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PRESCRIBING ANTIBIOTICS AND OTHER MEDICATIONS FOR CHILDREN UNDER FIVE YEARS IN THE OUTPATIENT DEPARTMENTS (OPD) OF FOUR SECONDARY HOSPITALS IN FREETOWN SIERRA LEONE

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ABSTRACT

Introduction: The study of prescribing patterns seeks to monitor, evaluate and suggest modifications in practitioners' prescribing habits so as to make medical care rational and cost-effective. Information about antimicrobial use patterns is necessary for a constructive approach to problems that may arise from the multiple antibiotics available. The aim of the research was to determine the proportion of patients that are prescribed antibiotics in the outpatient department of four secondary hospitals. The specific objectives were to collect baseline information on the prescribing pattern of antibiotics, analyze the type of antibiotic prescribed and estimate the number of prescriptions per child and offer recommendations based on findings. **Method:** This study used a cross-sectional one-day point prevalence survey (PPS) and was conducted as per the World Health Organization (WHO) prescribing indicators in which one hundred and fifty-six prescriptions were reviewed in total from the four hospitals. **Results:** The average drug per prescription was 3.3 (SD=0.9). The most prescribed pharmacological class according to this study were antibiotics (28.5%) followed by analgesics (26.2%), and antimalarial (24.5%). Paracetamol was the most commonly prescribed drug. The study shows that the most prescribed antibiotic was Amoxicillin. The total number of antibiotics

prescribed was one hundred and forty-seven for a total of one hundred and fifty-six patients, giving an average of 0.942 antibiotics per patient. Overall, generic prescription and prescribing from the essential medicines list were 64.5% and 76.7% respectively. **Conclusion:** In accordance with World Health Organization (WHO) indicators used in this study, drugs were irrationally prescribed within secondary hospitals. The study recommends that the Drugs and Therapeutic Committees of the hospital should select the most appropriate antibiotics in terms of cost- effectiveness, develop standard prescription guidelines and enforce the usage of the guidelines to salvage unnecessary usage of antibiotics and other drugs at secondary hospitals.

KEYWORDS: Prescribing indicators, under-five, outpatients' clinic, rational prescribing, Prescribing pattern, rational drug use, drug utilization, free healthcare, Sierra Leone.

INTRODUCTION

Prescribing trends are important exploratory instruments for assessing the role of drugs in the society. In a secondary care Centre, the prescription is supposed to be rational, reasonable, safe, effective and economical.[1] The ultimate objective is to achieve rational and effective medical care, particularly in developing nations. The World Health Organization (WHO) defines rational use of medicine as when "patients receive medicines that are appropriate to their clinical needs, at doses that satisfy their individual needs, for an adequate period and at the lowest cost to them and their families".[2]

Prescriptions have legal implications, as they may indicate that the prescriber takes responsibility for the clinical care of the patient and in particular for monitoring efficacy and safety. As medications have increasingly become pre-packaged manufactured products and medical practice has become more complex, the scope of meaning of the term "prescription" has broadened to also include clinical assessments, laboratory tests and imaging studies relevant to optimizing the safety and efficacy of medical treatment. A prescription should consist of the following seven parts: (1) Date, Identification of the prescriber (2) Name of the patient and information as to age, (3) superscription or heading (4) Inscription or main body of prescription (5) Subscription or directions to the compounder (6) Signature or directions for the patients (7) prescriber's signature, seal of the prescriber.[3]

The use of antimicrobial agents has become a routine practice for the treatment of pediatric illnesses.[4][5] Antibiotics may be a lifesaving treatment for children with bacterial infections

and are among the most common drugs prescribed to children frequently.[6] Antibiotic resistance is a major global health problem, steaming mainly from their excessive and inappropriate usage.[7] non-adherence to standard treatment guidelines (STG) and lack of effective infection prevention and control in hospitals coupled with poor hygiene practices seen mainly in low and middle-income countries.[8] The majority of low-income countries lack the necessary diagnostic infrastructures, technical personnel, and few options for antibiotics while there is a higher burden of infectious diseases.[9]

General medicine use in healthcare settings

Essential Medicines are those medicines that respond to the priority health need of a particular population as defined by the World Health Organization (WHO). They need to be available and affordable at all times in adequate amounts and they have demonstrated effectiveness, quality and safety. Essential medicines are one of the most cost-effective components for any health system, with an immediate and long-lasting health impact, when observing these parameters. Prescribing trends are important exploratory instruments for assessing the role of drugs in the society. In a secondary care Centre, prescription is supposed to be rational, reasonable, safe, effective and economical.[1] The ultimate objective is to achieve rational and effective medical care, particularly in developing nations. Antibiotic may be a lifesaving treatment for children with bacterial infections and are among the most common drugs prescribed to children frequently.[6]

