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REVIEW ARTICLE

Irrational Use of Drugs

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ABSTRACT

Irrational use of drugs could be detrimental issues in the practices of healthcare communities. This problem arises either because of the wrong prescription or inappropriate self-medication. Faulty prescribing practices and incorrect self-medication will lead to an ineffective treatment regime. Still, they can also be unsafe as these may exacerbate or prolong the illness and distress the patients. In turn, these will incur unnecessary treatment costs. The most typical issues in the irrational use of drugs are the patient's lack of information about the medicine and inadequate proper consultation from physicians. Lack of regulation in the appropriate use and supply of drugs by the relevant enforcement agencies could also be the problem in the irrational use of drugs. Ulceration and inflammation due to the irrational use of NSAIDs, antibiotics, and unhealthy lifestyle may contribute to the novel therapeutic strategy challenges. The ability to purchase the drugs without a doctor's prescription of nonsteroidal anti-inflammatory drugs (NSAIDs) was also the landmark event that became the most widely used medications for the anti-inflammatory, analgesic, and antipyretic effects. Inadequate knowledge from both drug providers and patients may contribute to the most recognized influential factors in the irrational use of drugs in various countries. The recommendation should introduce an appropriate educational intervention that can be designed to promote rational prescribing. Proper regulation on prescription practices by policymakers and physicians could be the way to ensure the standard of rational usage of drugs have compliant with the healthcare communities.

INTRODUCTION

Drugs have been used for many centuries to cure or control diseases and symptoms since medical technology advances. The irrational prescribing, like overuse or misuse of drugs, could often cause significant adverse effects. These bad practices are not easy to overcome and cure, but prevention is possible by improving the teaching methods of pharmacotherapy on rational prescribing (de Vries et al., 1995; Chowdhury, 1991). If the irrational use of drugs is not discouraged, this could reduce the quality of drug therapy that could increase morbidity and mortality.

Factors Influencing the Irrational Use of Drugs

Various factors have been determined to influence the irrational use of the drug. These include patient, prescriber or physician, drug supplying system, and drug regulation. The most common issues in the irrational use of drugs are patients' lack of information about the medicine and improper consultation from physicians. The misleading belief that there is a pill for every illness leads the patient to seek the use of drugs. Additionally, some patients often find prescribed drugs to be more relevant to their demands and expectations than drugs' rational use. Prescriber or physician's limited training, experience, and lack of knowledge on drug information have heavily contributed to the injudicious prescription of medications. In some circumstances, the irrational use of drugs could be due to the unreliable drug supplying system. For example, a shortage of the essential drug supply may lead to the prescription of non-essential medications or supplying the expired drugs that diminish the effectiveness of the treatment regime (World Health Organization [WHO], 2016).

The Problem of Irrational Use of Drugs

Deficiency of regulation in the proper use and supply of drugs by the relevant enforcement agencies could be the problem in the irrational use of drugs. This deficiency may lead to various other problems such as low quality of drug therapy that could increase patients' morbidity and mortality. Irrational use of drugs will also reduce the utilization of vital drugs as patients are prescribed wrong medications. This, in turn, will increase the healthcare cost and waste of resources. Moreover, the injudicious drug prescription and use can threaten health as unwanted adverse reactions, and the emergence of drug resistance may occur. The psychosocial impact also could be encountered as the patient comes to have confidence as "there's a medicine for every disease". This will lead to increasing demand for medicines (Alamgir & Ahmed, 2015).

Rational Use of Drugs: WHO

The definition of the rational use of medicine by the World Health Organization (WHO) indicates that the medication prescribed to the patients is appropriate to the clinical needs, in doses that meet the patient and community needs, for an adequate time at the lowest cost (Toklu, 2015). Practices of prescription medicine by physicians in developed and developing countries are numerously reported; for example, the drugs were prescribed not related to the diagnosis and erroneous use of antibiotics with the consumption in inadequate quantities (Hogerzeil, 1995). In Bangladesh, many drugs can be purchased without any proper prescription (Rahman et al., 2007). Injudicious prescription and use of drugs will increase the unnecessary cost of healthcare treatments and be detrimental to the patients.

Rational clinical decision-making and rational drug use must be considered two sides of the same coin; each one requires the other to result in a maximum benefit programme (Anwar, 1994) and (Ali & Chowdhury,1993). Therefore, the prescription of drugs requires knowledge, judgment, skill, and wisdom, and above all, a sense of responsibility (Bennett & Brown, 2008). A study conducted by Dawood et al. (2017) reported factors such as age,

gender, race, education level, health status, and income level determined their level of knowledge about medicinal use (Dawood et al., 2017). Also, researchers found that all the drugs prescribed to patients were listed in the EDL (Essential Drug List). The average percentage of drugs adequately labelled was 92.0%. The percentage of patients who had adequate knowledge of how to take their drugs was 74.9%. The percentage of the public health clinics that kept the Standard Treatment Guidelines (STG) in their premises was 95.0%, but none kept the EDL in their premises, which might affect the drug prescribing decision (Saleh & Ibrahim, 2006).

