for the completion of each part of the protocol.
10. Specify which groups of staff, in which organisations, will require access to confidential patient information, and links appropriately to information-sharing protocols and security policies developed through work on Caldicott and information governance.
11. Can be tested against the targets and objectives agreed at the start of the development process.
12. Give a name and contact number – the clinical leader or protocol co-ordinator, for example – for questions or further copies of the protocol.
13. Have a reference at the bottom of the document to the date of the protocol or version number, and the review date.

The implementation of protocols should be preceded by piloting the protocol, training all involved staff on its use and reviewing the pilot. Once, results from the pilot have been reviewed, the protocol should be widely disseminated and implemented. Following implementation, audit should take place to identify adherence and needs for changes in future review processes.

**Reference:**
The DGoP – Federal Ministry of Health and in collaboration with the World Health Organization has conducted the National Essential Medicines List (NEML) – July 2013 Consensus Workshop that started in the 28th of July 2013 and continued for three days. The number of workshop participants exceeds 80 representing specialists from different fields of medicine and pharmacy.

During the workshop, an introductory presentation about the Concept of EML and how the medicines have been selected. During this presentation also, a thorough description of the process for developing the NEML that extended for 2 years was presented. After the presentation and during day 1 and day 2 of the workshop, the participants have been divided into nine subgroups. During day 3, the rapporteur of each group has summarized the final work of the subgroup and then, presented what the group has reached consensus on. After each presentation, the discussion was opened to the flour. By the end of day three, the groups has reached consensus on the final draft of the NEML.

The closing ceremony has been honored by the Undersecretary of Health – D. Isam Eldin Mohamed Abdullah. During the ceremony, speeches have been delivered by the Head of EML updating committee – Dr. Mohammed A.Rahman ZainElabdin, the Director General – Directorate General of Pharmacy – Dr. Salah Eldin Jawhar, he Director General – Central Medical Supplies Corporation – Dr. Gamal Khalafallh M. Ali, the WHO representative in Sudan – Dr. Anshu Banerjee and finally, by the Undersecretary – Federal Ministry of Health who emphasized the importance of NEML in the availability and affordability of essential medicines in Sudan.

The final work of all groups has been combined in on document representing the EML final draft.
Sudan standard treatment guidelines (STGs) are part of an initiative to promote the rational use of medicines (RUM) in Sudan. RUM requires that “patients receive medications appropriate to their clinical needs, in doses that meet their own individual requirements, for an adequate period of time, and at the lowest cost to them and their community” (WHO 2012).

Sudan’s STG’s summarizes recommendation and evidence for the treatment of common clinical conditions presenting in the primary care. This was a 3 year collaborative effort between the General Directorate of Pharmacy (GDoP), Sudan and the World Health Organisation (WHO).

The aim of the STGs is to provide practitioners in the primary care with evidence based recommendations on therapeutic management of common conditions, methods of prevention and patient education.

The STGs have been developed in two phases; the first of which was based on the top 10 common conditions presenting in Sudan’s hospitals. In the second phase, protocols from the national treatment programmes (Tuberculosis, Malaria, Human Immunodeficiency Virus, Leishiminiasis) and management guidelines for a further 12 common conditions were incorporated.

The drugs therapies in these STGs inform the Essential Medicines List thus enabling appropriate and timely procurement of medicines to ensure an uninterrupted cost effective drug supply.

A methodology that involved key informants from the intended medical specialities and engagement of stakeholders was adopted. It consisted of the following steps:

1. Establishment of a task force- The taskforce is the body that is responsible for the oversight of the guideline development process to ensure that it meets national needs, follows good practice and is suitable for the purpose for which it is intended.
2. Engagement of stakeholders- The directorates involved in medicines procurement and those involved with provision of health in the primary care.
3. Target group- The target group was identified according to the WHO recommendation which states the following:
   - Prescribers in the public health care system
   - Those prescribers with limited training or having limited access to information sources
   - Areas or levels of care where prescribing is more challenging and shows variability
4. Identification of Priority diseases – Data from hospital admissions, hospital deaths and clinic attendance was used to identify priority group of diseases to be included in this volume.
5. Establishment of Subcommittees - For Each disease state subcommittees were chosen, based on WHO recommendations:
   - Specialists in the field with more than 5 years experiences.
   - Pharmacy specialist
   - Those who have the time and commitment to developing the STGs
6. Training of subcommittees: Training on the format of STGs and the development process was conducted by experts from the Sudan Evidence Based Medicine Group (SEBMA) and a WHO consultant.
7. Development of STG- Each guideline was developed in two stages: the first draft which was written by the subcommittee. For the development of the STG’s, a robust and scientific methodology was adopted to identify evidence based guidelines and when present supported with local evidence. In the absence of sound clinical evidence, expert local opinion has been sought. The second draft was developed after a meeting by the subcommittee members added to members from the task force. A specific format informed by WHO was followed in writing all the STGs and a final copy produced after a final consensus meeting that incorporated stakeholders and members from the taskforce and subcommittees.
Improving child health requires delivering integrated, effective care in a continuum, starting with a healthy pregnancy for the mother, through birth and care to pre-term newborns, through to toddlers and children to adolescents. Investing in health systems is the key to delivering this essential care. Medicines constitute an important component of the child care.