Rational drug prescribing

The World Health Organization (WHO) define rational use of medicine as when " patients receive medicines that are appropriate to their clinical needs, at doses that satisfy their individual needs, for an adequate period and at the lowest cost to them and their families".[2] A pediatric patient's medical care is based on a provisional and final diagnosis and the best course of treatment that requires a prescription regimen.[10] Especially infants and children vulnerable to contact diseases and the harmful effects of drugs due to pharmacodynamics differences and pharmacokinetics.[11] Drugs use in pediatrics is not widely researched and the availability of pharmaceutical drugs approved when compared with adult medicine, the correct dosage type is limited.[12]

Prescribing antibiotics for conditions for which they are not needed to contributes antimicrobial resistance, thereby increasing the risk that these drugs will not be effective when they are needed. These drugs must therefore be used when the benefit outweighs the

risk. The principle for prescribing antibiotics, therefore, includes correct diagnosis of a bacterial infection for which a specific antibiotic is known to be effective compared with a placebo, to choose a drug that fewest adverse effects for that patient to maximize the benefit and minimize the risk, choose a drug that has efficacy in treating or preventing the disease but leaves other bacterial in the body intact. This minimizes the spread of resistance and leaves intact the body's organisms that are natural defense against other invading organisms. Adherence to this principle minimizes the incidence of superinfection. As much as possible choose a drug that is available, convenient and inexpensive to assure adherence and contain care cost. The doses of antimicrobials vary according to several factors including age, weight, hepatic and renal function and severity of infection. Prescribing the so-called 'standard' dose in serious infection may result in failure of treatment and even death of the patient; therefore it is important to prescribe a dose appropriate to the condition.

The route of administration of an antimicrobial often depends on the severity of the infection. Life-threatening infection requires intravenous therapy. Whenever possible painful intravenous injections should be avoided in children. The duration of therapy depends on the nature of the infection and the response to the treatment. Courses should not be unduly prolonged except in cases of tuberculosis and chronic osteomyelitis because they encourage resistance, increase side effects and are costly.

Use of antibiotics in combination may be justified by empirical therapy of an infection for which the cause is unknown; for treatment of poly microbial infection; to enhance antimicrobial activity for a specific infection (I.e. for synergy); or to prevent emergence of resistance as in tuberculosis treatment.

Antibiotic prophylaxis may be used to protect healthy persons from the acquisition of or invasion by specific microorganisms to which they are exposed e.g. respiratory infection and bacterial endocarditis.[13]

Effect of irrational antibiotic prescribing

Prescribing drugs is an important skill which needs to be continuously assessed and refined according. Commonly the prescribing behavior is influenced by many factors like unethical drug promotion, lack of knowledge direct to consumer advertising, and non-availability of drugs. So there is a chance of irrational drugs in the prescription. The assessment of prescription will help to know the attitude of the physicians towards prescribing and to

provide rationality in the prescription. This rationality of prescription will help the physician to upgrade their knowledge and improve their attitude towards selecting the most appropriate cost-effective treatment.[14]

Antibiotic resistance is a major global health problem, stemming mainly from their excessive and inappropriate usage[7], non-, adherence to standard treatment guidelines(STG) and lack of effective infection prevention and control in hospitals coupled with poor hygiene practices seen mainly in low and middle-income countries.[8] The majority of low-income countries lack the necessary diagnostic infrastructures, technical personnel, and few options for antibiotics while there is a higher burden of infectious diseases.[9]

Misuse of antimicrobials and its consequences

The antimicrobial resistance to microbes leads to severe consequences. Infection course by resistant microbes failed to respond to treatment resulting in prolonged illness and greater risk of death, long period of hospilitazation and infections which increase the number of infected people moving into the community. When an infection becomes resistant to first-line antimicrobial, treatment has to be switched to second or third-line drugs, which are always much more expensive and sometimes more toxic as well. In poor countries, where many of the second or third-line therapies for drug-resistant infections are not available, making the potential of resistance to first line antibiotics is considerably greater. The limited number of antibiotic in these countries are becoming increasingly inadequate for treating infections and necessary antimicrobials to deal with infections caused by resistant pathogens are absent from the essential drug list.[15]

The consequence of antibiotic resistance is well documented from the torrent of reports in the literature. In European countries, it is estimated that 25,000 patients die each year because of antibiotic misuse. In China, about 14,738,000 moderate to adverse events occur yearly from antibiotic misuse. Findings from the USA show that 250,000 people are hospitalized while about 14,000 death are recorded each year as a result of diarrheal infection associated with antibiotic misuse.[16] Furthermore, by 2050 there will be about 10 million annual deaths from untreatable infections due to resistance organisms, at a cumulative global cost of US$100 trillion if measures are not in place now.

