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Patient Problem Solving and Preventive Care

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Abstract: As important members of the health care team, pharmacists work collaboratively with patient's other health care providers in all types of patient care settings ranging from community pharmacies to hospitals and long-term care facilities. Across these settings, pharmacists take specific actions that regularly contribute to improving patient safety. In addition, to training on medications, pharmacist education and training includes assessing health status of patients, providing education and counseling, managing diseases and using health care technologies. Pharmacists use this education and training to prevent medication errors, drug interactions and other adverse medication events from reaching patients. With the expanding number and complexity of medications, pharmacist's roles and responsibilities have expanded broadly beyond medication distribution. Pharmacists are providing patient care in almost all health care settings to help people of all ages get the most from the medications that are prescribed to them. Examples of pharmacist's patient care services include providing health and wellness screenings, managing chronic diseases, assisting patients with medication management, administering immunizations and working with hospitals and health systems to improve patient care and reduce the number of patients who are readmitted to the hospital following their hospital stay.

Key words: Pharmacists, healthcare, prevention, care, risk, drug, patient

INTRODUCTION

Preventive health care aims to prevent disease from occurring (primary prevention), reduce progression of disease by identifying it before it becomes symptomatic (secondary prevention) and decrease the impact of disease if it does occur (tertiary prevention). Pharmaceutical care is a straightforward concept. It involves the pharmacist working in concert with his/her patients and other healthcare providers to identify, monitor and achieve desirable health-related outcomes through the appropriate use of medications. In daily professional practice, pharmacists are faced with numerous critical choices that could potentially affect them, their patients and their staff. When faced with such choices, a pharmacist must be able to use an appropriate decision-making process to ensure that a well thought out solution is attained. Good decision makers create decision frames designed for specific problems. Framing helps simplify the problem by including some and excluding other information. Using an economic decision-making approach, the goal is to maximize cost-effectiveness with a solution that is most profitable or least costly, depending on the situation.

Background: Medications are powerful tools that if used correctly can prevent or treat disease. If used incorrectly, there is potential to cause great harm to people who take them. These unintended effects, called adverse effects can occur from any medication. As health care teams which include physicians, pharmacists and other health care providers are making decisions about using specific medications to treat an individual patient, they must weigh the potential risks against the desired benefit of each medication to minimize the chance of harm to the patient.

MATERIALS AND METHODS

The research is conducted through secondary data search from several sources from books, technical newsletters, newspapers, journals and many other sources. The present study was started from the beginning of 2018. PubMed, ALTAVISTA, Embase, Scopus, Web of Science and the Cochrane Central register of was thoroughly searched. The keywords were used to search for different publisher's journals like elsevier, springer, willey online library, wolters kluwer were extensively followed. Studies regarding steps of pharmaceutical care, identifying and monitoring drug-related problems were given priorities. Several chronic diseases and pathological conditions analyzed and added to the study. Issues regarding patient education and preventive measures were found to be similar most extent and to some extent different from continents, countries and even states. A few interesting

features of health seeking behavior, self-medication, wrong perceptions, irrational drug use and corrective measures through pharmacist's intervention were added afterwards to maintain a logical sequence. Many studies found regarding patient adherence and compliance issues of different health conditions in different countries found to be not within the scope of this study.

RESULTS AND DISCUSSION

Exhibit 1; Healthy people 2020 focus areas (Anonymous, 2010):

- Access to quality health services
- Arthritis, osteoporosis and chronic back conditions
- Cancer
- Chronic kidney disease
- Diabetes
- Disability and secondary conditions
- Health communication and health information technology
- Environmental health
- Family planning
- Food safety
- Health communication
- Heart disease and stroke
- Human immunodeficiency virus infection
- Immunization and infectious diseases
- Injury and violence prevention
- Public health infrastructure
- Medical product safety
- Mental health and mental disorders
- Nutrition and obesity
- Occupational safety and health
- Oral health
- Physical activity and fitness
- Public health infrastructure
- Respiratory diseases
- Sexually transmitted diseases
- Substance abuse
- Tobacco use
- Vision and hearing

Nine steps to pharmaceutical care:

