Polypharmacy: The past, present and the future

"The human desire to take medicines comes with a price tag. Arising out of a restorative instinct, polypharmacy becomes itself an affliction."[1]

INTRODUCTION

Polypharmacy is a term used to define the administration of more than five drugs at a time. Such a high number of drugs are generally prescribed to elderly patients, since they suffer from a host of disorders, which have to be addressed together. A study conducted by Randall and Bruno (2006), found that the elderly account for 34% of prescription medications and 40% of over-the-counter (OTC) medications used in the United States. Steinman and co-workers (2006) conducted a study among patients 65 years and above at a veterans administration medical centre and found shocking evidence that pointed out an overwhelming 40% of those patients were taking inappropriate medications.[2]

The great alchemist Paracelsus said, *"Poison is in everything, there is nothing that is not poison. The dosage makes it either a poison or a remedy."* Drugs are harmful too unless used in the appropriate dose. Excessive use, as is done in polypharmacy, also can result in adverse effects. Geriatric patients process drugs differently than an able-bodied individual. This is mainly because of changes in the pharmacokinetic processes. Slower absorption results in increased systemic presence; the drug becomes concentrated in particular areas because of an increase in fat content and also slower circulation; the metabolism of the drug goes down due to a fall in the level of CYP450 and other enzymes along with a weakened hepatic function; and to top it all, poor renal functioning hampers the excretion of the drug.[2] All of these factors significantly elevate the effect of a drug, and with geriatrics being prescribed a multitude of medicines, adverse effects of Herculean proportions are waiting to occur.

Causes of Polypharmacy[2]

- The geriatric population suffers from multiple health conditions requiring the use of several medications.
- The patient refers several doctors but does not inform each other and fills all the prescriptions.
- The side effects of a drug are misinterpreted as symptoms of a disease and additional drugs are prescribed.
- Self medication and usage of herbal medicines without a clear understanding about the side effects.
- Meaningless prescriptions by doctors to gain revenue.

The usage of polypharmacy for various diseases has been given below: [3,4]

Advantages	Disadvantages
Prophylactic drugs counter side effects of other drugs	Higher risk of drug — drug interactions
Increased adherence due to lower side effects	Higher incidents of ADR's
Increased disease control due to multiple targets	Higher risk of non-adherence
Reduction in symptoms	Higher medication error risks
Benefit to society	Higher costs for the patient to bear

The usage of polypharmacy for various diseases has been given below:

Advisable	Unadvisable
Tuberculosis	Chronic schizophrenia[3]
Diabetes	Bipolar disorder (exceptions present)[4]
Hypertension	Crohn's disease[5]
H. Pylori eradication regimens	
HAART for AIDS	

The Way Ahead

As is evident, polypharmacy without reason could wreak havoc on the patient and the society. The need of the hour is "Intelligent Polypharmacy.'' The prescriber and administrator should be aware of the fact that multiple medications should be prescribed only when it is known that these drugs will be able to target the disease from various pathways. The benefits of these drugs should be more than the individual and combined risk of side effects.

"Polypill" was a concept proposed by Wald and Law in 2003. This pill consisted of a statin, thiazide diuretic, β-blocker, ACE inhibitor, folic acid, and aspirin. It was estimated that such a treatment could lower the risk of cardiovascular disease in the elderly by around 80%.

Some more examples like, the treatment of Tuberculosis using multiple drugs; and the medication for diabetes patients consisting of metformin and sulfonylureas can be taken into consideration.

Implementation of polypharmacy by a medical practitioner requires thorough knowledge about a particular drug and its side effects. Before prescribing, the doctor should check for existing medications and take those into account along with proper evaluation of the psychological state of the

patient. Certain drugs with a narrow therapeutic index (*e.g.* digoxin) or those known to influence the metabolism (e.g. warfarin) should be paid more attention while prescribing.

CONCLUSION

While the repercussions of misusing polypharmacy are well known, the benefits of such treatments to the needy have to be taken into account as well. The efficacy of the medication is of paramount importance to the patient, while the safety aspect takes the prime spot for health professionals. Balancing these two sides of polypharmacy is a tough job and appropriate knowledge has to be gained to avoid any harmful effects.

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