Mini Review

Pharmaceutical care and drug related problems: current implication of clinical management

Abstract

Pharmaceutical care is a practice in which the practitioner takes responsibility for a patient's drug-related needs, and is held accountable for this commitment. The long-suffering is foremost to the hobby of the pharmacist. Pharmaceutical care is substantial building block of whole someness care and should be integrated with distinctive constituents of wholeness care. Pharmaceutical cares not withstanding furnished for the direct benefit of the long-suffering and the pharmacist is accountable directly to the long-suffering of that care. According to Pharmaceutical Care Network Europe classification volume 6.2, a drug related problem is 'an event or circumstance enclosing drug therapy that actually or possibly interposes with desiderated wholeness consequences. The event could obviate or holding pattern the attainment of desiderated therapeutic intentions in long-suffering. According to Robert J.Cipolle text book of pharmaceutical care practice (3rd edition), drug related problems are classified into seven classes, based on problem associated with medication such as indication (unnecessary treatment & need for additional treatment), effectiveness (ineffective drug & dosage too low), safety (adverse drug reactions & dosage too high) and non-adherence.

Keywords: pharmaceutical care, drug related problems, clinical management

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Abbreviations: ADRs, adverse drug reaction; CPS, cognitive pharmaceutical services; DRM, drug related morbidity; DRPs, Drug-related problems; PC, pharmaceutical care; PCNE, pharmaceutical care network Europe; WHO, world health organization

Introduction

Pharmaceutical Care, delineated as "the stipulation accountable of medication therapeutic for the intention of performing determinate consequences that ameliorate patients fantabulous of life", has been applicable in multitudinous distinctive clinical parcel to manipulate and meliorate treatment consequences using a follow-up strategy.[1-3] These consequences enclose: (1) heal of an ailment (2) close out or downgrade of patients' symptomatology (3) enthralling or dillydallying of a malady procedure (4) precluding an ailment or symptom. Clinical pharmacy is a frequently accustomed hitch in pharmacy rehearse and in pharmacy literature. It is a wholesomeness firmament which delineates the hobbies and services of the clinical pharmacist to elaborate and advance the reasonable and applicable usage of medicinal output and procedures.[4,5] Pharmacists, the "drug adroit" on the outfit, support party elaborate, accomplish& observe the therapeutic regimen & furnish drug information & education services to the long-suffering and party.[6]

Pharmaceutical care encloses the procedure amid which a pharmacist work-together with a long-suffering and distinctive professionals in beguiling, equipping, and monitoring a therapeutic blueprint that will produce explicit therapeutic consequences for the long-suffering. This, in turn, encloses three substantive blowout, (1) distinguishing implicit and concrete drug-related problems (2) settle upon concrete drug-related problems, and (3) distinguishing drug-related problems.[7] The pharmacists in pharmaceutical care guarantee; the applicableness of indicated drug, the effectiveness and safety of indicated drug and the compliance of the drug to the long suffering (adherence to the drug, economical deliberation of the long-suffering), distinguish, stick-to-itiveness, and preclude DTPs, and guarantee that

the long-suffering therapeutic intention are encountered and that optimal wholeness-related consequences are scored.[8,9] The WHO and distinctive set down community pharmacists to be immaculately placed to play monumental tasks in facilitating meliorated long-suffering adherence by, amid distinctive, furnishing long-suffering with CPS that enclose the qualification of applicable wholeness-related information and consulting to advance self-care and the veracious usage of medicines.[10-13] There is bounteous attestation that pharmaceutical care and CPS have been triumphantly practiced by pharmacists over a compartmentalize of infirmity individuality and in otherness pharmacy practice settings.[14-19]

