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Project on

Literature review on Polypharmacy & It's Associated Risks

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APPROVAL

This project paper, Literature review on polypharmacy & it's associated risks, submitted to the Department of Pharmacy, Faculty of Allied Health Sciences, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of Bachelor of Pharmacy and approved as to its style and contents.

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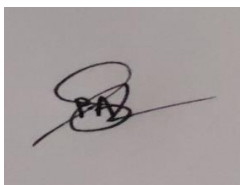
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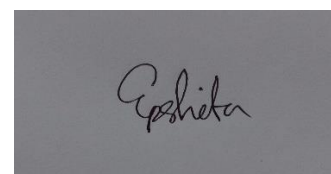
I hereby declare that this project report, “Literature review on Polypharmacy & It’s Associated Risks” is done by me under the supervision of Mr. Pollob Ahmed Shuvo, Senior Lecturer, Department of Pharmacy, Faculty of Allied Health Sciences, Daffodil International University. I am declaring that this Project is my original work. I also declare that neither this project nor any part thereof has been submitted elsewhere for the award of Bachelor or any degree.

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*The persons who always encourage me in every
sphere of my life.*

Abstract

Polypharmacy refers to the utilization of multiple drugs by an individual to address various health issues. Though it can be advantageous for some patients, it also carries certain risks. These include unfavorable drug reactions, medication interactions, and the potential for errors in medication administration. Polypharmacy can also heighten the likelihood of falls, cognitive problems, and hospitalization. For older adults who frequently suffer from multiple chronic ailments and are prescribed numerous medications, the risks associated with polypharmacy are particularly significant. Healthcare providers should be cognizant of these risks and employ appropriate strategies to minimize them while optimizing patient outcomes. Such strategies may include decreasing medication use, simplifying medication schedules, and conducting regular medication reviews. A patient-centered approach that takes into account individual preferences and objectives is critical in tackling the challenges of polypharmacy.

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Chapter: One

Introduction

1.Polypharmacy

Polypharmacy, which is defined as the routine use of at least five drugs, is prevalent in at-risk populations such as older adults and younger people and raises the risk of negative medical consequences.[1] When a person is taking several different medications at once, they are polypharmacy. This frequently occurs when a person has a number of chronic illnesses that call for long-term drug care, such as diabetes, high blood pressure, heart failure, osteoporosis, and/or symptoms like pain or insomnia. Older persons are more susceptible to polypharmacy since chronic diseases and their symptoms worsen with age.[2] One or more medications may be used to treat each ailment, which makes polypharmacy, the practice of taking many medications, frequent in the elderly population with multimorbidity.[3]The most typical definition of polypharmacy is the use of five or more regular drugs. The following categories were used to classify polypharmacy for this study:

- Non-Polypharmacy: four drugs or less
- Minor polypharmacy: using five to nine drugs
- Major-Polypharmacy: taking ten or more drugs concurrently

Clinical experts, those who create clinical guidelines, and decision-makers are all interested in polypharmacy since it is viewed as a significant and growing difficulty for contemporary clinical practice. Here, we evaluate the scope of the issue in the general adult population from an epidemiological standpoint, utilizing data from a narrative review of the literature.[4]

1.1 Risks from Polypharmacy

A known risk factor for frailty is polypharmacy. It is "the administration of more medications than are clinically necessary or appropriate, involving the use of multiple medications." [5] Approximately 8 of the 20 years of life left when a person reaches age 65 are likely to be spent using multiple medications. More than half of the remaining life expectancy will be spent using multiple medications after the age of 75. Increased prescribing rates are linked to increased risks of adverse events and potentially unsafe prescribing. According to the PRACtICE Study, 30% and 47% of patients receiving five or more and ten or more drugs, respectively, had problems with their prescriptions or monitoring over the 12-month study period. Each additional drug raised the likelihood of a mistake by 16% when other factors were taken into account. [6] Mistakes in pharmaceutical storage or administration might occur when several different prescriptions are taken at once. Clinicians may make incorrect prescriptions if they are unaware of the medications that their patients are taking. As an example, a drug could be prescribed more than once. [2]