Risk of antibiotic use

Adverse drug reaction (ADR)

An adverse drug reaction (ADR) is a response to a drug which is noxious and unintended, and which occursat doses normally used in man for the prophylaxis, diagnosis, or therapy of disease, or for the modification of physiological function. The reaction may be a known side effect of the drug or it may be new and previously unrecognized.[17]

Adverse drug reaction versus adverse event

An adverse event is any undesirable event experienced by a patient whilst taking a medicine, regardless of whether or not the medicine is suspected to be related to the event. An example of an adverse event is a patient being hit by a car while on a specific medication.

An adverse drug reaction is any undesirable experience that has happened to the patient while taking a drug that is suspected to be caused by the drug or drugs. An example of an adverse drug reaction could be a patient experiencing anaphylaxis shortly after taking a drug.

Mechanism of drug resistance

The genetic change in an organism is the course of most drug resistance, either a chromosomal mutation or the acquisition of a plasmid or transposon.[18]

Appropriateness of prescription

The World Health Organization's systemic approach will help to reduce poor-quality and erroneous prescribing. This six-step prescribing approach implies that (1) the physician should assess and clearly identify the issue of the patient; (2) determine the therapeutic goal; (3) choose the appropriate drug treatment; (4) initiate treatment with appropriate specifics and consider non-pharmacological therapies; (5) provide facts, guidance, and warnings and (6) periodically assess therapy (e.g. track treatment outcomes, consider drug discontinuation). Two additional steps are added by the authors: (7) consider medication prices while prescribing, and (8) use computers and other resources to minimize errors in prescribing. Together with continuing self-directed learning, these eight steps form a structured approach to prescribing that is effective and practical for the family practitioner. Usage of tools to prescribe and have access to references to electronic medicines on a desktop or handheld computer can also improve the legibility and accuracy of prescriptions and help physicians avoid errors.

Appropriate prescription of antibiotics ensures that antibiotics are administered only when required and the correct antibiotic is chosen and administered at the right dose and for the right duration when appropriate. Effective prescription of antibiotics should, where available, be consistent with evidence-based national and local recommendations for clinical practice, when available.

Inappropriate prescribing of antibiotics entails excessive prescribing of antibiotics and even where an antibiotic is required but the wrong antibiotic is prescribed (inappropriate selection) or the wrong dose is given or the wrong period of the antibiotic is prescribed. At least 30% of the antibiotics prescribed in the outpatient setting are unnecessary, CDC reports, suggesting that no antibiotics were needed at all.[19] Fifty percent of all outpatient antibiotic use can approach total inappropriate antibiotic use, including excessive use and inappropriate selection, dosing and duration.[20][21]

Antimicrobial stewardship

In recent years, the usage of the word 'antimicrobial stewardship' has exponentially increased, usually referring to programs and interventions aimed at maximizing antimicrobial usage. While human healthcare originated with antimicrobial stewardship, it is increasingly applied in wider contexts, including animal health and One Health. When the use of the word 'antimicrobial stewardship' becomes more widespread, what antimicrobial stewardship is, as well as what it is not, is important to remember.

The definition of antimicrobial stewardship most frequently quoted in recent years is that given by IDSA in 2007, which described antimicrobial stewardship in terms of its objectives.[22] In 2012, IDSA revised this, stating that 'antimicrobial stewardship refers to coordinated measures aimed at enhancing and evaluating the effective use of antimicrobial agents by encouraging the option of the optimal antimicrobial drug regimen, including dosing, length of therapy and route of administration'.[23] This conceptualizes antimicrobial stewardship as a series of measures directed at a specific purpose; but it overlooks the stewardship functions of non-prescribers by staying centered on individual prescriptions, and it faces another problem similar to many other descriptions: the terms' appropriate ',' logical 'or' optimal 'do not specifically recognize the need to balance individuals.