Overview of drug therapy problems

Drug therapy problem is an occurrence or circumstance including drug therapy that actually or potentially interposes with yearned health consequences. An actual DTP is an event that the long-suffering is popularly proficiency even if they are middlingly restrained, as long as a implicit DTP is an event that the long-suffering is not popularly proficiency, but is at peril of advancing due to either drug therapy prescribed or synchronic infirmity states[20,21] or DTP that are categorized as actual, if seeable afflictions are hand over the long-suffering and implicit if there is a eventuality to influence the patients in the hereafter.[22,23] Drug therapy problems appear when drug therapy problems happen in one or further of a long-suffering one or further of a patient's seeks for drug therapy are not encountered.[24] DTPs are baneful clinical events directly related to the usage of medicines and perhaps enclose beneath or overtreatment, incongruous dosing, selection of formulation, drug interactions, poor adherence, and affliction caused by adverse drug events.[25,26] Drug related problems are relatively frequent in hospitalized patients and also a considerable have to do with in wholeness care as long as of escalated cost, morbidity and mortality. The cost of drug related morbidity and mortality overpassed $177.4 billion in 2000 of total costs, followed by long-term-care admissions, which accounted for 18% ($32.8 billion).[27] Drug-related problems (DRPs) lead to substantial morbidity (1) and

mortality (2), as well as elevated health care expenditure (3), which in turn influence both patients and society.[28-30] DRM (drug related morbidity) is a phenomenon of therapeutic malfunction.

It is a delinquency of a therapeutic agents or agents contemporaneously to generate deliberated therapeutic consequences. The generalization of DRM encloses both treatment failure and production of a modern medical knot, like ADR or toxic drug effect. If DRM is not realized in time it perhaps leads to drug related mortality which is consummate catastrophe.[31-33] Delineations and classifications of DRPs differ, and modified versions of these are repeatedly used when documenting clinical interventions.[34-37]

Fountainhead of drug therapy problems[38,39]

Patient need	Drug therapy problem types
Indication	Unnecessary drug therapy
	Needs additional drug therapy
Safety	Ineffective drug
	Dosage too low
Effectiveness	Adverse drug reaction
	Dosage too high
Compliance	Noncompliance

Frequent DTPs, their causes & some instances of DRPs

Needs additional drug: this could appear when a long-suffering seeks further medication to heal their circumstances or precautionary therapy is necessitated to degrade the pitfall of advancing a new circumstances or a medical circumstances demands admixture therapy to perform synergism or additive effect.[40]

Examples: *Solely ampicillin for neonatal sepsis, **only spironolactone in ascitic patients

Intervention: *For neonatal sepsis ampicillin + gentamicin are recommended because they have bactericidal synergism effects or gentamicin interfered with bacterial lysis induced by penicillin. **For ascitic patients furosemide and spironolactone must be prescribed in 5:2 ratio to reduces risks of potassium imbalances,

Unnecessary drug therapy: No reasonable medication indication for the drug at this time or this could happen when the long-suffering has been emplaced on too multifold medications for their circumstances and the drug is candidly not obligated.[41]

Examples: *Enalapril + HCT + Propranolol for primary prevention of HTN and congestive HF. **Intervention:** *For primary (essential hypertension) life style modifications or DASH (dietary approach to stop hypertension) is recommended.

Ineffective drug therapy: The drug is not the consummate effective one for the medical challenge or when a patient is given medication that does not heal the patient's circumstances or the circumstances is contumacious to the drug product being used or the dosage form is malapropos.[42]

Examples: *Antacids for errosive GERD, **ceftriaxone for urinary tract infections.

Intervention: *For GERD histamine 2 antagonists are the first line for patients with mild to moderate symptoms and grade I-II esophagitis.

Dosage too high: The dose is too high for the long-suffering or the dosing frequency is too short or the duration of therapy is too long or a drug interaction causes a toxic reaction to the drug product or the dose was administered too rapidly & this could appear when a patient is given medication that is too strong & is causing deleterious effects or is merely not compulsory.[43]

Examples: *valproic acid + phenobarbital for epileptic patients-valproic acid inhibits the metabolism of phenobarbital, then decrease the production of enzyme and increase the drug concentration serum in the body and finally cause phenobarbital toxicity. **Digoxin with TTC leads to Digoxin toxicity due to drug-drug interaction exists-tetracyclines decrease absorption of digoxin and increase bioavailability of digoxin in patients, ***oral iron preparation for anemic + PUD patients- here antacids causes iron to form macromolecular polymer thereby reducing iron oral preparation absorption as a result of a PH elevation in stomach.

Intervention: ***Take oral iron preparation 1 hour before antacid and 2 hours after antacid

Noncompliance: This could happen when a patient chooses not to or disremember to receive a medication or the patient does not comprehend the commandment or the patient prefers not to receive the medication or drug product is too precious or the patient cannot get down or self-administer the medication seemly.[44]

Examples: *Bismuth-based quadruple therapy/Sequential therapy in H. pylori eradication therapy/proton pump inhibitors or histamine-2 antagonists + bismuth subsalicylate + metronidazole + tetracycline for H-pyloric infected patients with peptic ulcer disease.

