International Journal of Pharmaceutical Research and Applications
Volume 9, Issue 3 May-June 2024, pp: 1023-1037 www.ijprajournal.com ISSN: 2456-4494

A Review on Self-Medication during the Covid-19 Pandemic: Challenges and Opportunities

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Date of Submission: 15-05-2024 Date of Acceptance: 25-05-2024

ABSTRACT: Self-medication is an alarming concept mostly in the COVID-19 pandemic. This review focused on the self-medication of allopathic drugs, their use, their safety, and the reason for using them. It would be safe, if the people who are using it, have sufficient knowledge about its dose, time of intake, and side-effects on overdose, but due to lack of information, it can cause serious effects such as antibiotic resistance, skin problems, hypersensitivity, and allergy. Hence, developing countries like India where have poor economic status, education status as well as poor health care facilities. People have less knowledge regarding the risks associated with their self-medication. We are on the edge of the sword whether to promote self-medication or not. It is recommended that a holistic approach should be taken to prevent this problem, which includes proper awareness and education regarding self-medication and strictness regarding pharmaceutical advertising. Dispensing modes in need to be improved through proper education, and strict regulatory and managerial strategies to make health care easily accessible and cost-effective. Health professionals have to spend some extra time educating patients regarding the same. Improved knowledge and understanding ofself-medication may result in rational use and thus limit emerging microbial resistance issues.Many research studies show that self-medication is a global phenomenon. This article is focused on self-medication, over-the-counter, their use, reasons, names of the medicines commonly used, and common and minor illnessesthat use self-medication. If a person using self-medicationhas sufficient knowledge about medicine it is well and good. But at the same time person's lack of information about a particular medicine can cause serious reactions. E.g. skin problem hypersensitivity, allergy, anaphylactic shock, and then the person's family members will end up in serious problems. The ratio of educated people who are using self-medication is high compared to illiterate people. Self-medication in India is very much in use, especially in rural areas.Government and health authorities need to concentrate on this area.

KEYWORDS: Self-medication, over-the-counter, medicine, COVID-19.

I.INTRODUCTION:

The World Health Organization (WHO) and the International Pharmaceutical Federation define self-medication as a run-through by which a human being selects and uses medicines to treat signs/symptoms or minor health problems, recognized as such by themselves. When done appropriately, self-medication can help the individual's health and is documented by the WHO as part of self-care. Self-care is what people do by themselves to inaugurate and maintain health, preventing, and dealing with disease. This concept of self-care includes health, nutrition, lifestyle, socioeconomic, and environmental factors, and self-medication.[1] Every day, we practice self-medication in the form of self-care for our health. Around the 1960s in the West-self-care and self-medication were regarded as unnecessary and potentially even unhealthy practices. This paternalistic approach to medicine, supported by health systems designed to treat sickness (rather than prevent disease) remains a familiar aspect of health care in many countries today. Self-medication has traditionally been defined as "the taking of drugs, herbs or home remedies on one's initiative, or on the advice of another person, without consulting a doctor. "Families, friends, neighbors, the pharmacist, previously prescribed drug, or suggestions from an advertisement in newspapers or popular magazines are common sources of self-medications.

International Journal of Pharmaceutical Research and Applications
Volume 9, Issue 3 May-June 2024, pp: 1023-1037 www.ijprajournal.com ISSN: 2456-4494

Figure 1: Self-medication chart

Nowadays, self-medication should be seen as the "desire and ability of people/patients to play an intelligent, independent and informed role, not merely in terms of decision-making but also in the management of those preventive, diagnostic and therapeutic activities which concern them." [2] Self-care is what people do for their selves to establish and maintain health, and prevent and deal with illness (WHO, 1998). It is a broad concept encompassing hygiene, nutrition, lifestyle, environmental factors, socioeconomic factors, and self-medication. Self-medication, as one element of self-care, is the selection and use of medicines by individuals to treat self-recognized illnesses or symptoms (WHO, 1998). It is the use of non-prescription medicines by people based on their initiatives. Husain A and Khanum A, (2008) also defined self-medication as obtaining and consuming medication without professional supervision regarding indication, dosage, and duration of treatment.However, self-medicationdoes not necessarily mean the consumption of modern medicines but also herbs.[3]

Self-medication is practiced all over the world. Today all countries rich poor, developing, developed, all are practicing self-medication. Nowadays worldwide appreciation is seen towards self-medication and self-care. Countries like Australia, Argentina, Brazil, Canada, China, Colombia, Cost America, el Salvador frame, Germany, Guatemala, India, Italy, Spain, Sweden, Switzerland, the UK, Venezuela& many others countries are practicing self-medication use of SM depending upon healthcare system culture, education, economics, religion, awareness about

International Journal of Pharmaceutical Research and Applications
Volume 9, Issue 3 May-June 2024, pp: 1023-1037 www.ijprajournal.com ISSN: 2456-4494

medicine, the influence of media & communication, etc. But for minor illnesses& symptoms, the suffering of human beings is the same all over the world. Some study shows South Africa is using more self-medication compared to others. The percentage of OTC medicine satisfaction is in Mexico.[4] Self-medication can be defined as the use of drugs to treat self-diagnosed disorders or symptoms, or the intermittent or continued use of a prescribed drug for chronic or recurrent disease or symptoms. It may include the use of herbs, the retention and re-use of prescription drugs, or the direct purchase of prescription-only drugs without medical input. The practice of self-medication is common worldwide in both developed and developing countries. Internationally; self-medication has been reported as being on the rise.[4]