Based on the WHO guidelines (WHO, 2012), the rational use of drugs can only be achieved when appropriate drugs indication complied, as the medicine should be prescribed only when they are essential. The appropriate prescribed drugs also need to be abided based on effectiveness, safety, availability, and price, e.g. the drugs prescription for diarrhoea in children is erythromycin and never be the tetracycline. The appropriate administration of drugs also needs to be considered. It depends on the dose, route, duration, and interval. The dose is based on age, hepatic, or renal impairment. In children and old age, the dose should be reduced due to the reduction of drug metabolism capacity and vital organs' function.

Furthermore, the duration is maintained to prevent drug resistance and prevent adverse effects, e.g. the full course should be maintained in case of antibiotics. The appropriate drugs prescribed for the patient also need to comply. The patient's sensitivity to the drugs should be considered during pregnancy and lactation. Some drugs are contraindicated during this period. Moreover, the appropriate drug evaluation is also crucial as it needs to follow up on the patient's curation progress and the resistance and adverse effect of drugs. The drug should also be available when needed at reasonable prices, efficacious, safe, and acceptable (WHO, 2012).

Regardless of WHO guidelines for the rational use of drugs, it is also essential to know the common examples of irrational prescription or drug use. The drugs are prescribed with no indication of drug therapy, e.g. antibiotics for viral upper respiratory tract infection (Connor et al., 2018). However, antibiotic does not affect viral infection, use of wrong drugs for a specific condition, e.g. tetracycline in childhood diarrhoea has adverse effects on bone calcium during childhood leading to growth retardation, dental caries, etc. Again, the use of drugs with doubtful/unproven efficacy, e.g. use of anti-motility agents in diarrhoea may prevent the evacuation of bacteria from the body and exacerbate the condition, failure to provide available, safe. The effective drug, e.g. failure to vaccinate against measles and tetanus as well as the use of correct drugs with incorrect administration, doses, and duration, e.g. use of intravascular metronidazole when oral formulation should be appropriate causing the patient embarrassed, and the treatment becomes expensive.

Irrational Use of Antibiotics

Irrational use of antibiotics is a great problem in the community. This was highly found in the Tanzanian population. It includes prescription of incorrect doses, self-medication, and non-bacterial illness treatment, resulting in increased resistance to the commonly available antibiotics. The recommendation has been made to reduce the irrational use of antibiotics by strictly controlling antibiotics' accessibility in drug outlets without prescription. The supply chain of antibiotics should also be strictly controlled and monitored. Community education campaigns should be ensured by providing clear messages about how to use antibiotics appropriately with a strong emphasis on the fact that antibiotics play no role in the treatment of most upper respiratory tract symptoms (URTS) and acute diarrhoea since they are typically caused by viruses (Mboya et al., 2018).

Irrational Use of Antiulcerant

Although peptic ulcer disease due to *Helicobacter pylori* infection has been shown to have substantially declined in prevalence over the past two decades (Lanas & Chan, 2017), ulcers due to the irrational use of NSAIDs and unhealthy lifestyle possessed new therapeutic challenges. The treatment regimen for *H. pylori* consists of proton-pump inhibitors (PPI) with two antibiotics, also called PPI-based triple therapy, prescribed for 7 – 14 days. As mentioned above, the irrational use of antibiotics can cause the development of antibiotic resistance. This inline with reports by Malfertheiner et al. (2017) and Graham and Laine (2016) where the effectiveness of the regimen to eradicate *H. pylori* has declined in many countries from 90% to less than 70% over the past two decades. This occurrence contributed mainly to the fact that patients did not adhere to the proper medication prescribed.

Both NSAIDs and alcohol consumption have been shown to cause stomach ulcers, which is more common in high-income countries. However, due to ulcers caused by *H. pylori* cannot be differentiated from NSAID-caused ulcers, proper testing of *H. pylori* is recommended to avoid improper prescription of antibiotics, which can lead to drug resistance. Most often, treatment with PPI allowed more than 85% of NSAID-associated ulcers to heal after 6 – 8 weeks, provided the discontinuation of NSAID usage (Lanas & Chan, 2017). However, strict adherence to PPI treatment is needed to avoid bleeding and surgery in severe stomach ulcers. However, PPI is not free from side effects. The long-term use of PPIs is associated with a higher risk of community-acquired pneumonia, osteoporosis, and hip fractures (Arafat et al., 2017).