Statement of problem

Currently, there is no information on prescribing antibiotics in the outpatient department setting in secondary hospitals targeted under five healthcare patients in Sierra Leone. There are no specific antibiotic guidelines available for usage in secondary hospitals in Freetown. The lack of a well-equipped laboratory and the little knowledge about drugs of some prescribers (CHO, Nurses and Doctors) have been identified as major flaws in the prescribing and dispensing of appropriate antibiotics to the outpatient department of the hospitals. Also, the number of hospital pharmacists attached to these hospitals for identification of drug-related problems and resolving them through prescription review is very small.

Justification of the study

The consequence of antibiotics resistance is well documented from the torrent of reports in the literature. In European countries, it is estimated that 25,000 patients die each year because of antibiotics misuse. In China, about 14,738,000 moderate to adverse events occur yearly from antibiotic misuse. Findings from the USA show that 250,000 people are hospitalized while about 14,000 deaths are recorded each year as a result of diarrheal infection associated with antibiotic misuse.[16] Furthermore, by 2050 there will be about 10 million annual deaths from untreatable infections due to resistance organisms, at a cumulative global cost of US$100 trillion if measures are not in place now.[24]

The response to the establishment of measures towards reducing antimicrobial resistance, e.g. stewardship programs is being hindered by the scarcity of data about how antibiotics are used and for what conditions.[25] Moreover, the name and quantity of antibiotics use, for treatments or prophylaxis, in adult patients or children are still merely unanswered in the literature primarily in low-income and African countries.[26] In Sierra Leone, there is evidence of multi-drug resistance[27] inappropriate use of antibiotics[27] and lack of proper laboratory bacterial diagnostics but still, there are no antimicrobial audit programs in any of the public hospitals.[28]

Point prevalence surveys highlight the proportion of patients within a setting receiving antibiotics the total patient population at a one-time point. It is the first step towards understanding the extent of antibiotic use within a health facility.[29] The resulting data provides useful information upon which interventions towards rational antibiotics prescription can be anchored.[29][30] The WHO Methodology for Point Prevalence Survey on Antibiotic Use in Hospitals was recently published, to provide a standard protocol that

surveys antibiotics prescribing in health facilities. The protocol was adapted considering the limited resource setting thereby enabling the easy conduction of the survey that provides data comparisons between hospitals, countries, and regions over time.[7]

AIM

To conduct a prevalence survey on prescribing antibiotics in four secondary hospitals providing child health care in a prospective study in Freetown Sierra Leone.

OBJECTIVES

- To determine the total number of medicines prescribed, pharmacologic classification of antibiotics prescribed as well as average number of medicines and antibiotics per prescription.
- To evaluate various prescribing indictors and compare them to WHO ideals.

Research Questions

1. What are the commonly prescribed antibiotics used for various conditions in under- five children outpatient departments(OPD) in secondary hospitals.
2. What is the average number of antibiotics prescribing for under-five children in a secondary hospital.
3. Are antibiotics prescribed irrationally or prescribed using standard treatment guidelines at a secondary hospital.

METHODS

Study Design and Setting

A cross-sectional prevalence survey (PPS)to evaluate the antibiotic prescription was conducted in the outpatient department (OPD) of these four secondary hospitals namely, the Rokupa Government Hospital, Macaulay Street Hospital, King Harman road government hospital and Lumley Government Hospital,. These hospitals have a department for pediatrics and are located in Freetown the capital city of Sierra Leone a densely populated area. This study was conducted as per the World Health Organization (WHO) prescribing indicators.

Population / Sampling technique

The study population included all less than five years of age patient that were seen by the Doctor at the outpatient Department and were prescribed medicine at the time of survey at

Rokupa, Macaulay, King Harman and Lumley Government Hospitals in Western Area Urban at a specific time.

The screening system covered the prescriptions of all under five patients prescribed by the doctor in the Outpatient Department (OPD) of the four secondary hospitals.

Study frame

Data collection within these four hospitals last for four days, weekends excluded. A day in each of the hospitals. To prevent the bias that may arise from patients' new prescriptions, a start-to-complete approach was followed whiles collecting data from the OPD.

Inclusion and exclusion criteria

All Pediatric patients prescription at the day of the study in the Out Patient Departments (OPD) of Rokupa, Macaulay, King Harman road and Lumley Government Hospitals in Freetown. Information such as age and sex were recorded. The drug data such as the name of the drug, dosage form, dosing frequency, duration, and route of administration data were also noted.