The importance of self-medication as a phenomenon has attracted the interest of health professionals, especially when drugs become deregulated and changed from prescription status to being sold over-the-counter (OTC).[5] Individuals and the healthcare sector can both benefit from good self-medication practices. For example, decreasing absenteeism from work due to minor illnesses, saving time and money spent on doctor visits, and reducing (or at least optimizing)the burden on governments due to health expenditure associated with the treatment of minor health conditions.According to recent studies, among the most common reasons for people to self-medicate are the convenience of going to a pharmacy rather than seeing a doctor and avoiding the need to go to a hospital for treatments. However, inappropriate self-medication with OTC drugs can lead to drug-related problemsand have serious consequences (including death). Globally, the increasing rate of inappropriate self-medication is becoming a public health concern, particularly antimicrobial resistance caused by inappropriate antibiotic use.[6] This therapeutic and societal benefit of antibiotics appears to be threatened by abuse, self-medication, and misuse of antibiotics. In many countries, taking medicines, such as antibiotics, without a prescription has been a commonplace occurrence ineveryday life for many years. Younger children are often given medications by their parents, whereas older adolescents and adults may self-medicate themselves. Self-medication has always been favorable usually over-the-counter (OTC) drugs available in pharmacies and local retail outlets. In the developed countries, 3–68% of antibiotics are sold without prescription withpediatric self-medication rates above 80%. In developing countries, and particularly in Africa, studies have revealed a higher burden (30–85%) of self-medication, and in addition, the medications taken are often misused and the patients have wrong habits [1,2,16–18]. The self-medication of antibiotics remains a global problem and the misuse and overuse of antibiotics are further complicated by the spread of infections involving multi-drug resistant bacteria (MDRBs) which limit the action of drugs previously considered to be highly effective, as well as the shortage of novel antibiotics. The result is the risk of increasingly frequent therapeutic stalemates. Thus, tackling the global spread of antibiotic resistance is a high priority for the World Health Organization (WHO) which recommended creating increased awareness about self-medication and its control.[7]

II. REASONS:

The reasons for self-medication mentioned in the literature are mild illness, previous experience of treating similar illnesses, economic considerations, and a lack of availability of healthcare personnel. The most common medications used for self-medication are analgesics and antimicrobials. Study on self-medication shows that it is influenced by many factors such as education, family, society, law availability of drugs, and exposure to advertisements. A high level of education and professional status has been mentioned as a predictive factor for self-medication. Self-medication is an area where governments and health authorities need to ensure that it is done responsibly, ensuring that safe drugs are made available over the counter and the consumer is given adequate information about the use of drugs and when to consult a doctor. Unlike other aspects of self-care, self-medication involves the use of drugs, and drugs have the potential to do good as well as cause harm. In this context, the Pharmacist has an important role. The present study was undertaken to evaluate the frequency of (i) branded medicines used by professional students, (ii) awareness, (iii) trust in the medicinal system, and (iv) reasons behind self-medication.[8] Self-medication is an inevitable fact, whether due to cultural or economic factors, and it is necessary to inquire about the global and current phenomenon of self-medication to offer an explanation both at the mass and individual level. It has been reported that self-medication is practiced between 60% to 80% of the health problems cases. Eichenberg in Germany found that 94.9% of personal interviews

International Journal of Pharmaceutical Research and Applications
Volume 9, Issue 3 May-June 2024, pp: 1023-1037 www.ijprajournal.com ISSN: 2456-4494

of those questioned did treat at least one of the 25 symptoms included in the survey with non-prescription medicine before potentially seeing a doctor.[9]It has been estimated that more than 50% of antibiotics are purchased without a prescription and used over-the-counter in most parts of the world.Inappropriate drug use in self-medication has also been identified which includes taking inadequate doses, sharing medicines, a short duration of treatment, andstopping treatment upon the improvement of disease symptoms. However, despite the widespread problem of irrational use of antibiotics, no systematic review has been conducted so far to examine antibiotic usage patterns in the Middle East. There is a need for evidence from well-designed studies on the use of antibiotics by the general public to help in planning and implementing specific strategies and interventions to prevent their irrational use and consequently to reduce the spread of antibiotic resistance. Thus, this systematic review was conducted to (1) assess the extent of self-medication with antibiotics (SMA), (2) identify reasons for self-medication, (3) determine negative outcomes of SMA, and (4) identify recommendations made to reduce SMA. Information on risk factors influencing self-medication, the source of antibiotics, main indications for self-medication, most commonly used antibiotics, source and level of information on antibiotics, and antibiotic use practices are also summarized purchased without a prescription and used over-the-counter in most parts of the world. Inappropriate drug use in self-medication has also been identified which includes taking inadequate doses, sharing medicines, a short duration of treatment, and stopping treatment upon the improvement of disease symptoms. However, despite the widespread problem of irrational use of antibiotics, no systematic review has been conducted so far to examine antibiotic usage patterns in the Middle East. There is a need for evidence from well-designed studies on the use of antibiotics by the general public to help in planning and implementing specific strategies and interventions to prevent their irrational use and consequently to reduce the spread of antibiotic resistance. Thus, this systematic review was conducted to (1) assess the extent of self-medication with antibiotics (SMA), (2) identify reasons for self-medication, (3) determine negative outcomes of SMA, and (4) identify recommendations made to reduce SMA. Information on risk factors influencing self-medication, the source of antibiotics, main indications for self-medication, most commonly used antibiotics, source and level of information on antibiotics, and antibiotic use practices are also summarized.[10]

III. OBJECTIVE:

Self-medication is defined as the selection use of medicines without any doctor's prescription by people or over-the-counter medicines for minor illnesses or symptoms According to WHO self-medication is the selection and use of non-prescription medicines by individuals to treat self-recognizedillnesses or symptoms. It is practiced worldwide. This article covers (aims to find) the reason for self-medication medicines used for symptoms, the most commonly used medicines, whom all use self-medication, the name of the medicines, and from where they get information about medicine most commonly used medicines are pain killers antipyretics, cough cold remedies, anti-allergies antacids, vitamins, and tonics. All though some medicines are risk-free and useful for the treatment of minor health problems, their excess & regular use may lead to some serious health problems and side effects, and adverse reactions. The practice of self-care may change locality and rejoin. It is more in younger and educated people because they have no time to go to a doctor and no patience to wait. This article presents all about self-medication.[4]