Prescribing Pattern of NSAIDs

The development and purchase ability without a doctor's prescription of nonsteroidal anti-inflammatory drugs (NSAIDs) were the landmark events that soon became the most widely used medications for the anti-inflammatory, analgesic, and antipyretic effects (Urrusuno et al., 2008). It was reported that analgesics with minimal anti-inflammatory effects were the most prescribed NSAIDs (94.5%) in the outpatient department (OPDs) of government hospitals and UMS Polyclinic (UPC). In contrast, analgesics with potent anti-inflammatory effects were the most prescribed NSAIDs (76%) in private polyclinic OPD (PPC). On the one hand, this might be because the more educated and higher-income groups of patients are familiar with analgesics with minimal anti-inflammatory effects, such as paracetamol, ibuprofen, aspirin, etc. Therefore, PPC prescribers may select only the costly analgesics with potent anti-inflammatory effects to meet the patients' demand for a more effective and faster cure. On the other hand, comparatively less-educated and lower-income groups of patients registered at the medical OPDs of UPC had received analgesics prescriptions with minimal anti-inflammatory effects because these medications were considerably cheaper and were mostly available in the clinic (Rahman et al., 2014). However, this was a descriptive study, so the statistical analysis was not done.

Later, data showed that more educated and a higher-income group of patients were mostly registered at the OPDs PPC, whereas a less-educated and a lower-income group of patients were generally registered at UPC in Kota Kinabalu, Sabah, Malaysia. This could be responsible for the substantial variations in NSAIDs' prescribing patterns in the OPDs of the two polyclinics (Rahman et al., 2014).

Therefore, the patients' educational and socioeconomic status may affect the prescribing pattern of NSAIDs in the medical OPDs of these two polyclinics. Like most drugs, NSAIDs are double-edged swords in terms of adverse effects. On the one hand, analgesics with minimal anti-inflammatory effects have lower risks to induce adverse effects, particularly in the gastrointestinal tract, especially with paracetamol and ibuprofen at a

low dose (Bennett & Brown, 2003) and (Bhartiy et al., 2008). However, analgesics with potent anti-inflammatory effects have higher risks to induce potent adverse effects. Thus, sporadic consumption of NSAIDs may subside the symptoms for the time being, but the actual pathology may sometimes be hindered and aggravated, complicated, and even turn to fatality in some cases (Targownik & Thomson, 2006; Chan & Graham, 2004).

The prescribers in the OPDs of PPC had to prescribe the additional drugs than the UPC prescribers to prevent the adverse effects of the potent NSAIDs, which ultimately increases the total cost of medication. This report has some similarities with the report in Bangladesh (Rahman et al., 2007). Potent NSAIDs should be avoided because the rational use of drug demands should be available as needed and affordable to most people (Chowdhury et al., 1997).

Irrational Use of Drugs in Different Countries

Irrational use of medicines was found in both Vietnam and China, but issues with polypharmacy as well as the overuse of antibiotics were more severe in Vietnam while overuse of injections was unique in China. Lack of proper knowledge from providers and patients was the most recognized influential factor (Mao et al., 2015). Researchers found a high level of polypharmacy and non-generic prescribing of antihypertensive drugs. They recommended increasing prescription drugs that are cost-effective and emphasize fixed-dose combinations (FDCs) to control blood pressure (Akunne & Adedapo, 2019). In another study, researchers from Bangladesh got almost the same result while evaluating the prescription patterns of antidepressant drugs among physicians (Islam et al., 2019). Researchers from India also reported that multivitamins are irrationally prescribed and taken as self-medication by the public. As many of the ill effects are often unnoticed and under-reported, they advised India's government to regulate the manufacture and sell these nutraceuticals to promote drugs' rational use (Krishnan et al., 2016). Therefore, pharmacology education should incorporate problem-oriented rational treatment programmes, provide rigorous supervision in prescribing during clinical training, offer higher quality in-service training, and continuous medical education to improve physicians' prescribing attitudes and skills and reduce irrational medicine use (Calikoglu et al., 2019).

Prevention of Irrational Prescribing or Way of Rational Prescribing

Based on the WHO preventive measures, irrational prescribing can be prevented by making a correct diagnosis, limiting the number of drugs, encouraging the availability of essential drugs, providing adequate training, drug information with medicine cost-effectiveness and standard treatment guidelines to the prescriber by continuing education incorporating the concept of essential drugs, the teaching of rational prescribing into the curriculum of medicine, pharmacy, dentistry, and nursing as well as provide effective public education to the consumer and on the public. Public education also needs to propagate the information on the significant improvement of medicines' rational use with information brochure as it is a useful tool to provide health-related education to the general public (Pandey & Chaudhari, 2017). The researchers of Ethiopia realised that TB programmes need to emphasise the practical and rational use of second-line drugs for newly diagnosed MDR-TB patients to prevent the emergence of pre-XDR/XDR-TB strains20 (Shibabaw et al., 2020).

CONCLUSION

In conclusion, recommendations should be made to introduce an appropriate educational intervention that can be designed to promote rational prescribing. Inappropriate use of medications is likely to harm both patients and health systems, so policymakers and physicians should try to reduce this infirmity.

CONFLICT OF INTEREST

The authors declare that they have no conflicting interests in publishing this article.

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