- Develop a covenantal relationship between the pharmacist and the patient
- Collect relevant drug, disease and patient information
- Interpret this information to identify all the patient's drug-related problems
- Prioritize the patient's drug-related problems
- Identify those drug-related problems for which the pharmacist will assume responsibility
- Identify patient-specific outcomes for each drug-related problem for which the pharmacist has assumed responsibility
- Develop a therapeutic plan to attain the desired patient-specific outcomes for each drug-related problem
- Develop a monitoring plan to assess whether predetermined outcomes have been attained
- Implement and follow the pharmacy care plan which consists of desired outcomes, therapeutic plan and monitoring plan

Prevention and problem solving: The pharmacist's main responsibility is to maximize positive outcomes of drug therapy and minimize drug misadventures. Patient therapy should result in the achievement of definite outcomes that improve the patient's quality of life (Anonymous, 2018). Definite and desired outcomes that improve a patient's quality of life are:

- Cure of a disease
- Elimination, amelioration or reduction of the patient's symptoms
- Arresting or slowing the disease process
- Preventing further disease or symptoms and
- Returning the patient's physiological status to a normal healthy state

Pharmaceutical care is patient-oriented and it involves developing, implementing and monitoring a therapeutic plan that is designed to achieve these outcomes. Drug-related hospital admissions may be precipitated by a host of factors including adverse drug reactions, drug-drug interactions, drug misuse, inadequate or improper therapy and nonadherence leading to disease exacerbation or complications.

To date, numerous studies have found an increased rate of hospital admission rates secondary to medication noncompliance and adverse drug reactions. The actual number of DRPs necessitating hospital admission may be higher than reported because of lack of documentation, further underestimating the problem. Initially, collecting and interpreting relevant patient information, identifying patient health-care needs and formulating a DRP list may be challenging for the pharmacy student. These steps require that the student learn to recognize, obtain and process relevant drug, disease and patient information in a problem-solving format. Problem solving involves identifying drug-related problems, suggesting interventions and documenting patient outcomes. Each patient is unique and how one approaches each particular problem is specific for that individual patient. Problem solving is a learned and developed skill which frequently requires fine tuning over time.

Identifying drug-related problems: Both clinical pharmacists and Computerized Physician Order Entry systems with Clinical Decision Support (CPOE/CDSS) can reduce DRPs (Zaal *et al*., 2013). The type of pharmaceutical problem identified in the community pharmacy setting may differ from that reported in the hospital practice environment. The incidence of potential drug interactions and adverse drug reactions was found to be four-fold greater in the community setting when compared to the hospital setting.

Exhibit 2; Drug-related problems encountered by pharmacist monitoring:

- Untreated condition
- Improper drug selection
- Under-dose
- Failure of patient to receive drug
- Overdose
- Adverse drug reaction
- Drug-drug interaction
- Drug-food interaction
- Drug without indication
- Nonadherence
- Duplicate therapy
- Allergies
- Requiring renal or hepatic adjustments
- Miscellaneous
- Poly-pharmacy

Making recommendations: Assessing the DRP list and making therapeutic recommendations or interventions requires clinical knowledge and a strong pharmaceutical foundation. Staying abreast of clinical knowledge and continually striving for improvement will aid in the transition from student learning to application of knowledge gained during clerkship rotations and the work environment. Access to information and becoming familiar and knowledgeable of where to obtain information may help address and resolve DRPs. Reliable and validated internet resources, drug information resources, the primary medical/science literature and national guidelines may help guide the management of one's patient.

Patient education: To provide adequate patient education it is important that the patient knows the drug name, indication, dosage or strength and frequency of his/her medication (s). Focus may be placed on patients with a history of nonadherence, new prescriptions, new diagnosis, chronic diseases, potential drug-drug interactions or multiple daily medications. Restructuring pharmacist responsibilities to provide pharmaceutical care will make the opportunity to provide discharge counseling for the profession attainable in healthcare settings. Through discharge counseling, the pharmacist, along with allied healthcare team members, may help the patient make the difficult transition from the controlled hospital environment to his/her home. Most states mandate outpatient counseling and this is a wonderful encouragement, inducement and opportunity for the pharmacy student to develop this skill during the experiential component of the curriculum (McGinnis *et al*., 2013).