Self-medication is a global phenomenon and a potential contributor to human pathogen resistance to antibiotics.The adverse consequences of such practices should always be emphasized to the community and steps to curb them. Rampant irrational use of antimicrobials without medical guidance may result in a greater probability of inappropriate, incorrect, or undue therapy, missed diagnosis, delays in appropriate treatment, pathogen resistance, and increased morbidity. This review focused on the self-medication of allopathic drugs, their use, their safety, and the reason for using them. It would be safe, if the people who are using it, had sufficient knowledge about its dose, time of intake, and side effects on overdose, but due to lack of information, it can cause serious effects such as antibiotic resistance, skin problems, hypersensitivity, and allergy.[2]

The two main reasons for self-medication were prior experience 25(39.10%) and mildness of the disease 24(37.50%). Paracetamol 31(48.44%) and NSAIDs 27(42.20%) were the two most frequently consumed medications with drug retail outlets

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Volume 9, Issue 3 May-June 2024, pp: 1023-1037 www.ijprajournal.com ISSN: 2456-4494

26(40.63%) as the main source of drugs to practice self-medication. Self-decisions 41(64.00%) followed by family/friends 20(31.65%) were the two most frequently reported sources of drug information for self-medication in this study. More than half of the respondents disagreed with the practice of self-medication in the present study. Moreover, there were statistically significant differences between respondents who reported practicing self-medication based on gender,specific field of study, and study year.[3]According to the study findings, it is recommended that more information about the risks of self-medication, drug adverse reactions, antibiotic stewardship, more supervision of the prohibition of over-the-counter drugs and selling practices, and adequate facilities for people's access to medical services be provided at the policy level.[6]

IV. ASSESSMENT:

To our knowledge, this is the first systematic review to assess the self-medication prevalence for COVID-19 prevention or management. It assessed the most important databases and sources for grey literature search and preprint repositories; without language limitations. Thus, our results should reflect the state of knowledge until the search date. Self-medication is a global phenomenon that may involve health risks at both the individual and community levels. Previous studies have found that self-medication is a common practice. Three systematic reviews conducted in Iran, Ethiopia, and India; reported a prevalence of 53%, 44%, and 53.6%, respectively; for a recall period that ranged from a single day to 6 months.[16] A systematic review and meta-analysis have reported a high prevalence (53.57%) of self-medication practices in India. In our study, the prevalence was much lower than the findings reported in the meta-analysis. This difference could be explained by the profile of study participants in our study. It has been reported that non-steroidal anti-inflammatory drugs (NSAIDs) and drugs for the management of allergic symptoms are the most commonly used self-medicated drugs. Our findings are in line with this observation. In our study, pain was the most common symptom for which self-medication was used. However, our observations differed for the drugs for allergic symptoms. In our study, the second common reason for self-medication was menstrual symptoms. This can also be explained by the profile of study participants. In our study, there were almost 70% female participants. A study reported a 42% prevalence of self-medication for primary dysmenorrhea. Our study was not focused on primary dysmenorrhea which explains lower rates in our study population.

V. SYMPTOMS:

The most common symptoms for self-medication include headache cold and cough. If we consider the different symptoms of the study participants including cough, allergy, and sore throat then in our study also, the prevalence of using anti-cold and cough medicines is considerable among the medicines used for self-consumption. Antipyretics are another commonly used self-medication. In our study, fever was the fourth most common cause of consumption of self-medication. A satisfactory observation from our study is very lessself-medication for the treatment of infection. Only one participant reported self-medication for treatment of infection.[17] Self-medication is the practice of taking medicines, herbs, or home remedies on one's initiative, or on the advice of another person, without consulting healthcare professionals. The signs and symptoms associated with COVID-19 include a dry cough, headache, fever, flu, fatigue, joint pains, nausea, vomiting, and diarrhea. Most of these signs and symptoms also manifest in conditions such as the common cold, flu,whooping cough, and malaria. Due to these similarities in clinical presentations coupled with increased poor health-seekingbehavior, many people have resorted to self-medicatingbehavior. Thus, the emergence of COVID-19 has led to an increase in self-medicationpractices among different populations including healthcare workers. Poor health-seekingbehavior is influenced by factors such as cultural beliefs, socio-economic factors such as level of education, availability of medicines, absence or lack of qualified healthcare professionals, perceived quality of health services,and accessibility to healthcare facilities.[18] The majority of people were afraid to go out in the pandemic and more males were observed using medication with medical advice. After the pandemic broke, a vast majority of the population was left jobless. Bamgboyeet al.,determined self-education practices and factors affecting them and had similar results as that of our study. While SM due to common symptoms, respiratory tract infection, and fear was practiced only after the onset of the pandemic, those practicing SM based on their experience were doing so even before the lockdown and pandemic. The WHO recommends the use of precautionary

International Journal of Pharmaceutical Research and Applications
Volume 9, Issue 3 May-June 2024, pp: 1023-1037 www.ijprajournal.com ISSN: 2456-4494

measures during the pandemic; however, it does not recommend SM for the symptoms of COVID-19 and related factors. Despite this, frequent use of antibiotics was found among the studied population. The use of medication for different symptoms wasfollowing the study.[19]