1.2 High Risk Group

The dangers associated with polypharmacy are increased in vulnerable populations, such as older individuals and those who already have co-morbid conditions including diabetes and rheumatic disorders. Patients who are housebound or in nursing homes are likewise more likely to experience polypharmacy-related problems. A higher risk of mortality is one of the problems linked to polypharmacy, along with unfavorable clinical outcomes such renal failure and fractures from falls. Additionally, there is a financial burden on health systems as a result of outcomes like a rise in emergency

room visits and readmissions. Increased drug use was linked to more frequent acute hospitalizations in a study of rheumatoid arthritis patients; even after adjusting for age and sex, patients in the highest drug use group (10 drugs) experienced a more than three-fold increase in the rate of hospitalization. For individuals using steroids, the likelihood of admission to the hospital was even higher. Older people will make up a rising percentage of the population in industrialized nations, and this "aging" of the population will be accompanied by a corresponding rise in the number of persons with chronic diseases like hypertension, arthritis, diabetes, and heart disease.[6]

1.3 Appropriate Polypharmacy

Given that the term itself still lacks a generally agreed definition, discussing polypharmacy and the implications for pharmaceutical safety can be difficult. Despite the fact that we have described polypharmacy as the prescription of several medications, it is also frequently defined by a numerical criterion. (e.g. co-prescribing of four or five medications). The phrase might also mean two different things. For instance, the term "polypharmacy" can be used to describe the prescription of "many drugs" or "too many drugs," the former being perfectly acceptable. Polypharmacy has frequently been stigmatized and associated with ineffective pharmacological therapy or using "too many" medications. Observational studies have emphasized the connection between older people's polypharmacy and potentially improper prescribing (PIP), as well as adverse clinical outcomes that put patients' safety at risk. Observational studies have emphasized the link between older adults' polypharmacy and potentially improper prescription (PIP), as well as the adverse clinical outcomes that put patients' safety and wellbeing at risk. (e.g. ADEs, medication non-adherence). As a

result, interventions designed to enhance the appropriateness of prescribing for patients who receive polypharmacy frequently put an emphasis on lowering the number of medications administered.[7] More focus on primary prevention of diseases and improvements in healthcare for the younger ill patient[8]

Healthcare providers frequently need to adjust their behavior in order for interventions to improve clinical practice. (HCPs). For instance, a number of studies have emphasized the target behavior of HCPs implementing various evidence-based recommendations. Researchers can target causative factors that determine behavior/behavior change by adding behavior change theory into intervention development, increasing the likelihood that interventions will be successful. To employ specific strategies as part of the intervention to elicit the desired changes, this necessitates having a firm grasp of the target behavior as well as knowledge of pertinent behavior modification theories. [9]

1.4 Epidemiology

The literature contains a wide range of polypharmacy prevalence rates. Depending on the age group, definition, healthcare context, and region, it ranges from roughly 4% to about 96.5%.[10] Clinical guidelines are becoming a more important factor in physicians' treatment choices for chronic illnesses. However, rather than the comprehensive care of patients, the majority of guidelines are created with a focus on a single condition. The influence of guidelines on the expansion of polypharmacy is difficult to measure.[4] The primary source of illness and disability in Europe is chronic conditions, which also account for a sizable portion of healthcare expenses. Particularly older people are more prone to not only have chronic disorders,

but also to have several diseases that have the effect of lowering quality of life and degrading health outcomes. The issue of multi-morbidity is very common in the elderly population and creates complex care needs because each illness might affect how other concurrent disorders present themselves clinically and therapeutically. This makes pharmacological therapy difficult and increases the possibility of polypharmacy.[11] Over 170 clinical guidelines have been released by the National Institute for Health and Care Excellence in the UK, up from just three in 2004 and 21 in 2015. A study looking at the potential impact of following guidelines in a fictitious clinical circumstance concluded that this would result in a significant amount of treatment burden. There is evidence that such guidelines have a direct impact on doctors' prescribing behaviors¹⁶.^[4]

1.5 Polypharmacy and Nutritional Status in elderly people

Elderly persons are more likely to experience negative health outcomes, such as malnutrition, due to age-related changes in physical health and an increase in diseases. According to recent research, polypharmacy may encourage the development of low nutritional status, most frequently as a symptom of negative pharmacological side effects.[12]the relationship between older patients' polypharmacy and their dietary state, functional ability, and cognitive capacity.[13]Medication has the potential to negatively impact nutritional health, particularly as the number of drugs rises. Malnutrition and polypharmacy have a complicated relationship.[14] The fact that elderly individuals experience nutrition issues more frequently and are more commonly vulnerable to polypharmacy suggests that polypharmacy has an

impact on nutrition. It is well-known that roughly 65% of hospitalized patients are nutritionally worse off than their similarly aged and healthy peers. A worsening nutritional condition could have a negative impact on the healing process.[15]