While a medicinal product is licensed it must have undergone extensive testing including pre-clinical tests and clinical trials to ensure that it is safe, of high quality and effective. This is not necessarily true for medicines used to treat children. Children are not involved in clinical trials for many reasons and hence there are no initial safety and dosing data for them. In addition, when the product has just been launched, it is always only available in an adult formulation. Hence, the prescriber has no alternative but to use these adult formulations e.g. crushing a tablet.

Children are not miniature versions of adults. Specific clinical trials in paediatric populations are required due to age-related differences in the drug handling or drug effects which may lead to different dose requirements to achieve efficacy or to avoid adverse effects. Thus, in the absence of authorised medicinal products to treat conditions in children, the prescriber must be careful when calculating doses and using adult formulation to avoid serious calculation errors.
Instructions to authors
Scope of the Journal: Rational use of medicines related to health care providers and patients.

Suitability of publication:
All topics related to the different aspects of RUM will be evaluated by the editorial board. Prospective authors with a subject(s) or questions about the suitability of their papers or materials are invited to request an opinion from the Editorial Board. (nmicrl@gmail.com).

Avoid plagiarism

How to submit materials:
Manuscripts can be handed over directly to the editor-in-chief as soft copy or by e-mail (nmicrl@gmail.com).

Types of manuscripts:
1. Research papers.
2. Case reports.

Preparation of manuscripts
All manuscripts must be typed in Arial font size 12, with 1.5 line spacing. Manuscripts must be in Word. Page margins on all sides must be at least 2.5 cm wide. You can use either English or American spelling but not both on the same manuscript.

1. Research papers
Original research will have the priority of publications. Author(s) name and affiliations should be clearly written. Contact person, telephone number and e mail address should be included. Total words count should not exceed 800 words including references, tables, table captions, figure legends, and footnotes. Maximum of three tables and figures are accepted.

The manuscript should be divided into sections. Each section should have a separate heading. Subheadings take the form of paragraph lead-ins (should be bold case), indented and run in with the text, separated by a period.

Introduction: This section should provide the reader with sufficient background information to evaluate the results of the research. An extensive review of the literature is not needed in this section. It should also give the rationale for and objectives of the study that is being reported.

Methods: Sufficient information must be provided so that the reader will understand the methodology and be able to repeat the experiment.

Results: The results section should be written in such a manner to provide information by means of text, tables and figures. Results and discussion may be combined or there may be a separate discussion section. If a discussion section is included, place extensive interpretations of results in this section. Do not repeat the results. Give numbers to figures and tables in the order in which they are mentioned in the text. All figures and tables must be cited in the text.

Conclusions and recommendations: Acknowledge personal, financial and institutional assistance at the end of this section.

References: Use the Vancouver reference system. Cite 6 references maximum.

2. Case reports
Any case that is related to RUM will be considered. The manuscript should include the following:

Setting, complete description of the case, consequences and outcome and finally follow up if applicable. Words count should not exceed 400 words.

NOTE: Ethical clearance is a requirement for all researches from 2012 onward.
Highlights on some of the NMICRL activities in 2013

Training on how to manage the SJRUM website, February 2013

Workshop on medicines information centers, for states’ and hospitals’ pharmacists, FMoH Great Hall, February 2013

Collaboration with CMS in preparing a seminar title (The Role of the Pharmacist, UK experience), Alshargah Hall, March 2013

Participation on woman’s day exhibitions at Ahfad University for Women, March 2013

Seminar on RUM for the student of the Faculty of Pharmacy, Alnilee University, May 2013

Seminar on RUM for States’ pharmaceutical cadre at FMoH CPD, August 2013