VI. DRUGS USED IN THE PANDEMIC:

As per a Google Trends study, since the global coronavirus pandemic was declared in 2019, there has been a relative increase in the number of people searching for information about self-medication for various ailments, which might also indicate that there has been anincreased interest in the number of people browsing about self-medication of various ailments during the pandemic. In a study on self-medication practices during the COVID-19 pandemic, it was found that the majority of respondents self-medicated with Acetaminophen, Ibuprofen, Azithromycin, Penicillin, Antiretrovirals, and Hydroxychloroquine for flu-like symptoms. One study found low self-medication during the pandemic.[20] Ibuprofen was the second drug most consumed (7.4%) in our study even though it has been reported that this NSAID increases the risk of developing thromboembolism in COVID-19 patients.Furthermore, it has been proposed that it could worsen the course of COVID-19 infection, but more evidence is still needed. It also needs to be considered that ibuprofen alone or in combination with acetaminophen could mask the fever during COVID-19 infection causing a delay in diagnosis and treatment. Regarding the consumption of the antibiotic azithromycin, one in five respondents who consumed it reported that they consumed it without having any respiratory symptoms, as a preventive measure, or because they thought they would have COVID-19. In an in vitro study, the combination of azithromycin and hydroxychloroquine showed a synergistic effect against SARS-CoV-2, and it was also reported on the possible anti-inflammatory properties of azithromycin, which could improve the disease progression.[21]SM is considered a part of the more extensive self-care process, which motivates individuals to undertake activities related to health improvement, treatment of illness, disease prevention, and restoring health after injury or disease. SM helps to decrease the economic burden on patients, the healthcare system, third-party government agencies, and insurance companies. However, the consequences of inappropriate and unnecessary SM cannot be understated, as SM may lead to polypharmacy, incorrect diagnosis, adverse effects, drug interactions, antibiotic resistance, and increased drug expenses. Healthcare policymakers prefer to promote laws and policies in favor of prescribed drug use, but the challenges associated with SM in the general population cannot be ignored. Thus, improved public awareness and education about the safe and rational use of drugs are necessary to overcome the challenges of SM.[22]Most students (15.4%) reported using herbal preparations of Giloy (Tinospora cordifolia) followed by vitamin C 18 (3.5%) to increase their immunity for the prevention of COVID-19 infection in parallel with the study by Sadio AJ et al. This finding could be clarified by the fact that Tinospora cordifolia has unique immuno-modulating properties and benefits in the treatment of infection caused by SARS-CoV-2. Besides, WHO also promotes indigenous and traditional medicine practices as new therapies in the quest for potential treatments for COVID-19. This study found that theprimary source of drugs for self-medication was pharmacies, followed by leftover medicines from previous prescriptions, congruent with previous studies conducted in Nepal. Several pharmacy shops near the college have made it easy for students to access drugs and facilitate them to practice self-medication, as stated in previous studies. Family/relatives (42.6%) were the primary sources of suggestion for self-medication, whereas pharmacist (60.31 %) was the primary source. Since most of the students in this study were in their early 20s, they consulted with their family members to self-medicate.[23]We found out that the most common factors that led to self-medication among the participants as ascertained from the pharmacy records, face-to-face interviews where it took place, and responses from pharmacy personnel were attributed to attitude towards health facilities during the peak period of coronavirus, the relative /friend's influence distance of the school clinic to the hostel, and perceived inefficacy of service as at that time, all these at the bi-variate analysis. The main factor of self-medication was the fear of visiting the medical facility/ getting tested for the COVID--19, at logistic regression, AOR=2.4, P value=<.05.Similar to these findings, various studies reported different reasons for engaging in self-medication. These include knowledge about the disease/treatment, previous experience, availability of medications, mild diseases, affordability, and saving time. These reasons however are subject to the environment and study populations where the studies were carried

International Journal of Pharmaceutical Research and Applications
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out, all this summing up as the key indirect determinants of the perceived fear of visiting a medical facility as it is in this current study.[24] Prices of essential COVID-19 medicines have increased by 4% globally since February 2020, as reported by Gustav Ando in Life Science Research and Analysis. Although there is no specific treatment for COVID-19, the drug administration in Bangladesh started working in advance to increase the production of some supportive medicines. Despite the availability of essential drugs, the increased demand in major cities for self-medication of azithromycin roseby almost 37%, hydroxychloroquineby 18%, doxycycline by 12%, and ivermectin 7% respectively. The total amount of buying those medicines in response to the COVID-19 situation had an unnecessary financial burden on the people in Dhaka. Overall economic hardship in low and middle-income countries has to cope with the added expenditure, that could be avoided by strict regulatory surveillance on self-medication and dispensing without prescription. Although there is no approved specific medication to prevent or treat COVID-19, this online survey among educated adults with high socioeconomic standings revealed that the high prevalence of self-medication of prescription-only drugs was persistent during the outbreak in Dhaka city. Unsolicited news of spread, effects, and remedies in media channels, the internet; mental stress oflockdown and isolation, insecurity, and panic about the scarcity of drug and healthcare support might have triggered the practice of self-medication.[25]The WHO does not recommend self-medication with any medicines, including antibiotics, as a form of prevention or management of COVID-19. Despite the advice of clinicians and governments, 34.2% of the people surveyed in our study used a treatment without a prescription. These treatments included modern treatments as well as traditional medicine. The prevalence of self-medication found in our study is probably related to i) the long delay in finding an appropriate treatment for COVID-19 based on an adequately powered randomized trial; ii) the influence of social media that proposes any type of product to prevent or treat COVID-19; iii) the influence of leaders (political and religious) who have claimed the efficacy of certain products or who claim to have discovered traditional remedies;and iv) the stigmatization of people infected with SARSCoV-2, which encourages some people to take care of themselves at home.[26]Major reasons for self-medication were convenience, affordability, lack of means to the health facility/hospital, fear of being diagnosed COVID-19 positive and fear of visiting the health facility/hospital, and time-saving. On the perception of respondents to self-medication, most of them (40.6%) opined that self-medication should be discouraged, however, the percentage of respondents practicing self-medication is still high. This may have emanated from the fact that self-medication practice reduces the time spent waiting for a doctor, can save lives in emergency states, and affordable cost of health care (Almasdy& Sherrif, 2011). Also, the World Health Organization recommended that self-medication can assist in the prevention and treatment of sicknesses where consulting a doctor is not necessary, therefore making treatment of common illnesses cheaper. Nevertheless, inappropriate use of medication could lead to a rise in diseases triggered by abuse and cause waste of public funds (WHO, 2000).[27] Participants in this study were mainly female (81.2%), with a mean age of 38. Answers allowed us to verify that the current pandemic didn't affect the frequency of visits to the Pharmacy and the situations where people used self-medication were mainly minor, such as headaches (54.1%) and muscle pains (26.5%). The medications used more often were analgesics (60.0%) and anti-inflammatory (40.0%). However, many people indicated that they didn´t seek more information about medicines (49.4%) and/or supplements (7.6%) used during this period. In general, people visited the Pharmacy with a similar frequency and purpose as the previous year.[28] The most common drugs used for self-medication in the perceived treatment or prevention of COVID-19 were Vitamin C and Multivitamins, as wellas antimalaria drugs other than Hydroxychloroquine/Chloroquine. Others were Amoxicillin, Ciprofloxacin, Herbal products, Erythromycin, Metronidazole, and Hydroxychloroquine and Chloroquine. The possible explanation for the high usage of Vitamin C and Multivitamins by the participants might be because Vitamin C had been reported to have significant potency and efficacy in the management of COVID-19, as well as the availability of these products without restriction and control. Furthermore, the claim of a possible association between COVID-19 and Malaria might be responsible for the high consumption of antimalaria drugs among the study participants.[29]For chloroquine in adults, the lethal dose is estimated to be between 30 and 50 mg/kg, while doses higher than 20 mg/kg can also be toxic. These dosages can