Chapter: Two

Purpose of the study

2.1 Purpose of the study

- The goals of this project are to get a thorough understanding of the effect of appropriate or non-appropriate polypharmacy being researched.
- To promote the appropriate use of medication and minimize medication-related harm
- Aims at the assessment of prescribing pattern for elderly patients, since they are more prone to prescription of multiple medications. The prescription of multiple medication leads to polypharmacy, more adverse drug reactions and nonadherence to treatment.
- Identify common complications.
- to learn about the harmful aspects of polypharmacy and how to improve polypharmacy.

Chapter: Three

Methodology

3.1 Methodology

A methodological review presents a structure for various research methodologies and methods of collecting and analyzing data. This chapter focuses on the strategies utilized in the research process. A search was done using keywords such "Polypharmacy, multimorbidity, risk factor, appropriate or non-appropriate polypharmacy, invention, prescribing and behaviour change" in online search engines, academic bibliographic databases, PubMed, and Medline. There are many variables to take into account, including the study sample, the study population, the research tools, the methodology, and the data analysis. This is an overview of earlier research on "Polypharmacy". Studies on the definition of polypharmacy, invention of appropriate polypharmacy etc. Some of the information was obtained by reading research articles, while the remaining was sourced by searching the internet for relevant data. The information collected from previous research articles was coded numerically and imported.

Chapter: Four

Literature Review

4.1 Effects of Polypharmacy on adults & role of pharmacist

Most of the research said, aging patients' polypharmacy complicates treatments, raises costs, and presents a problem for healthcare organizations. Some systematic study investigates the efficiency of interventions led by pharmacists in lowering polypharmacy in the context of the changing role of the pharmacist.

4.2 Effects of Polypharmacy on children

Pediatricians are seeing an increase in the prevalence of chronic illnesses, and these illnesses are being treated with pharmaceuticals that are rising proportionately. The majority of clinical studies concentrate on the security of single drugs in adult patients. However, since juvenile patients have different pharmacokinetic processes and physical features, data from these trials are frequently extrapolated for use in those children. Concern over polypharmacy grows as research progresses and additional medications are approved for pediatric usage. The prevalence and impact of polypharmacy in this patient population are mainly unknown because pediatric kids are being diagnosed with complex illness states at higher rates and being prescribed medications for them. Most of the studies concentrate on the management of pediatric patients' polypharmacy and the opportunity for pharmacists to do so.

4.3 Reduction of Polypharmacy

Most of the studies that were chosen had a secondary goal that was frequently achieved in addition to a reduction in the number of drugs. Although the goals varied, improving the standard of prescribing for senior people was the overarching goal. Despite the small number of drugs that were removed,

these controlled investigations supported the usefulness of pharmacist interventions. The majority of research were not intended to show how cutting back on the number of medications would affect the clinical effects of polypharmacy. (nonadherence, adverse drug reactions, drug-drug interactions, increased risk of hospitalization, and medication errors). Cost savings were the most often stated result. Therefore, it was challenging to determine whether the patient had benefited from the therapies. Many of the studies that were identified had subpar methodological quality. Particularly, the study objectives were frequently vague and overly general. The term "polypharmacy" has been defined in a variety of ways, and the best definition will depend on the study's objectives and patient population.

More research is required to determine the best strategy for reducing polypharmacy, particularly in the frail senior population, and to determine the true benefits of reducing the number of medications they must take, in terms of enhanced quality of life.

4.4 Development of Polypharmacy

Major polypharmacy (>5 medicines) was found in just 4% of people according to a 1997 study. In 4 years, there was an average rise from 1.3 to 1.8 long-term drug users. Age, diabetes, coronary ischemia disorders, the initial number of medications, and the use of medications without a clear indication all predicted an increase in polypharmacy (P 0.005). There was no discernible difference between the groups with a sluggish or no growth in drug usage and the average number of ailments, notably in the elderly who showed the biggest increase[16]

Chapter: Five

Results & Discussion

5.1 Results

In this article we can identify the "many" or "too many" medicines which are inappropriate polypharmacy. Which are harmful for our health[7] A total of five or more drugs were regularly taken, according to 27% of older. Compared to older using only one or two prescriptions, 12% of elders taking five or more medications had a side effect over the past year that necessitated medical treatment. The quantity of prescription drugs was related to the frequency of visits to the emergency room, even after age and the number of chronic diseases were taken into account. Less than half of all seniors claimed that their doctor had reviewed their prescriptions and mentioned any potential side effects to them.[17]