Every other patient and wards was excluded.

Sampling and data collection

The study sites were the outpatients department of four Secondary hospitals. A prospective sampling of a day's prescription at the Rokupa Government hospital, Macaulay Government hospital, Kingharman Road and Lumley Government Hospitals.

The data collection instrument was a questionnaire which was developed for this study which is attached as an appendix

Data analysis

Data were analyzed using the Microsoft excel and Questionnaire data was coded and exported to SPSS for analysis.

Categorical variables were reported using frequency and percentages. Results were presented in charts and tables.

Ethical consideration

Ethical clearance from the College Administration was made available before the commencement of the study. The general hospital managers were informed formally about the study, and all protocols discussed before data collection.

RESULTS

Table 1: **Names of hospitals involved in the study.**

Name of Hospital	F	%
Government Hospital Macaulay street	24	15.4%
King Harman Maternal and Child Health Hospital	25	16.0%
Rokupa Government Hospital	50	32.1%
Lumley Government Hospital	57	36.5%

Table 1 describes the distribution of patients per hospital.

Lumley government hospital represents37% (f=57), Rokupa government hospital represents32% (f=50), King Harman Maternal and Child health hospital represent 16% (f=25) and Government Hospital Macaulay street represents15% (f=24)

Table 2: Gender and Age distribution of patients involved in study.

GENDER	f	%
MALE	70	45
FEMALE	86	55
AGE CATEGORY		
1-5 YEARS	96	62
BELOW 1 YEAR	60	38

Table 2 describes the gender and. age distribution of the patients involved in the study Female patients (86) represented 55% and Male patients (70) represented 45%, most patients, 96 (62%) were in the age range of 1-5 years and 60 (38%) were within the age range of to the age 0-1 year.

Table 3: Total number of medicines prescribed.

Medicines names	f	%
Paracetamol	132	25.6%
Artemether / Lumefantrine	115	22.3%
Amoxicillin	60	11.7%
Albendazole	29	5.6%
Ciprofloxacin	22	4.3%
Ferrous Sulphate/folic acid(FeFol)	22	4.3%
Chloramphenicol	17	3.3%
Metronidazole	14	2.7%
Oral rehydration salts (ORS)	12	2.3%
Trimethoprim / Sulfamethoxazole	8	1.6%
Ferrous Sulphate	8	1.6%
Zinc Sulphate	8	1.6%

Zincofer	8	1.6%
Erythromycin	7	1.4%
Folic acid	6	1.2%
Others	47	9.1%

Table 3 shows the distribution of various medicines prescribed for patients, the most common was Paracetamol, followed by Artemether/ Lumefantrine and Amoxicillin.

Table 4: Percentage of antibiotics prescribed for patients N =145.

Top 10 prescribed antibiotics n=145	%
Amoxicillin	40.5%
Ciprofloxacin	14.9%
Chloramphenicol	11.5%
Metronidazole	9.5%
Trimethoprim/Sulfamethoxazole	5.4%
Erythromycin	4.7%
Ampicillin	3.4%
Amoxicillin / Clavulanic acid	2.0%
Ceftriaxone	2.0%
Gentamycin	2.0%
Others	4.1%

Table 4 shows the distribution of the various antibiotic prescribed for patients, the most prescribed antibiotic was Amoxicillin, followed by ciprofloxacin, chloramphenicol and metronidazole.

Table 5: Pharmacological Classification of the prescribed medicines.

Classifications	f	%
Antibiotics	147	28.5%
Analgesics	135	26.2%
Antimalarial	126	24.5%
Vitamins /Minerals	56	10.9%
Anthelmintic	29	5.6%
Electrolyte replenisher	12	2.3%
Antifungal	8	1.6%
Others	2	0.4%

Table 5 represents the distribution of the pharmacologically classified drugs. It shows that 28% 0f the prescribed drugs are Antibiotics are the most prescribed drugs, 26.2% are analgesics, 24.5% are antimalarial and 10.9% are Vitamins/ Minerals.

Table 6: Prescribing Indicator.