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highly vary in older patients and those having comorbidities, especially cardiac issues. Many observational studies concluded that the usage of hydroxychloroquine, chloroquine and/or azithromycin were associated with QT prolongation and any need for usage must outweigh potential adverse effects. The use of these drugs is purely case-based and cannot be done without a registered medical practitioner. Reports in Nigeria claimed that three people had overdosed on chloroquine after claims on social media about the efficacy of the drug. Similarly, ivermectin can result in serious consequences for pregnant women and patients suffering from meningitis.[30]One of the main problems with self-medication is that people usually self-medicate with less regard to proper dose, duration, and possible drug interaction, especially for patients with chronic illnesses. The most common drugs used for self-medication during the COVID-19 pandemic are multivitamins, zinc, azithromycin, ivermectin, chloroquine, and hydroxychloroquine. If not used properly, they can cause serious health issues such as severe vomiting, liver and kidney damage, neurotoxicity, ventricular arrhythmia, and even death. Moreover, Self-medication contributes to masking the symptoms and delays proper health care. It also carries the risk of developing resistance against antimicrobial and antiparasitic agents, especially since Africa is endemic to Malaria. It became harder for patients with immunological conditions depending on chloroquine and hydroxychloroquine to access their medications, leaving them liable to inflammatory flares and worsening conditions.[31]During the early phase of the COVID-19 outbreak in Italy, the Italian NHS experienced unexpected and exceptional changes in demand for drugs used for the treatment of COVID-19 and injectables for supportive care. Increased claims for hydroxychloroquine are in agreement with US prescription refill patterns.2,3 Although the association of increased use with public expenditure was negligible, there may be ethical issues associated with off-label emergency use. More than granting drug prescriptions withan uncertain risk-benefit balance, the participation of individuals in clinical trials should be promoted.4 In hindsight, 3 treatment scenarios can be identified. In phase 1 (March 2020), there were exponential increases in cases of COVID-19 and urgent requests for treatments with a small evidence base. In phase 2 (April 2020), the COVID-19 growth rate slowed, and randomized clinical trials were implemented to provide results for better evidence-based practice. In phase 3 (May 2020), the epidemic curve was flattened and COVID-19 treatment approaches were reshaped based on preliminary trial results.[32]Requiring a prescription from a medical professional is one formal solution; however, in our context, non-physicians may also prescribe medications. This explains the unexpectedly high prevalence (26.84%) of reported paramedical prescriptions. In this context, having a prescription does not guarantee that a correct diagnosis has been made by a qualified healthcare provider. Interestingly, 96% of respondents who come to buy antibiotics agreed with the statement that antibiotics should be access-controlled drugs prescribed by a physician; this prevalence is higher than that reported in previous studies, 48% and 62%. Similarly, dispensing drugs is a pharmaceutical act, but more than 78% of dispensers were pharmacy assistants. This is supported by other studies showing that the prescriber is not a physician and around 70% of prescriptions are dispensed by pharmacy auxiliaries. This can be explained by the fact that pharmacists have other activities outside the pharmacy and that the profession no longer requires their permanent presence for the extemporaneous preparation of medication.[7]Initially, we examined the frequencies of different types of self-medication before and during the lockdown. It should be emphasized that not all responses necessarily imply inappropriate self-medication: refraining from consulting a doctor despite experiencing worrying symptoms and/or buying prescription medications before they are needed do not necessarily indicate the taking of medication, but not seeing a doctor when one feels unwell, and having ready access to drugs, will both increase the probability of self-medication occurring. For all time points aggregated, “Never” responses to individual questions concerning self-medication ranged from 59% to 80%. The most common type of behavior that respondents admitted to was sometimes refraining from consulting a doctor despite having worrying symptoms (almost 42%). Also, a little less than 40% of respondents had taken prescription drugs without medical consultation and had bought such drugs before they were needed.[14]Antibiotic resistance has transformed into a serious worldwide health problem and people are still not aware of the risks or damages that occur at the personal as well as at public/community level. According to the Centers forDisease Control and Prevention (CDC) in