Research has shown that polypharmacy is associated with several risks, including:

1. Increased risk of adverse drug reactions: Taking multiple medications increases the risk of adverse drug reactions, which can lead to hospitalization, disability, or death.
2. Higher risk of drug interactions: Certain medications can interact with one another, leading to reduced efficacy or increased toxicity.
3. Decreased medication adherence: Taking multiple medications can be confusing, leading to errors in dosing or administration, which can decrease medication adherence.
4. Higher healthcare costs: The use of multiple medications can increase healthcare costs, as patients may require more frequent doctor visits, lab tests, or hospitalizations.

5. Increased risk of falls: Certain medications, such as sedatives or antipsychotics, can increase the risk of falls, particularly in older adults.
6. Higher risk of cognitive impairment: Some medications, such as benzodiazepines, can cause cognitive impairment, which can impact daily functioning and increase the risk of accidents.
7. Increased risk of hospitalization: Polypharmacy has been linked to an increased risk of hospitalization, particularly in older adults.

To reduce the potential dangers associated with polypharmacy, healthcare providers should routinely assess and examine a patient's medication treatment plan, assess the likelihood of drug interactions, and include patients in the decision-making process. Patients should also receive education about their medications, including their advantages and disadvantages, and be encouraged to ask questions and notify healthcare providers of any negative effects or changes in their condition. Due to its delayed progress, some researchers have focused on developing polypharmacy. A study found that the number of long-term drug users increased by an average of 1.3 to 1.8 over the course of four years.[16]

5.2 Discussion

A higher risk of a negative health result has been associated with polypharmacy. Due to the possibility that observed symptoms are connected to the disease itself, it is difficult to determine the extent to which polypharmacy increases the risk of adverse outcomes.[18]Both patients and doctors have difficulties dealing with complex pharmaceutical regimens and ambiguous decisions. Those who frequently take medications (especially sedatives/hypnotics) without a clear indication, those who already use a

number of medications, those with a history of cardiovascular disease, diabetes, or stomach symptoms, and those who over time develop hypertension or atrial fibrillation are more likely to develop polypharmacy.[16] In addition, the use of multiple medications may result in difficulty in determining the correct dose or administering the medications, leading to a reduced adherence to the treatment regimen. This can have adverse effects on the treatment outcomes, prolong hospital stays, and lead to an increase in healthcare expenses. Additionally, certain drugs, such as sedatives and antipsychotics, may induce dizziness or drowsiness, particularly in elderly patients, increasing their susceptibility to falls. In particular for older persons, polypharmacy can raise the risk of falls and cognitive decline. This is due to the fact that some medications may result in disorientation, drowsiness, or dizziness, which can make it harder to complete daily duties and raise the risk of falling. Another considerable danger linked to polypharmacy is cognitive impairment. Certain drugs, like benzodiazepines, may induce cognitive impairment, which can result in accidents, difficulty in performing everyday activities, and an overall reduction in the quality of life. Moreover, polypharmacy has been linked to higher healthcare expenditures and hospitalization rates, especially in older adults, owing to the requirement for frequent physician visits, laboratory tests, or hospital stays. To reduce the dangers related to polypharmacy, it's crucial to collaborate with a healthcare provider to create a personalized medication plan. This could mean simplifying the medication routine, decreasing the amount of medication or the number of drugs taken, or exploring alternative treatments that are more efficient or have fewer side effects.

Chapter: Six

Conclusion

6.1 Conclusion

The term "polypharmacy" describes the use of numerous drugs by a single person to treat various illnesses or symptoms. While polypharmacy may be necessary in some circumstances, there are a number of hazards and adverse effects that can be connected with it. The possibility of drug interactions, which can happen when two or more medications interact with each other in ways that can increase or decrease their effectiveness or result in undesired side effects, is one of the main dangers connected to polypharmacy. Polypharmacy also carries the hazards of prescription errors, adverse drug reactions, cognitive decline, falls, and higher healthcare expenses. Healthcare professionals should put a priority on communication and coordination among all parties involved in a patient's care, regularly review and reassess the need for each medication, inform patients about the potential risks and benefits of their medications, and, when appropriate, take into account non-pharmacological methods of managing symptoms and conditions.

Chapter: Seven

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