Prescribing indicator	Below 1 year	1 - 5 years	Overall	Ideal According to WHO
Number of prescriptions(%)	60	96	156	NA
Number of drugs prescribed (%)	179	336	515	
The total number of antibiotics prescribed (%)	54	93	147	
Average medicines per prescription (SD)	2.9 (0.9)	3.5 (1.0)	3.3(0.9)	≤3
Percentage of Encounter with antibiotics	80.0%	80.2%	79.1%	≤30
Percentage of medicines prescribed by generic name	61.5%	66.1%	64.5%	100
Percentage of medicines prescribed from NEML	71.5%	79.5%	76.7%	100

Table 6 shows that a total of 156 prescriptions were analyzed, 60 prescriptions for 0-1 year and 96 prescriptions for 1-5 years patients. The average medicines per prescription (SD) is 2.9 (0.9) and 3.5 (1.0) for 0-1 and 1-5 years respectively, a total percentage of 3.3(0.9%). The total percentage of encounterswith antibiotics is 79.1% and the percentage of medicines prescribe by generic and National essential medicines lists are 64.5% and 76.7% respectively.

DISCUSSION

The findings show the average medicines per prescription was 3.3 (SD=0.9) overall. This average is notably higher than the WHO cutoff point of less than or equal to three (≤3)[31][32], Further analysis of the extent of polypharmacy revealed that about half of all prescriptions had four or more prescribed medicines. These results are in line with a previous study[33] but higher than what was reported by Palmer, L *et al.* within the same setting[34] It was also higher than findings from studies in Nigeria[35], India[36], Pakistan[37] and Ethiopia.[38] The extent of polypharmacy seen in this study may be due to the prevailing scarcity of highly qualified health workers in the health sector,[39] forcing the system to allow community health workers and nurses to prescribe.

In a similar study[40] titled- "Antibiotics prescription pattern and determinants of utilization in the national health insurance scheme at a Tertiary Hospital in Nigeria," based on a sample of 802 out-patients who were prescribed medications under the National Health Insurance Scheme, the average number of medicines per patient encounter was found to be 4.0 ± 1.8. The class of penicillins, specifically amoxicillin/clavulanate, was found to be the most frequently prescribed antibiotic,. constituting 43.3% of the total prescriptions Moreover, the study highlights that being <5 years old and taking more than four medicines are significant

predictors of antibiotic exposure. The findings with respect to most commonly prescribed antibiotic group was similar in both studies.[40]

The age range of 1-5 years has the highest prescription with antibiotics compared to the 0-1 year. Lumley government hospital (37%) had the highest number of patient attendance followed by Rokupa government hospital (32%), Kingharman road maternal and child health (16%) and Macaulay Street government hospital (15%)% respectively. The total number of prescriptions that were reviewed during the survey were 156 of which 86(55%) were female while 70 (45%) were male patients. The result of this study shows important information about the prescribing pattern for under five patients in secondary hospitals in Sierra Leone. Most of the patients seen were 12 months to 59 months and there were more females than males.

The most prescribed pharmacological class according this study (Table 5) were antibiotics (28.5%) followed by analgesics (26.2%), antimalarial (24.5%) vitamins/minerals (10.9%), antihelmatics (5.6%), electrolyte replenisher (2.3%) and antifungal (1.6%).

Analysis of individual drugs shows that Paracetamol (25.6%) was the most prescribed for those under five, followed by Artemether/Lumefantrin (22.3%), Amoxicillin (11.7%), Albendazole (5.6%), Ciprofloxacin and Ferrous Sulphate/folic acid (4.3%) accounting for the top five.

The study shows that the most prescribed antibiotic in the Outpatient Departments at the four hospitals was Amoxicillin, followed by ciprofloxacin, chloramphenicol and metronidazole, it was found that Amoxicillin has a frequency of 40.5%, Ciprofloxacin 14.9%, Chloramphenicol 11.5%, Metronidazole 9.5% and Trimethoprim/Sulfamethoxazole 5.4%.
The average antibiotic prescribed = total antibiotic prescribed ÷ total number of patient
Average antibiotic prescribed = 147 ÷ 156 = 0.942.
An average of 0.942 antibiotics was prescribed per patient

CONCLUSION AND RECOMMENDATIONS

The extent of polypharmacy seen in this study may be due to the prevailing scarcity of highly qualified health workers in the health sector.[39] Forcing the system to allow community health workers and nurses to prescribe. The development of hospital based local formulary by an active DTC and possibly adhering to it may be a step towards mitigating this trend.

The result revealed that there is a need for developing standard prescription guidelines at secondary hospitals so that a uniform prescription pattern by all Doctors for particular diseases and conditions is maintained. I recommend to the Therapeutic committee to develop a standard prescription guideline and enforce its usage in order to salvage unnecessary usage of drugs in secondary hospitals.