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Volume 9, Issue 3 May-June 2024, pp: 1023-1037 www.ijprajournal.com ISSN: 2456-4494

developed countries like the United States, annually many patients admitted to hospitals are infected by antibiotic-resistant pathogens, and approximately 23,000 die due to the absence of therapeutic choices available along with vague and fatal effects resulting in troubled diagnosis. For example, in children suffering from meningitis who may suffer neurological damage, antibiotics as a first line of therapy is not of much significance. An infection of antibiotic-resistant pathogens can slow the healing process and cause more therapeutic expenses.54 In underdeveloped countries where the healthcare system is not as advanced, the costs become comparatively higher. A study estimated that in India more than 58,000 infants died in 2013 because of antibiotic-resistant bacterial infections, although it produces over 40% of the world's antibiotics. Another study reported that 95% of the infections in hospitalized patients are detected as resistant to a wide range of antibiotics.[11]Most of the students used Corex syrup for cold and cough treatment which is themost potent drug in initial therapy it is not a safe drug of choice. The second drug of choice was Benadryl. Both are scheduled H drugs and drugs should be taken only with the prescriber's advice. White patches in the mouth, lesions in the tongue, and nodes in the mucosal sites of the cheek may be considered as primary symptoms of cancer that may delay the diagnosis if the patient tended self-medicine. Major reasons for self-medication at the student level were time-saving, did not need advice from a prescriber for minor illnesses, economic, and fear of crowd at the clinic. Most of the respondent has a positive attitude toward self-medication for minor illnesses. However, minor illness symptoms may cause major illness if not diagnosed properly. Most of the fatal diseases have symptoms like fever, body aches, and headache.[8]Studies on the use of self-medication have shown that the increase in self-medication was due to several factors such as socio-economic factors, lifestyle, ready access to drugs, the increased potential to manage certain ailments through self-care, and greater availability of medicinal goods in the market. The patient's serenity with the healthcare provider, long waiting times, cost of the drugs, educational level, age, and gender are the other important factors influencing self-medication. One of the most common reasons for indulging in self-medication includes the high fees for private doctor's consultations. The condition is worse in rural or distant corners, where the people are deprived socially, economically, and educationally and illiterate with inadequate health facilities. In another study, prior familiarity and the non-seriousness of the illness were the top two reported factors for self-medication and reading materials were the top reported source of information on self-medication. The patient's valuation of his illness has been minor was also identified as one of the major factors for self-medication in a study conducted in Nigeria. Although, OTC drugs are intended to be used as self-medication and are of established efficacy and safety their inappropriate use due to lack of knowledge of their side effects and drug interactions could have serious consequences, especially in special population groups such as children, elderly, pregnant, and lactating mothers.[1]Public education campaigns are a successful tool for raising public awareness about antibiotics. Other studies, however, have found that public awareness campaigns on antibiotics have not affected the level of knowledge or the types of interventions desired by participants.39,40 In that respect, a study from Jordan showed that physicians may be influenced to prescribe a particular drug based on education, patient demand, pharmaceutical promotions, and price.18 Another study reported varying levels of awareness of bacterial resistance among healthcare professionals,29,41 which, taken with the results of the current review, indicates the urgent need for serious multi-faceted educational efforts aimed at both the public and HCPs. Educational programs could take several forms, including brochures and posters, public lectures and seminars, and public media such as television, radio, and social networks on the Internet, to post advertisements, programs, and lectures encouraging the proper use of antibiotics.[10]In this study headache, common cold, and fever were the most reported complaints for which drugs were taken. Other complaints include stomach ache, diarrhea, sore throat, pimples, insomnia, vomiting, and constipation. To us, the latter problems by nature need expert help and need not be self-medicated. The self-medication for similar patterns of ailments was experienced by the pupils in earlier reported published literature. Drug groups commonly used for self-medication included antipyretics (76.5%) followed by analgesics (75.0%), cough suppressants (38.5%), antacids (29.1%), and antibiotics (23.5%) while in the study conducted in Karachi[20], analgesics were the most common (88.3%) followed by antipyretics and antibiotics; Among the sources of medicine for self-medication, 79.3% get the medicines from chemist

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shop followed by 16.9% who used the medicines available at home, 2.2% get the medicines from relatives and friends which is in congruence to the study conducted in Malaysia[21] where the major sources of the medicines are pharmacy, home medicine cabinet.[12] Throughout the study, it was evident that adolescents largely attribute their self-medication practice to the influence of others, especially family and friends, is author also reported that nearby people are the ones that most affect the development of this practice and that they are not always "suitable professionals to attend health or drug-safety consultations". Jiménez et al. Found that parents' influential behaviors, such as consuming unprescribedmedications are statistically related to the presence of self-medication in adolescents. Likewise, and given that pharmacies represent the most frequent place to acquire medications that adolescents consume without a prescription, the correlation was significant (p-value ≤ 0.05) with the performance of such practice; a similar result to that disclosed by Tobon. Unlike the aforementioned, some variables were not statistically important in the associationcase, for example, the level of education and marital status were not significant, unlike the contribution of Jiménez where it is found that education and singleness are linked to self-medication (p-value ≤ 0.05).[9]