Specified areas of preventive care: Pharmacists have embraced the opportunity to participate in the prevention and screening of a variety of other chronic conditions such as osteoporosis, osteoarthritis, diabetes, hypercholesterolemia, hypertension, asthma, chronic obstructive pulmonary disease, sleep disorders, depression and they seem interested in becoming more involved in cancer screening (Ibrahim and Ibrahim, 2013; Odedina *et al*., 2008).

Obesity treatment/long-term behavioral modifications: According to, data collected from the United States National Health and Nutrition Examination Survey, nearly 70% of US adults are over weight or obese. Pharmacists, commonly considered one of the most trustworthy and accessible health care professionals are ideally situated to provide counseling for weight and lifestyle management (Jordan and Harmon, 2015). Well trained pharmacists to perform basic physical assessments such as weight, waist circumference, blood glucose monitoring and pharmacotherapy counseling while additional training could be easily obtained for services that would encompass dietary counseling, guidance on physical activity and behavioral counseling.

Cancer screening: By 2032, the number of new cancer cases is estimated to increase by nearly 80% in Canada (Anonymous, 2005). Patients frequently visit pharmacies for health information and have long sought advice from pharmacists regarding signs and symptoms of cancer (Lum *et al*., 1989). Between 21,000 and 40,000 deaths could be avoided with proper colorectal screening (Richards, 2009; Havlicek and Mansell, 2016). However, thousands of people still die unnecessarily every year because of a late cancer diagnosis, indicating that it is imperative that innovative ways of enhancing patient participation in these types of screening programs continue to be explored. For women 40-74 years of age who actually participate in screening every 1 and 2 years, breast cancer mortality is reduced by 40% (Seely and Alhassan, 2018). The role of the pharmacist in

cancer care is now growing with community pharmacists advocating, promoting, supporting and providing cancer related health promotion (Calis *et al*., 2004). It is estimated that in all over the worldwide about 1.4 million women are living with Cervical cancer (second most after the breast cancer) (Naz *et al*., 2018). The USPSTF recommends against routinely screening women over the age of 65 who are considered low risk as evidenced by previously negative pap smears due to increased risks of potential harms and invasive testing compared to a low perceived benefit (Grade D recommendation) while the American Cancer Society recommends screening until age 70.

Diabetes and CVD prevention: According to the WHO, at least 2.8% of the population worldwide suffer from diabetes. Considering the increasing rate of type 2 diabetes it is understood that by the 2030 the prevalence of diabetes mellitus will be double (Lambert and Bingley, 2002). Community pharmacists are ideally placed to support in the screening, education and referral of individuals at risk of diabetes. Patients with various symptoms contact community pharmacists and when indicated, pharmacists refer patients to medical practitioners for further management (Jaber *et al*., 1996). About 18 million people die each year from CVDs, an estimated 31% of all deaths worldwide (WHO., 2017). Of these deaths, 85% are due to heart attack and stroke. Over three quarters of CVD deaths take place in low and middle-income countries (WHO Web, 2017). In addition, to medication dispensing, the pharmacist can provide more direct interventions (e.g., medication education and disease management) as a support to the physician's action in order to improve medication adherence to achieve the goals of desired therapeutic outcomes and to improve safe medication use and humanistic control (Swieczkowski *et al*., 2016).