Despite emerging concerns over the inappropriate and overuse of antimicrobial agents, their use among children under five is very high in Sierra Leone (see Table 5-6). Furthermore, singling out antibiotics in the analysis, my finding shows that eight out of ten prescriptions contain an antibiotic. The rate of use of antibiotics presented in this report is lower than a study in Ethiopia[40] but higher than what the WHO recommended.[42][43] Also higher than previous reports from Sierra Leone[33][34] underscoring a likely increase in the trend of antibiotic use in the public sector over time. The basis for the high use of antimicrobials is complex and challenging to establish due to improper data management in the country. Nevertheless, possible explanations may be due to the high infectious disease profile in the country and/or as a result of increased uptake of the free health care (FHC) scheme in which all healthcare services including all medicines are free for this group of patients. More evidence is needed for definitive conclusions.

The extent of prescribing from the National Essential Medicines List (NEML) and by generic name was lower than 100%.But higher than previous findings.[33],[34] The overhauling ofthe health system including reforms in the national pharmaceutical sector[39], May have influenced the increase inadherence to the NEML after the introduction of the FHC scheme.

REFERENCES

1. Ghai, O P.*Essential pediatrics.* 4th edition. New Delhi, India.: interprint A-16, Narain all, 1998.
2. WHO. *The rational use of drugs. report of a conference of expert.* Nairobi : World Health Organisation, 1987.
3. *Reducing medication error. a retrospective audit of drug prescriptions in a tertiary care hospital.* mehrotra, sameer and Basukala, Sunil. 2015, international jurnal of analytical, pharmaceutical and biomedical sciences, Vol. 4.
4. *Pediatric drug prescribing.* Sanz, E J, Bergman, U and Dahlstorm, M. 1989, European Journal of clinical pharmacology, pp. 37: 65-8.

5. *Drug prescribing in pediatric.* Summers, R S and Summers, B. 1986, Annals of tropical pediatrics, pp. 6: 129-33.
6. *Combatiing the risk or antibiotic resistance in children.* Eposito, S, Sperotto, F and Nicolim, G. pmid24608580, 2014, Minerva pediatric, 66(1): 31-39.
7. *Point prevalence survey of antibiotic use in 26 Saudi hospitals in 2016.* Al Matar, M, et al. 2019, J infect Public health, 12(1): 77-82.
8. WHO.*WHO methology of point prevalence survey of antibiotic use in hospital*, 2018.
9. *Antibiotic use among hospitalised patients in limited laboratory infrastructure in Freettown Sierra Leone.* Sulaiman, Sulaiman, et al. 2018, International Journal of infectious disease, 2020; 90: 71-76.
10. *Rational drug therpy in pediatric practice.* Ghai and Paul. 1988, Indian pediatric, 25(12): pp. 1095-109.
11. *Drug prescribing in pediatric.* Summers, B. 1986, Ann Trop pediatric, 6(2): 129-33.
12. *Controlof antibiotric therapy in pediatric patient.* Principi. 1981, Developmental pharmacology and therapeutic, 2(3): 145-55.
13. *Antibiotic prescription and resistance. A comtemporary literature review.* Iyalomhe, Godfrey S. Bbosa, Iyalomhe, Sarah and Eholor;, Richard. 2011, International Journal of Medicine and medical science, 3(14): 376-380.
14. *Prescribing pattern of anibiotic in pediatric inpatient department of a tertiary care teaching hospital in Bangalore.* Rad, Laya Vahdati and Alekhya, Modupalli. 2018, Doctor of pharmacy (Acharya & BM Reddy college of pharmacy).
15. *Antibiotic resistant a global issue.* Bisht, Rekha, et al. 2009, Asian Journal of pharmaceutical and clinical research, 2(2): 34-39.
16. *Paramedical staffs knowledge and attitude towards antimicrobial resistance in Dire Dawa Ethiopia; a cross sectional study in 2017* . Regssa, B.,A. Endale,and D . Bekele,. 2017; p. 16.
17. WHO. *Adverse drug reaction,* 2013.
18. Levinson. *Review of medical microbiology and immunology.* 13th. s.l. : Mc Graw Hill education, 2014.
19. *Prevalence of Inappropriate Antibiotic Prescriptions Among US Ambulatory Care.* Fleming-Dutra, Katherine E, et al. 2016, JAMA: the Journal of the American Medical Association, 315(17): 1864-1873.