Intervention: *Providing the patients clear, concise, and logical instructions by his/her mother tongues if applicable, giving the drug regimes and how daily s/he will take frequency instructions accordingly.

ADR: The drug product causes an unwanted reaction that is not dose-related or this could when a patient has an allergic response to a medication or safer drug is seeked as long as of patient peril factor or a drug interaction causes an unwanted reaction.[45] Examples: *Amoxicillin for penicillin allergic patients, **Insulin + Glibenclamide for uncontrolled type 2 diabetes mellitus- here Glibenclamide increase the risk of hypoglycemia or low blood sugar. ***Topiramate + valproic for epileptic patients-topiramate increases the risk of valproate-associated adverse effects (e.g. hyperammonaemia), ****Salbutamol + propranolol + theophylline for asthmatic and hyperthyroidism patients.

Intervention: ****Substitute non-selective beta blockers (propranolol) to cardioselective beta blockers (atenolol, metoprolol, esmolol)

Dosage too low: The dose is too low to produce the passionate consequence or the dosage interval is too few and far between or this could happen when a patient is given medication that is not strong enough to get advantageous or therapeutic effects & a drug interaction downgrades the quantum of active drug attainable or the duration of therapy is too short.[46]

Examples: *Ketoconazole + omeprazole + paracetamol for PUD + fungal skin disease- here omeprazole will decrease the level or effect of Ketoconazole by reducing stomach acidity. This interaction may occur when both drugs taken mouth concomitantly without time interval gap. **Amoxicillin 500mg BID for 7 days to treat ear

infections, ***500mg bid amoxicillin in proton pump inhibitors based triple therapy, proton pump inhibitors once/bid + clarithromycin 500 mg bid + amoxicillin 500mg bid for H-pyloric infected patients with peptic ulcer disease. ****Carbamazepine + valproate for epileptic patients-here carbamazepine is a potent inducer of CYP450A4 enzymes .It induces the metabolism of valproic acid and decrease the production of enzyme then metabolism of valproic acid increases and valproic acid concentration in the serum level decreases, finally cause valproic acid failurity. *****Rifampicin + oral contraceptives for TB patients who take contraceptives pills-here Rifampicin reduce plasma estrogen concentration or lowers the effectiveness by decreasing the birth control hormone levels (ethinyl estradiol and progestin).

Intervention: *Take Ketoconazole at least 2 hours before or 1 hour after taking omeprazole/ ***For H-pyloric infected patients with peptic ulcer disease in proton pump inhibitors based triple therapy, proton pump inhibitors once/bid + clarithromycin 500 mg bid + amoxicillin 1g bid.

Conclusion

Pharmaceutical care (PC), delineated as "the stipulation accountable of medication therapeutic for the intention of performing determinate consequences that ameliorate patients fantabulous of life", has been applicable in multitudinous distinctive clinical parcel to manipulate and meliorate treatment consequences using a follow-up strategy. These consequences enclose: (1) heal of an ailment (2) close out or downgrade of patients' symptomatology (3) enthralling or dillydallying of a malady procedure (4) precluding an ailment or symptom. Pharmaceutical care is a fantabulous philosophy and functioning strategy indispensable for realizing the benefits of medicine use for the individual patient and at national levels. A Drug-related problem is an event or circumstance enclosing drug therapy that actually or potentially interferes with desired health outcomes. 5 patient needs for drug therapy, (1) every drug has an appropriate indication, (2) drug therapy is effective, (3) drug therapy is safe, (4) patients can comply with drug therapy, (5) no untreated indications are present. DTPs have been categorized by different research groups into different classification systems. According to Cipolle text book of pharmaceutical care practice, there are seven categories of DTP that involve indication, effectiveness, safety and compliance.

Data sources

Sources searched include Google Scholar, Research Gate, PubMed, NCBI, NDSS, PMID, PMCID, and Cochrane database. Search terms included: Pharmaceutical Care and drug related problems.

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Conflicts of interest

Author declares that there is no conflict of interest.

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