Hormone replacement therapy: Hormone Replacement Therapy (HRT) is supplementing women with hormones that are lost during the menopausal transition. To relieve the symptoms associated with menopause, conventional HRT includes an estrogen and progesterone component to mimic hormones created by the human ovary (Harper-Harrison and Shanahan, 2018). It is imperative for healthcare providers to improve the quality of lives by reducing bothersome menopausal symptoms and preventing disorders such as osteoporosis, atherosclerosis and coronary heart disease, dyslipidemia and so on. The lower incidence of CHD in premenopausal women is attributed to the favorable effect of estrogen on the lining of the blood vessels, the end othelium (Felty, 2006; Chen *et al*., 1996). Women with metabolic syndrome have 6 times increased risk of developing CHD and the underlying pathophysiology could be related to insulin resistance or central obesity (Wilson *et al*., 1999). The risk of sustaining a fracture in a postmenopausal woman is almost twice the lifetime probability of developing breast cancer for a woman (Ho-Pham *et al*., 2009). Since, DHEA is available OTC, pharmacists can provide education on symptoms and replacement therapy to women interested in purchasing this product. In addition, to providing therapy-optimization recommendations and patient counseling to ensure safe and effective HRT use, pharmacists are also being asked by third-party insurance plans to discourage the initiation of or discontinue the use of high-risk medications such as estradiol when performing medication therapy management. The pharmacist should review the patient's profile and discuss the risks and benefits of starting or continuing therapy. If the patient wants to discontinue the hormone therapy, possible options for symptom control include local estrogen (e.g., Estring or Premarin Vaginal Cream) for vaginal symptoms; Venlafaxine, fluoxetine, sertraline or paroxetine for vasomotor symptoms and alendronate, calcium plus vitamin D or raloxifene for osteoporosis prevention.

Pharmacists intervention in preventing osteoporosis: Osteoporosis is a worldwide concern, causing more than 8.9 million fractures per year. Approximately 10 million men and women in the US have osteoporosis. In 2015, direct medical costs totaled $637.5 million for fatal fall injuries and $31.3 billion for nonfatal fall injuries. By 2025, the cost of fractures in the United States is expected to exceed $25 billion each year to treat more than 3 million predicted fractures (Tu *et al*., 2018) 25% patients discontinue treatment because they feared potential side effects, don't like taking medicine, drug type, cost, dosing regimen, provider follow-up, the asymptomatic nature of the disease or felt that the medication would not help their condition (Hall *et al*., 2017). Current estimates suggest that approximately 50-70% of the patients discontinue their osteoporosis medications within the 1st year of initiation. Establishing programs such as the MeMo program where the intervention was directed towards the pharmacists or FLS programs where the interventions included care coordination for patients with fragility fractures is attractive because these interventions were successful in non-RCTs (Jaleel*et al*., 2018).

Preventive counselling depression and stress management: Stress is one of the world's largest health problems, leading to exhaustion, burnout, anxiety, a weak immune system or even organ damage. Stress-induced

work absenteeism costs about 20 billion Euros per year in Germany (Martin *et al*., 2018), £8.4 billion in UK (Wedgwood, 2018) and $500 billion in USA (Cook, 2017). According to, the World Health Organization (WHO) data, depression is expected to become the second leading cause of disability or early death by 2020 (Kessler and Bromet, 2013). In high-income countries, up to 15% of people experience at least one major depressive episode in their life, women in the Western world are affected twice as often as men. Over 60% of Americans continue medication for 2 years or more and 14% continues medication for 10 years or more (Molenaar *et al*., 2018). The economic burden of mental illness in Canada is estimated at $51 billion per year (Chesney *et al*., 2014). As for the cost, the global cost of mental health conditions in 2010 was estimated at US$2.5 trillion and it will reach US$6.0 trillion by 2030 (Chen *et al*., 2017). Suicide was the 10th leading cause of death in 2015 in the world (Harms *et al*., 2017). PCMHI team's function to improve access and quality of integrative physical and mental health. Treatments are available for MH disorders; However, numerous barriers exist that prevent access to high-quality care. Many patients present with various symptoms such as insomnia, fatigue or chest pain which can be easily misdiagnosed. Clinical pharmacists play an integral role in improvement of patient outcomes and they should be required members of all PCMHI teams.