20. *Office-related antibiotic prescribing for persons aged ≤14 years — United States.* (CDC), Centers for Disease Control and Prevention. 2011, MMWR Morb Mortal Wkly, 60(34): 1153-6.
21. *Dynamics of antibiotic prescribing for children.* ME, Pichichero. June 19, 2002, JAMA., 287(23): 3133-5.
22. *Infectious Diseases Society of America and the Society for Healthcare Epidemiology of America Guidelines for Developing an Institutional Program to Enhance Antimicrobial Stewardship.* Dellit TH, Owens RC, McGowan JE, Gerding DN, Weinstein RA, Burke JP, et al. 2, 15 January 2007, Clinical Infectious Diseases, 44: 159–177.
23. *Policy Statement on Antimicrobial Stewardship by the Society for Healthcare Epidemiology of America (SHEA), the Infectious Diseases Society of America (IDSA), and the Pediatric Infectious Diseases Society (PIDS).* Fishman, Neil. 02 January 2015, Cambridge University Press.
24. *Changing antibiotic prescribing behaviour of clinicians in primary care.* Tonkin - Crine, S. and K.Knox. 2016, Cmaj, 188(2): 94-95.
25. *Antimicrobial resistance in adult hospitals inpatient in 53 countries; result of an internent- based global point prevalance survay 2018.* Verspoten, A., et al, 2018; 6(6): pp. e619-e629.
26. *Antibiotics usage in chainse children ; a point prevelance survay.* Zhang, J.S., et al. 2018, World J. pediatrics, 14(4): 335-343.
27. *An evaluation of the prescribing patterns for under patient at a tirtary hospital .* Cole, C.P., P.B James and A.T Kargbo,. 2015, J.Basic, Clin fan, 6(4): 109-114.
28. *Improving antimicrobial steward in the out patient department of a district general hospital.* Hamilton, D. and I.Bugg,. 2018, BMJ open quality, 7(4): e000495-e000495.
29. *A point prevalance study of antimicrobial use and practice among nursing home in Singapore.* Teng, Christine B, Yap, Kai Zhen and Selcuk, Aysu. 2019, Drugs aging, 36(6): 559-570.
30. *surveillance of antibiotics consumption point prevalence survey 2014, antimicrobial prescribing in pediatric wards of 16 Iranian hospitals.* Fahinzad, A et al. 2016, Arch Iran med, 19(3): 204-209.
31. *how to assess drugs use in health facility.* WHO, 1993.
32. *promoting rational use of medicine,core component.* WHO, september 2002.

33. *An evaluation of prescribing patterns for under-five patients at a tertiary paeditric hospital in sierra leone.* Cole, CP, James, PB and Kargbo, AT. 2015, journal of basic and clinical pharmacy, 6(4): 109-114.
34. *who prescribe better: Doctor or Dispenser ?* Palmer. 1997, World health forum, 18(34): 356-4.
35. *patter of priscribin drugs in nigeria arm hospital.* Hussain and Adebayo, ET. 2010, Annal of Africa medicine, 9(3): 152-158.
36. *prescribing pattern among medical practitioner in pune, India.* Kshirsagar, MJ, Patil, S and Langade, D. 1998, Bulletin of the world Health organization, 76(3): 217-5.
37. *Who/inrud prescribing indicators and prescribing trends of antibiotics in the accident and emergency department of bahawal victoria hospital, pakistan.* Atif, M, et al. 2016, Springer plus, 5(1): 1928.
38. *Evaluation of trends of drug-prescribing patterns based on who prescribing indicators at outpatient departments of four hospitals in southern ethiopia.* Kanche, Z Z, KD, Gidebo and Summoro. 2015, Drug design, development and therapy, 9: 4551-7.
39. GoSLMoHa., Sanitation.*Annual health sector performance report, 2016.* 2016.
40. Antibiotics prescription pattern and determinants of utilization in the national health insurance scheme at a Tertiary Hospital in Nigeria, 2019 Okoro R. et al, November 2019, African Health Sciences Journal, 19(3).
41. *Assessment of medicines use pattern using world health organization's prescribing, patient care and health facility indicators in selected health facilities in eastern ethiopia.* Bilal AI, Osman ED, Mulugeta A. 2016, BMC health services researc, 16(144).
42. *How to assess drugs use in a health facility.* WHO, 1993.
43. *Who/inrud drug use indicators at primary healthcare centers in alexandria, egypt.* Akl OA, El Mahalli AA, Elkahky AA, et al. 2014, Journal of Taibah University Medical Sciences, 9(1): 54-64.