To reduce the self-medication practice, the majority of students suggested measures like creating awareness and education, using valid prescriptions for procuring drugs, stringent rules on advertisement, and creating more healthcare facilities for low socioeconomic groups. Since multiple factors are involved at different locations in self-medication, hence it needs more multicenter studies to evaluate multiple factors. Limitations of the study are single center, small sample size, and female students out-number the males. In this type of study, to come to a conclusion on self-medication practice among undergraduate medical students, we need samples from all the batches from 1st year to the final year, which should be multicentric and include both urban and rural colleges.[13] The current study was designed to assess the prevalence of self-medication and the use of some relevant drugs, but it did not include household remedies. So, the prevalence of self-medication may be underestimated. As a result, the findings cannot be applied to all medications. Causality assessment was not run for the reported adverse drug reactions owing to the limitation of the study. As a result, reported adverse drug reactions may not accurately reflect the situation. In terms of assessing participants' basic medication knowledge, the high percentages of those answering the knowledge statements may have been overestimated because the investigator did not provide "unsure or I don't know" responses for each question. Most participants would choose the correct answer simply by guessing not because they are knowledgeable of this statement. Based on the online data collection, the findings of this study may not be representative of the entire population. Furthermore, because participants were asked to provide a history of use and adverse effects, recall bias could affect data accuracy.[6]The major information source for those who practiced self-medication was self-decision in this study. Similarly, self-decision (47.00%), and advice from family/friends (41.00%) were the two most common sources of information to practice self-medication ina study among medical and non-medical students in Palestine. However, reading material was the main source of information (30.50%) while advice from herbalists/traditional healers accounted least (3.70%) in another study reported at Gondar University. However, in this study, none of the respondents were recommended to practice self-medication by an herbalist indicating the fact that students mainly depend on modern drugs for self-medication that might have been influenced by their fields of study, among others. When asked if they would use any alternatives to self-medication in case of no relief, about 61(95.30%) of self-medicated respondents replied that they would have looked for modern healthcare services at hospitals, health centers, or clinics. However, only 3(4.70%) of those self-medicated respondents said that they had no alternatives to self-medication.[3]Medical staff members other than physicians and pharmacists represented the source of information for (22.9%) of the patients due to ease of access and prevalence in the city. The highestpercentage (91.1%) of the patients indicated that this was not the first time to usethe drug this also supports that a previous prescription is the most common source of medication for using the drug without a prescription, it's also shown that previous benefit from a particular drug is the most frequent cause of using a drug without prescription among the respondents (41.7%). A wide range of conditions was observed in this study in which drugs without prescription were used; the common cold was the most common condition thatdrugs without prescriptionswere used for may be due to that most

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of the cases were collected in the autumn and winter seasons, followed by headache, joint pain, gastric pain, back pain, toothache, tonsillitis, and urinary tract infection, and this result was consistent with many other studies. Many drugs have been used by patients who were involved in this study; analgesics and non-steroidalanti-inflammatory drugs were more frequently used than the others followed by antibiotics, this result is in agreement with the majority of previous studies in other countries. Paracetamol and NSAIDs were the most common types of analgesics used for self-medication; these results are similar to other studies conducted in other countries. In Erbil, antibiotics can be obtained without a prescription, Amoxicillin was the most frequent antibiotic used by the respondents.[5]Once medicines enterthe human body, get absorbed rapidly. At the same time, medicine gets sold rapidly through, powerful marketing and no or less control over medicine. They are used misused and overused for different types of illness. e.g. Taking painkillers for a long time out of consultation witha doctor and out knowing the cause of a headache. e.g. Paracetamol is an antipyretic and analgesic that is used in large doses and can cause liver problems (toxicity). A major problem or disadvantage of self-medication is the emergence ofhuman pathogen resistance microorganisms worldwide particularly in developing countries, where antibiotics are often used and available without prescription. Its irrational use increases the risk of adverse reactions. Aperson may develop resistance to particular antibiotics, hypersensitivity to drug withdrawal symptoms and temporary masking of disease can delay correct diagnosis. Some medicines are banned in the market &usersdon't know and they go on consuming. [4] The OTC Committee of the Organization of Pharmaceutical Producers of India is working toward the promotion of responsible self-medicationto grow the OTC sector. It aims to get regulatory support for issues such as the accessibility of household TC remedies and increase the awareness of the importance of responsible self-medication with the general public and the government. Many healthcare organizations have made important statements on self-care and self-medication, singly or jointly with WSMI. Some selected illustrations only are given here:The WHO: "It has become widely accepted that self-medication has an important place in the health care system. Recognition of the responsibility of individuals for their health and awareness that professional care for minor ailments is often unnecessary have contributed to this view. Improvements in people's general knowledge, level of education, and socio-economic status in many countries form a reasonable basis for successful self-medication." (Guidelines for the regulatory assessment of medicinal products for use in self-medication. 2000).[2]The fact that the majority (52.80%) of the respondents gathered information about self-medication from the previously prescribed medicines of physicians was consistent with the research work conducted earlier. However, as the respondents were younger, they were also influenced by other sources like previous illness experiences, opinions of family members, friends, and local people, and advertisements. This result resembles formerly conducted research findings. All the students irrespective of the year of the study reported that they were completely aware of the treatment procedure using self-medication. They were also cautious about completing the dose of the medicine, checking the instructions given on the insert before using it, and also looking for the expiry date of the drug before using it. Less awareness was noted among 1st year students. Non-inclusion of pharmacology as a subject in the 1st year curriculum could be the reason. In this research work, about 73.2% of the respondents believed the practice of self-medication to be part of their health care and the proportion was higher than the reports from India, Ethiopia, and Pakistan. Self-medication can only be considered a part of self-care if legitimate use of medicaments can be ensured. It may lead to accidental drug toxicity as thereis always a risk of using expired drugs and also sharing with friends or taking medicines that have been prescribed for other problems.[15]In an editorial commentary, Molento has expressed concerns about self-medication with ivermectin during the COVID-19 pandemic as it is advocated over broad audiences at official pharmaceutical homepages, YouTube channels, and TV interviews. There is strong evidence showing that people self-medicate using antibiotics such as azithromycin and Hydroxychloroquine. Iftikhar et al. found that About 15% of the participants took conventional and homeopathic medicines prophylactically to lower the risk of being infected with the coronavirus. Paracetamol was the most commonly used drug, followed by Fexofenadine, Zinc, Montelukast, and Ivermectin. People also took antibiotics including Azithromycin, Doxycycline, Amoxicillin, Levofloxacin, Linezolid, and Cephalosporins [20] In April 2020, a traditional