Responsible sexual behavior: Unintended pregnancies and STDs including infection with the human immunodeficiency virus that causes AIDS can result from unprotected sexual behaviors. Abstinence is the only method of complete protection. If used correctly and consistently, condoms can help preventboth unintended pregnancy and STDs. The concept of responsible sexual behavior is not clearly defined as it applies to adult women who have sex with men. Responsible sexual behavior is a socially desirable and deliberate pattern of behaviors used to promote sexual health, manage risk and foster respect for sexual partners within the context of community influences (Loew *et al*., 2018). Sexual education and health promotion should take place before sexual activity is initiated (Miranda *et al*., 2018). CSB also known as sex addiction, hypersexuality, excessive sexuality or problematic sexual behavior is characterized by repetitive and intense preoccupations with sexual fantasies, urges and behaviors that are distressing to the individual and result in psychosocial impairment. Compulsive sexual behavior can generally be divided into 2 categories: Paraphilic (fetishism, exhibitionism and pedophilia) and nonparaphilic (acts with multiple partners, masturbation, compulsive use of pornography and compulsive sex and sexual acts within a consensual relationship) (Derbyshire and Grant, 2015). However, the prevalence of STDs is a global health concern, there are currently >30 microorganisms including bacteria, viruses and parasites that are transmissible through vaginal, anal or oral sex or genital skin to skin contact and more than 1 million curable STIs acquired worldwide every day. Health care providers should be knowledgeable about the symptoms and signs of acute retroviral syndrome, characterized by fever, malaise, lymphadenopathy and skin rash. Pharmacists are well-positioned to provide STI screening services like APT but further investigations are needed to overcome financial, safety and confidentiality barriers (Wood and Gudka, 2018). Key barriers for APT included prescriber's legal responsibility and potential for medication-related adverse effects. A study on patient perceptions of STD screening and treatment provided by a pharmacist in an urban free health clinic shows overwhelming support of a pharmacist 80%, patient comfort with pharmacists in urine screen and treating STIs more than 95%. Patients also approved of pharmacists working under a collaborative practice agreement with a physician nearly 100% (Deppe *et al*., 2013).

Counseling about smoking, substance abuse, nutrition and oral hygiene: Collaborative practice agreements and new federal policies set the stage for pharmacists to assist in the clinical management of opioid and other drug dependencies. Pharmacists are now engaged in research and management of the pharmacological and behavioral risks of drug abuse, supports the clinical impression that drug dependence is associated with long-lasting neurochemical changes and demonstrates effective pharmacological treatments for certain kinds of drug dependencies. According to the World Health Organization (WHO), India is home to 12% of the world's smokers. Also 20% Americans are smoker. More than 1 million die each year due to tobacco in India. According to a 2002 WHO estimate, 30% of adult males in India smoke. However, pharmacists experience significant barriers to providing counseling including limited time, reimbursement and training in counseling techniques (Bock *et al*., 2010).

Counselling patients during hospital discharge: The 30-70% of medication-related hospital admissions in the United States are due to medication nonadherence with a result in cost of approximately $100 billion per year. Hospitalization and subsequent discharge home often involve discontinuity of care, multiple changes in medication regimens and inadequate patient education regarding the instruction of drug use, respiratory devices and disease information and also lack of information about the drug's side effects that can lead to medication nonadherence and low level of treatment satisfaction.

Counseling patients at the time of discharge and regular follow-up improves patient's medication adherence and treatment satisfaction and consequently improves clinical outcomes (Sanii *et al*., 2016).

CONCLUSION

Preventive care is a challenge that should be undertaken by health care providers in all practice settings. Pharmacists should "seize the moment" to educate and counsel patients regarding these various topics when the opportunities arise. Throughout this chapter, disease screening guidelines have been discussed. Several medications have evidence to their usefulness for chemoprevention of various diseases. Opportunities for pharmacists to help bring about awareness of recommendations and risk factors for the development of disease and educate patients as to the benefits of prevention, occur daily. It is important for the pharmacists on the "front line" to have a general understanding of current recommendations for screening and disease prevention, so that, they can provide appropriate counseling and care for their patients.

ABBREVIATIONS

- Accelerated Partner Therapy (APT)
- Drug Related Problems (DRPs)
- Computerized Physician Order Entry (CPOE)
- Clinical Decision Support Systems (CDSS)
- Compulsive Sexual Behavior (CSB)
- Centers for Disease Control and Prevention (CDC)
- Dehydroepiandrosterone (DHEA)
- Fracture Liaison service (FLS)
- Healthcare Establishments (HCEs)
- Hormone Replacement Therapy (HRT)
- Medication Monitoring and Optimization (MeMO) program
- Mental Health (MH)
- Patient Relationship Management (PRM)
- Primary Care Mental Health Integration (PCMHI)
- Randomized Controlled Clinical Trials (RCTs)
- Sexually Transmitted Diseases (STDs)
- US Preventive Services Task Force (USPSTF)

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