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medicine called Covid-Organics for the prevention and treatment of COVID-19 was promoted in Madagascar [28]. However, the number of cases of COVID-19 in Madagascar quadrupled from 2214 to 10,748 in July 2020 [2, 37]. Several reasons could explain the increase in the number of cases of COVID-19, but this increase raises questions about the effectiveness of COVID-19, which has not yet been properly tested in therapeutic trials. Artemisia plant, the main component of Covid-Organics, has shown some beneficial effects in the treatment of malaria but is not as beneficial as artemisinin-based combination therapies (ACTs) [38]. The WHO, fearing the risk of the development of resistance to ACTs linked to the use of this plant, does not recommend it for the treatment of malaria [38]. Furthermore, no studies have proven the efficacy of the prevention or treatment of COVID-19. In our study, one out of ten (10.2%) participants declared that they used traditional medicine for COVID-19 prevention. This finding could be explained by the fact that the use of traditional medicine is common in African culture and relatively less expensive than modern medicines [23], although the composition of these mixtures is usually unknown [23, 39]. In regard to traditional medicine, the WHO welcomes innovations around the world, including repurposing drugs and traditional medicines and developing new therapies in the search for potential treatments for COVID-19 [9]. The WHO is working with research institutions to select traditional medicine products that can be investigated for clinical efficacy and safety for COVID-19 treatment.[26]Another area of concern about self-medication is stockpiling, which leads to a shortage of these very necessary drugs in the market. Drugs that are certified for COVID-19 treatment have several proven uses and stockpiling leaves many people devoid of these essential medications.For instance, chloroquine is used to treat malaria and many autoimmune diseases including systemic lupus erythematosus and inflammatory arthritis. The scarcity of life-saving medications gives rise to increased expenses, patient harm, and increased errors by health workers, causing widespread apprehension in oncology, infectious disease, critical care, and many other settings. Hence, stockpiling deprives patients of their necessary medications and limits treatment in the context of this pandemic. Strict regulations need to be imposed to prevent stockpiling of essential medicines. Health professionals need to educate the general public; proper health education can significantly affect the views held by people, which in turn can have a positive influence on their family members and friends. Governments should develop strategies to regulate information regarding possible medications on the internet and further research to pinpoint the platforms dissipating misinformation. In addition, there should be improvement in the workflow in pharmacies, strict control regarding pharmaceutical advertisements, and improved communication between pharmacists and clinical teams on how supplies may affect healthcare delivery.[30]

VII. CONCLUSION:

The prevalence of self-medication is high in the educated youth, despite the majority being aware of its harmful effects strict policies need to be implemented on the advertising and selling of medications without prescription to prevent this problem. Education to help students decide on the appropriateness of self-medication is required as responsible self-medication can help prevent and treat diseases that do not require medical consultation and provide a cheaper alternative for treating common illnesses. Self-medication with authentic medical information can prevent a burden on the health care system in a country like India, where health professionals are scarce.This descriptive study has demonstrated that self-practice of medication is very common among undergraduate pharmacy students of five renowned universities which was facilitated by the easy availability of drugs and information from previous prescriptions. The use of antibiotics, antidepressants, and sedatives among a small segment of students without proper follow-up or lab tests by healthcare providers may lead to serious health hazards, not only to the students themselves but also to those to whom theysuggest the medication. Therefore, it is the sole responsibility of the health care professionals and drug regulatory authorities to ensure the safe use of drugs and control the exercise of self-administration of medications by describing the total impact of the drugs on the body to the students.Self-medication practice is common among medical and non-medical undergraduate students of Siddhartha Nagar, Nepal, with a significant difference between students in prevalence, pattern, and attitude. Headache was the most common symptom leading to Self-medication, and the most frequently used drug was Paracetamol. Since self-medication is a sensitive issue, health awareness programs must be initiated

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at the national level to educate students about its merits and demerits. Our investigation showed that the majority of the populace has adequate knowledge of self-medication as evidenced by a higher percentage of respondents in this category and there was a high level of self-medication practice beforethe COVID-19 pandemic lockdown. However, there was a decrease in self-medication practices during the COVID-19 pandemic lockdown compared to the practice before the lockdown. Thiscorrelates with the reduction in the incidence of sickness during the lockdown which could have resulted from the practice of good personal hygiene as recommended and campaigned by WHO to prevent the spread of COVID-19.During the lockdown period, behaviors connected with self-medication occurred in people who had not previously exhibited them. People with higher lockdown index scores were characterized by greater fears (about their health, finances, and employment) and poorer mental well-being, and were more inclined to believe in controversial theories relating to the new coronavirus. When controlling other variables in multiple regression analysis, such people were also shown to be more likely to have children under 18 in their households and to be more religious. It is important to discuss the issue of self-medication toward the end of developing appropriate public health programs that can help people properly manage their medication at a time when the availability of doctors is still limited and threats of future lockdowns persist. The prevalence of SMA is high in countries of the Middle East and is frequently associated with inappropriate drug use. Thus, we have to understand the links between different factors promoting SMA and assess the changing trends to help us derive strategies aimed at reducing drug-related health risks among the populations of the Middle East. Educational interventions targeting both the general public and HCPs and enforcing regulations on the non-prescription use of antibiotics could help reduce the challenge of the non-prescription use of antibiotics.

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